THE TRIBUNE BOOK

OF

OPEN-AIR SPORTS

PREPARED BY

THE NEW YORK TRIBUNE

WITH THE AID OF

ACKNOWLEDGED EXPERTS

EDITED BY HENRY HALL

NEW YORK
THE TRIBUNE ASSOCIATION

1887

This Book is Printed Without Type, being the First Product in Book Form of the Mergenthaler Machine which wholly Supersedes the Use of Movable Type.

PREFACE.

During the Summer of 1886 THE TRIBUNE was compelled to devote more than 500 columns of its valuable space to the Open-Air Sports of the United States, assigning to the collection and presentation of this class of news many of the best observers and writers in its service. Nothing can indicate more clearly than this the place which athletic amusements have taken in this country.

Open-Air Sports have, in fact, within the last few years achieved a wholly new and unprecedented popularity among our people. Twenty years ago a game of baseball or a yacht race seldom attracted any other witnesses than the personal friends of the contestants; whereas, in 1886, we have seen from 10,000 to 15,000 spectators assembled to witness a single game of baseball, and more than 30,000 people congregated at a yacht race. Henceforward every newspaper which is in accord with the spirit of the times must assign an important place in its columns to Open-Air Sports.

Out-door diversions have grown into favor so rapidly that there is a notable lack of precise, comprehensive and permanently recorded information concerning them. To obtain trustworthy data on any branch of athletics the novice has hitherto been compelled either to join an athletic club or buy a costly treatise; to acquaint himself with the whole field of open-air amusements he has found it necessary to purchase a library. A thorough resumè of the history, rules and records of every sport, with suggestions to beginners, all brought within the compass of a single volume and sold at a reasonable price, is imperatively demanded. THE TRIBUNE has made an effort to supply this popular want.

CONTENTS.

WHY WE WANT TO BE STRONG.

BY WILLIAM BLAIKIE, OF NEW-YORK, AUTHOR OF "HOW TO GET STRONG."

ALL persons like to be strong. They may not stop to think of it; but take away their strength, even for a day, and they will do almost anything to get it back. The being equal to what one has to do—the having the body do its work so well that we forget that we have a body—these are among the best things in life. Yet no intelligent nation does so little to give their children sound, strong bodies as we Americans. To train and inform their minds, to give them good characters, we gladly spend hundreds of millions of dollars. To give them sturdy, enduring bodies, we do almost nothing at all. We do not teach them work or play which will bring them this strength; indeed, most of us do not know how to. Such work as necessity imposes, such play as the child himself chooses, no matter how partial or uneven the development they bring—these are about all the bodily training which is ever had by ninety-nine children out of every hundred. Most city children do no work, and the greater part of their play is too light and trifling ever to bring them enduring vigor.

The baseball and other games described in the daily newspapers are the work of men, not boys, and of men who least need athletic exercise. The girls are even worse off than the boys. Who ever heard of a girls' baseball club? Or a girls' athletic ground? Indeed there is not one girl in a dozen, taking in the whole land, who can walk two miles in half an hour without being the worse for it. In fact, most of them cannot do it at all. To run, they simply do not know how. Fleet-footed Atalanta's fame is almost as fresh to-day as when she lost the race on account of the golden apples; and so many swift yachts are named for her that it is hard to keep the run of them. It is doubtful if ever an exercise was devised which will do as much to give a girl a graceful carriage, vigorous lungs, and shapely limbs, as running. If every city girl over twelve, for instance, had a pleasant place for running, and should average even one mile of it a day—not at the wondrous British pedestrian George's pace of 4 minutes 12 3-4 seconds, but even at an eight-minute gait—she would be astonished, and her parents would be delighted, to find how little the doctor would have to do in her case.

Plato, Aristotle, and the great teachers of Greece and Rome, well knowing its importance, educated the body as carefully as the mind. In the present day, at Amherst, Cornell and Harvard they are awake, and they are waking up at Yale and Columbia, Nassau and Wellesley, At West Point, the military academy is ahead of them all, and the instructors there will point out to you records showing an increase of over two inches in girth of arms, and even more of chest in a year, and that not of one pupil, but of everyone in the class. The value of this increase is hardly to be overestimated. Dr. Morgan in his English "University Oars," says: "An addition of three inches to the circumference of the chest implies that the lungs, instead of containing 250 cubic inches of air, as they did before their functional activity was exalted, are now capable of receiving 300 within their cells." * * * And that, in an attack of pneumonia or pleurisy, it may at once be seen that in such an emergency "these additional fifty inches will amply suffice to turn the scale on the side of recovery. It assists a patient successfully to tide over the critical stage of his disease."

Yet what do we do in New-York or Philadelphia, in Chicago or Boston, to give our children this priceless boon of strength and health? If your Board of Education in New-York City would look into this matter, find any rational and effective system of daily exercise for every scholar, substitute it for any of the less important studies, and let the teachers teach it, side by side with the mental training, they would soon find that, instead of a whole half of the 250,000 pupils on our list being absent most of the year, many of them from sickness, they would have such an attendance as was never before known, and such health as well.

Training the mind is far more tedious and difficult than educating the body. It takes six hours a day for from eight to ten whole years to give a child its mental training in the schools. On the other hand, one hour a day during that time, under a teacher who understood his or her work, would have given the pupil a clear idea of how to get strong and healthy, and would have started him off on his life's work with a good outfit of vital and muscular strength, which a very little daily care would keep for him through all his after life. There is not much sense in making the light in the lighthouse dazzlingly bright when the structure itself is so flimsy, that the first attack tumbles it all to pieces.

The ordinary life of most of the successful men of to-day is one of overwork, and of unavoidable strain and worry. The annual summer army bound to Europe for repairs; the daily deaths from Bright's disease and heart trouble; the Ortons, and Woerishoffers, and Osborns; the ever-spreading nervous exhaustion so familiar to all, too well attest this. It is a significant fact that the great operators of the stock market, the men of comprehensive grasp and large and sustained success, have been, almost to a man, country bred. By chance (though oftener from necessity) they laid in vigor by years of active out-door training. From Washington to Webster, from Benton to Grant, the great workers of this country have nearly always been men of exceptionally tough, enduring bodies. Franklin was as thickset a man for his height as John L. Sullivan, and an excellent swimmer, and a good long-distance walker.

The professional man even more than the merchant or manufacturer needs great bodily vigor. David Dudley Field says that the three chief elements of success at the Bar are brains, attention, and vitality. President Eliot, of Harvard University, who has for many years been peculiarly well placed to judge, says: "To attain success and length of service in any of the learned professions, including that of teaching, a vigorous body is well-nigh essential. A busy lawyer, editor, minister, physician, or teacher has need of greater physical endurance than a farmer, trader, manufacturer, or mechanic. All professional biography teaches that to win lasting distinction in sedentary, indoor occupations, which task the brain and the nervous system, extraordinary toughness of body must accompany extraordinary mental powers."

But, shall every man go in for the sixteen-and-a-half-inch arm of a Sullivan? Of every woman for walking 2,700 quarter miles in as many quarter hours with Madame Anderson? Are Hercules and the fishwomen the best specimens the race has yet produced? Not at all. An idea is prevalent in this country—surprisingly so for a people as intelligent as ours—that exercise always means nothing less than the extreme effort of the racer, agonizing to vanquish his antagonist. There are men in Rhode Island who can each eat a bushel of clams at one sitting. Yet it would hardly do to urge most persons to try the same thing. Eating in moderation is essential to life. Gorging is destructive of it. Because it would pay us all to be strong is no reason why we should have excessive muscular power and little else. Somewhere between the limp body and limbs of the helpless invalid, languishing on a sick bed, and the brawny gladiator of the arena, rejoicing in his might—somewhere between these two extremes lies the strength which all men—and all women, too—want. They want enough to give each a fairly developed body. And they want it for many reasons.

The body is full of organs, most of them vital. Impair the working of any one of these, or, worse yet, let it get so far out of order as to itself degenerate, and the whole man is unfit for work. He is sick. His effectiveness in any line is at once crippled St. Paul says if "one member suffer, all the members suffer with it." Or, as Emerson puts it, "sickness is poor-spirited, and cannot serve any one: it must husband its resources to live." Placed where every one must devote his best energies to his calling to succeed, often with others dependent solely on his efforts, he must stop his work, no matter how pressing, and divert such remnants of energy as he has left to trying to win back health and strength, and so to save his life. But had his body been first trained till it was fairly developed, and then exercised enough daily to keep it so, and had he known and followed the really simple rules for its care, he would know little or nothing of sickness, and would stand good chance, barring war, exposure, or accident, of living to a ripe old age. Everyone can use his muscles; and their judicious use at once tells on the vital organs themselves. Develop the muscles of your arms and shoulders, and your chest expands. The lungs, having now more room for their work, themselves become ample. And not the lungs alone. The heart is no longer cramped for space, and the other vital organs not only have more room to work in, but the deep breathing such development has caused brings with it a healthy activity in all these other organs. Dyspepsia emigrates, and the stomach digests. The liver, before balky, attends to its work now as if it was a partner in the concern. The kidneys are up to all they are asked to do—and they are asked to do a good deal in this iced water, etc., drinking nation. The bowels are no longer constipated; a vigorous tone is imparted to the whole machinery.

No part of the body feels the improvement more than the nerves. We Americans, city folks at least, give the nerves a terrible ordeal. First we do little or nothing to develop the body in youth. Then we keep the head and nerves on the stretch six hours a day. Then, at fourteen or fifteen, when the body is growing fast, and great care should be taken to make it both grow and develop well, we put the young man with that body, always partially and often wholly untrained, into a store, or bank, or telegraph office, where the head must be kept on the stretch ten hours a day. If the young man pulls through to manhood the ten hours never shorten, and the strain on mind and nerves steadily intensifies. Every spur to enterprise is held out. The youth sees that work brings more money, and he works with all his might. The brighter he is, the more doors to wealth are there open. The late Dr. Willard Parker said six hours a day are enough for mental work for any one, and, under almost no circumstances should a man allow himself to do over eight. But our youth knows nothing of this. He puts in the hours right along, and often, instead of stopping at six o'clock, he has to stay on till seven, eight, nine, and even later. Is it odd that he is tired at night? And after supper, what? As his body has been forgotten all day, will he now let it have its turn, and build it up sound and strong to stand this protracted brain and nerve strain? He will do nothing of the sort. Indeed, often, he does not know that such a thing is possible. But for two or three hours more, with cards and music, talk and public entertainments, some diversion which is always only mental or emotional, he finishes up the day, often in air which, instead of being pure and fresh, has been breathed over and over by hundreds of human beings, and is sometimes thick with smoke, and even redolent of beer besides. The examining surgeons will not to-day let a youth into the Navy, if he smokes cigarettes, so swiftly and surely do they injure the heart's action. Yet billions of these cigarettes are smoked all the same, and the young man we are considering always has his pack. He gets to bed along by twelve or later. He has sometime heard that you ought to sleep eight hours, and in winter even nine. But his friend boasts that six are enough for him, and he contents himself with that, or less. If he wakes up not rested; if he has little or no color; if he wonders why his body does not fill out and develop; and why he often feels tired and languid and must take something "to pull him together," he never stops to think that he is not only drawing on his principal every day, but that he will stand excellent chance of being a broken-down man at fifty, or before it. His doctor could have told him so all along. If he had gone out for a few days with his sinewy cousins in the country, and tried "a wrastle" with one of them, he would have quickly found that his body was a pretty slim affair; and that there are a good many things some city boys cannot do. And in middle age, and later on, the loss of these several thousand hours of sleep, with this ceaseless brain strain, begins to tell, and brings him some things he did not before know, and wishes he did not know—a tired feeling in the back of his head, and in the small of his back, and a habit of lying awake an hour or so along in the middle of the night—short as his night may be—perhaps with a sharp touch of neuralgia itself now and then besides.

And what is the way out of all this thing, which is undermining his strength so silently, yet so surely, taking away much of the power of enjoying life, and usually shortening life itself? Fortunately it is very simple. Professor Maclaren, of Oxford University, says the antidote is to be found in physical action. Exercise not only increases the size and power of the voluntary muscles, and the functional capacity of the involuntary, but it promotes the health and strength of the whole body by increasing respiration and quickening the circulation. And it does more. It brings bodily warmth and refreshing sleep. It moistens the skin, doing so much for its health, purity, and beauty that it is the best known cosmetic. It adds materially to woman's charms and greatly to her effectiveness, and the ease and safety with which she performs the great functions of her life. The ancient Greeks cultivated it because it brought personal courage, presence of mind, and decision. It gives activity, buoyant spirits, a sunny temper, and stamina for enduring protracted fatigue.

Three months ago young George Coe, two days before a half-mile race he was ready to run, grappled unarmed with a burglar, was shot in the forehead, had his collar-bone shot in two, and a bullet clear through his liver and right kidney; yet he pummelled the burglar till he left him for dead; and to-day is back at his bank at work stouter than he ever was in his life. Did not his strength and good condition do him a grand turn at a crisis which few men could have passed?

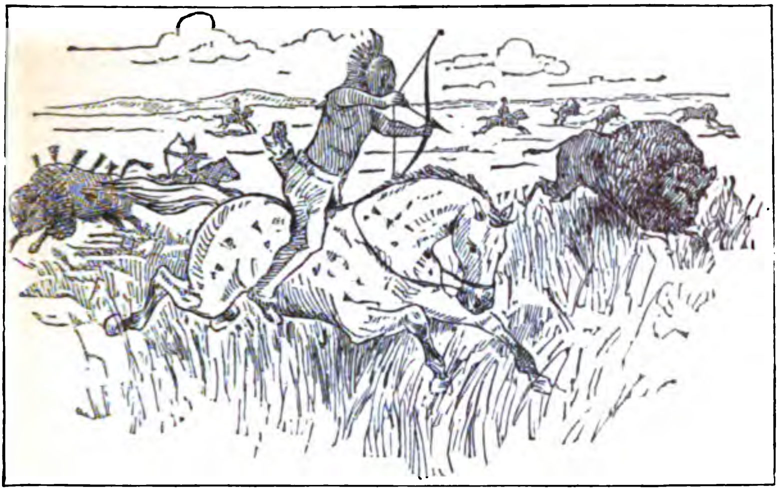
A German physician, of extensive practice in New-York, says that we Americans keep our nervous systems so highly wrought up, that while we can stand the ordinary wear and strain fairly, the minute a blow comes, a heavy business reverse, the loss of dear ones, or any other of the ills all men have to face, the shock is too great, and we break. But would we break, had we the good strength which Gladstone's lusty axe and low-heeled walking-shoes so well preserve for him?

Gifted intellects have occasionally done brilliant work with feeble bodies. But for great and sustained effort you want good sturdy strength, a body which sends up good blood to the hard-worked brain, and not an inferior article. For only with such a body, can the mind attain its utmost strength and vigor. Cut the boy off from ample play and his mind soon loses tone. And the man's does precisely the same thing.

Emerson well commends the good nature of strength and courage.

Tissot says that courage and gloom depend largely on the bodily condition; that exercise and strength bring firmness in prosperity or adversity, generosity in succor, patience and exertion in need, reflection in the business of life, and a wise confidence in our prowess which keep us from crying for help or despairing at trifles, and which must be at the bottom of every great enterprise—in short, the very qualities which show forth so prominent in the great man who rests peacefully at Riverside.

We might enter here into how to get this good strength in our large cities; how the members of a Stock Exchange, for instance, could add a story to their building and there have as charming a gymnasium as that of the New-York Athletic Club, and when these little differences between members of which we hear so much in the papers, and which give the Governing Committee so much to do, are to be adjusted, how the larger member of the two could just point upward in a way sure to be understood. But this paper is already too long.



ARCHERY, OLD AND NEW.

BY MAURICE THOMPSON, CRAWFORDSVILLE, INDIANA.

THE bow and arrows are frequently mentioned in the Bible, and in most of the oldest monuments of literature, in such a way that, had we no other evidence, we should be justified in assuming that the practice of archery comes down from the most ancient times, and that the archer's weapons were invented before any other effective engine of war or the chase; but we are not without other basis for such a conclusion. The testimony gathered by archæologists amounts to indisputable evidence that archery was an art, far advanced during the Stone Age. The mound-builders of America—the cave-dwellers of Europe and the earliest races of Asia have left their arrow-heads, to tell of their prowess with the bow. Indeed, from the peat-bogs of the far North to the wildest regions of the South, explorers have found relics of archer-craft belonging to a time far antedating any period of written history. Before the invention of letters, the bow was inscribed upon stone as the exponent of a force in human economy, and the value set upon it as a weapon was attested by the universality of its use.

A volume might be written filled with interesting evidence tending to show that during the Stone Age the art of archery was known all over the world; and that in America, Asia, Africa and Europe men had reached the same stage of proficiency in it. For example, the stone arrow-points found in the caves and bogs of Europe and in the laterite of India and the inscriptions found in Africa all speak of a close relation in form and material governing the manufacture of missiles for the bow.

One is tempted to assert that, from an examination of arrow-heads alone, the shrewd observer might be able to trace the slow progress of the science of projectiles toward the present state of development. The ancient broad, flat, triangular stone point was of the poorest shape possible for a long and accurate flight; the modern round, truncated point is the best possible for insuring a low and steady trajectory. Between these extremes of form are the slow steps of human experiment throughout unnumbered ages. Probably in earliest times, wild game and animals of the chase were so plentiful and so easy to approach that the chief aim of the arrow-maker was to shape the missile for producing the greatest possible wound without any special reference to compassing a long range of flight. Many of the wild beasts, existing at the time of the Stone-age men, were of enormous size and strength, demanding a heavy and tearing missile to bring them to death. Here in America, the mound-builders had the mastodon, the mammoth, the giant beaver, enormous bears, wolves and tigers, and probably other dangerous beasts to encounter, which are now, and for many centuries have been, extinct. Hence their arrow-points were often two inches broad and from four to seven inches long. I have in my possession a flint point, beautifully modelled, three and a half inches long by two inches broad, which was found imbedded with the skeleton of an ancient elephant in a bog in Indiana. I have made a fairly accurate calculation showing that a bow having the power to throw a thirty-inch arrow bearing such a point a distance of 150 yards with an elevation of forty-five degrees would require a drawing force of 120 pounds, which would be beyond the strength of any man now living.

From all the facts I have been able to collect and compare, I conclude that the pre-historic archer was a short-range sportsman and warrior. He went in for "weight of metal," rather than for effective long-flight missiles. With him, the study of range and trajectory was a slow process. Even the savages of to-day are very inferior archers at long range. The ancient Egyptians probably were excellent bowmen, as some of the old drawings give fairly good proportions to the bows and arrows represented, and show a knowledge of the fundamental rules of shooting. The Scythians, the Parthians and other ancient peoples were expert archers, as were also many tribes against which the early civilization of the Greeks had a fierce struggle. As history began to be recorded, the bow took its place as one of the symbols of war; and it entered literature to become a permanent figure in poetry and romance, a figure as practical and as universally understood as it was picturesque and decorative. It was claimed that the twang of its string suggested the first musical instrument.

So much for pre-historic archery. Now for the ancient.

The Greeks, matchless masters of the beautiful in art, saw in the bow of the savage a rude sketch, of which they made the most. Hogarth's line of beauty was a Greek bow slightly modified. This was not the best form for the weapon, but in the days of Grecian glory what was utility as compared with an expression of a lovely thought? The yew-tree grew to perfection in all the East, but horn was so transparent and so ready to show fine effect in modelling, that, though not half so good for bows, it was used to the entire neglect of the sturdy wood which in the hands of the Norman and the Englishman long afterward turned the tide of battles and changed the face of the world. Indeed, the Greek bow was the bow idealized, at first; and at last, it was the bow conventionalized. Its string began to twang in the verses of the poets with quite as much effect as upon the battlefield, we might almost say; and it became the weapon of gods and goddesses, like Apollo and Diana, and of matchless heroes who wandered over earth. The Romans took archery, as they did the rest of the arts, from the Greeks, but the Romans were hand-to-hand fighters and lovers of heavy weapons. Hence the bow and arrow were never very popular with them. They preferred the javelin, an arrow flung by the hand, to the archer's missile. Virgil, however, and some of the lesser Roman poets recognized the value of the decorative effect of archery, and used it to good purpose in both epic and lyric verse. He is not an archer who fails to feel the fine force of Virgil's description of the archery contest in the fifth book of the Æneid. My blood tingles as I think of Eurytion's wing-shot after Mnestheus had struck the bird loose from the mast-top.

The Parthians, like our Comanches, were cavalry archers; and their backward-sent arrows were dreaded by their foes. A "Parthian shaft" became a lasting figure of speech. Indeed, many fine phrases full of suggestion may be culled from ancient literature, showing how archery has enriched the languages from which ours is largely derived. Homer was master of such phrasing. Some of the old Persian poets, too, drew upon the bow and arrows for many a brilliant simile. Space forbids any details here, but archery runs through ancient history, poetry and romance like a thread of gold.

MEDIÆVAL ARCHERY.

About the time that the whole world was darkest, when the light of Christianity was flickering in the caves of the rocks and learning was in the keeping of a few hermits, the bow was being perfected. The men of the highlands of Normandy appear to have made the most of the weapon, for it was the Norman long-bow that wrought the conquest of England, and afterward, in English hands, darkened the air with whizzing shafts on many of the most sanguinary battlefields of Europe.

An old archer styling himself King Modus wrote a curious little book, probably early in the fourteenth century, in which he quaintly describes hunting deer and small game with the bow. About two centuries later the English writer, Roger Ascham, put forth his Toxophilus, a really fine treatise upon the old style of archery practice.

It was the Battle of Hastings that taught the greatest of all archery lessons. When William the Conqueror marshalled his bowmen and marched to Senlac Hill where Harold's army lay, the first cord that rang was prophetic of England's glory. Harold himself was killed upon the field. He fell with two arrows driven through his head.

Thus planted in England and watered by the best blood of the land, archery grew to its grandest proportions on the soil where at present it lives only as a charming sport. When William had fixed himself firmly in his new dominion he had also planted archery there, and thenceforward to the time when gunpowder drove the long-bow from the field of war, the English archers swept the world, so to speak, with their cloth-yard arrows. A list of the battles they won would include nearly every victory of English soldiers for three centuries or more. They were dreaded by all other nations as much as they were relied upon by their own. In the wars with Scotland and with continental nations the English bowmen did frightful execution even at long range. At Bannockburn, Flodden Field, Neville's Cross and Poictiers, and many a lesser fight, the hail of armor-piercing arrows made havoc equalled only by that of our bloodiest recent battles where the most

An Ancient Archer.

effective firearms were used by the best drilled and most intelligent soldiers that ever went to war.

In France, archery never flourished greatly, though the bow was well known to Frenchmen from the earliest historic times. True, as in Spain, the cross-bow, or arbalist, was much affected, but this hybrid weapon never has been free from a touch of condemnation, and its use has always been as if under protest (laws were made against it in England, whilst every effort was put forth by the crown to induce enthusiasm in the use of the long bow). Still French literature has felt the effect of archery, which we may trace from the fourteenth century down to the present time. The biographer of Francis Villon notes the fact that that inspired young scamp was given to consorting with archers of the watch and poultry thieves. In the songs of the South of France there is nearly as strong a bow-flavor as there is perfume of the rose.

The story of Jourdan, the archer who killed Richard the Lion-hearted, is one of the most striking and pathetic in all romance. Richard himself was a master-bowman and did not hesitate to use a cross-bow when he liked.

Queen Elizabeth was an accomplished archer, often going to the chase and insisting upon having the first shot at the deer.

Then there is always Robin Hood, mythical and real, the hero of the bow, with his garland of ballads (quite as much a saint as St. Sebastian himself in the eyes of all good archers) tramping through Sherwood Forest attended by his fivescore outlaws and shooting his arrows a mile at need! His story is the finest legend in any tongue.

William Tell comes next with his patriotism and his archery to wipe from our memory the story of cruel Cambyses and the Macrobian bow, rendered so touchingly and yet so heroically by the late Paul Hayne.

But it would be a day's work to catalogue the stories and legends, the historic incidents and the bits of romance gilded by archery. Homer and Shakespeare lead, the lesser bards sing after, and the bow never twangs without adding a touch of picturesqueness to the music that they make.

MODERN ARCHERY.

Archery in war came to an end when the missiles of firearms at last surpassed those of the bow in range and penetration. The bows that had won the battles of Agincourt, Homildon, Shrewsbury, Flodden, Cressy, Poictiers and many more, were taken from the yeomen and muskets were placed in their stead. Just when this came about it is impossible to determine. The change did not happen all at once, but was a slow process, the yeomen of England especially clinging to the ancient and noble weapon with stubborn tenacity even after the gun had been, in a measure, made in accordance with its present general model. As late as about the beginning of the eighteenth century laws were in force in Great Britain, regulating the manufacture of archery implements and the importation of bow-wood. As a sport, however, archery survived its military downfall, especially in England and France, and various games of target-shooting were practised, until in 1844 a great revival of the old pastime began and butts and gay targets were set up all over England. Certain great and ancient companies of archers, like the "Royal Toxophilites" and the "Woodmen of Arden," had kept up their organizations; and now, many new companies sprang into life and began to hold public target-meetings. In the year above named, a meeting of British archers was held; and in the year following ladies began to take part at the targets. Ever since then the meetings have been annually held with great success. At present, instead of one grand meeting there are four or five each year, besides numerous private targets.

In France the pastime has not fared so well, though a strong trace of archery lingers there under adverse circumstances. Some of the old French archery companies were suppressed by law.

The game of archery, so popular in England and which has gained a good foothold in America since 1878, is simply competitive shooting at a target with the long-bow and arrows. To the late Horace A.

Ford, the best bowman of modern times, is due more than to any other person the credit of the great advance in the scientific practice of target-archery made within the last forty years. He was indeed a wonderful archer at the targets. Some of his scores, made under the circumstances of a great public meeting, appear almost miraculous when compared with those of other archers of high grade. He it was who perfected the system of aiming now generally in use in target practice among good bowmen. Mr. Ford gave years of study and experiment to his favorite pastime, and gradually built up what he called his "Theory and Practice of Archery." His system of aiming, however, was fit to be used only at fixed ranges, and was wholly valueless in shooting at wild game where the distance shot would continually vary with circumstances. Mr. Ford greatly improved the manufacture of bows and arrows by his studies and suggestions, all of which appealed to scientific principles, so that now the English long-bow is probably the perfection of the weapon and the target arrows of the best makers are certainly a combination of everything desirable in their way.

Yew is the best wood for bows, being extremely light, highly elastic and very tough. It has but one bad quality; it is sensitive to heat. On a hot day it will, if exposed to the sun, lose an appreciable amount of spring. On this account some excellent bowmen (among them the present American champion, Colonel Williams) use hardwood bows, lancewood being preferred. Indeed lancewood makes a fine weapon. Mulberry and bois d'arc, or Osage orange, are the best American bow-woods. For a hunting bow I always use mulberry, because when it is kept well oiled it is not affected by heat or water; bois d'arc, however, has a finer elasticity.

To get the best bow in the world order one made, either by an English maker or by an American who knows the English method. Let Italian or Spanish yew be the wood, clear of knots, "snarls" and cracks. Examine the grain of the wood to be sure that it is straight and continuous; and choose it by its color, which should be a clean, clear, lemon-yellow, or a pale waxy brown. I have three yew bows, one by Aldred, of London, one by Horsman, of New-York, and the third by an unknown maker. All are of the best. A good yew bow should cost about $50, one of lemon wood about $10; the latter is good enough for all practical purposes.

An excellent weapon can be made by any person of a mechanical turn of mind upon the following plan: Take a good, clear billet of mulberry, sassafras, red-cedar, bois d'arc or swamp ash. Let the wood be split into a piece three inches square and say six feet long, unless the bow is to be shorter, and be sure there are no bad knots or cracks. Shave the billet evenly down until it is round and about two inches in diameter. Lay the piece away to dry for two or three months; and when it is thoroughly seasoned finish as follows: Mark the centre of the billet and from this point, in the direction of what is to be the lower end of the bow, lay off a space of five or six inches for the hand-hold, or handle. From each extremity of the handle taper the bow to the ends, excepting what is to be the back or outer side of the bow, which is to be cut flat and even with the grain of the wood.

Dress the handle and body of the bow down to nearly the strength desired and then finish up with sand-paper and emery-powder. A piece of green plush may be glued around the handle and the bow-tips may be set with horn; or, mere notches for the string may be cut in the wood. The length of the bow is usually equal to the stature of the archer; but I prefer it a little longer. For instance, my stature is five feet ten and a half inches, and I have found a bow six feet two inches long best suited to my use.

The strength of a bow is measured in pounds and is ascertained by drawing it back to the full length of a twenty-eight-inch arrow with a spring scales. The number of pounds registered is the "weight" of the bow. A fifty-pound bow is strong enough for a quite athletic man. In choosing the weapon, be sure that it does not bend, even the slightest bit, in the handle, for if it does the recoil is very hard on the bow-hand and arm. The charm of a yew bow is what archers call its "sweetness," that is, its softness of flexure and recoil.

Mr. Ford has well said that the arrow is the most important implement of the archer. Even an inferior bow will shoot well with a perfect arrow. It is in making the arrow that the mere amateur must necessarily fail; the work is too fine and difficult for any but the trained maker. In short, unless you wish to set about learning a very intricate and difficult art (about as difficult as watchmaking, for example), you would do well to order your target arrows from a dealer. I have never yet seen a "home-made" target arrow which could compare with the cheapest one manufactured by good English and American professional makers. I make, or order made, my hunting arrows as follows: a round shaft of hickory wood one-fifth of an inch in diameter as smooth as glass. In one end a deep notch for the bow-string: just above this notch three feather vanes glued on at equal distances from each other. These vanes are glued longitudinally on the wood and are of goose or peacock feather, cut three inches long and one inch wide or less. On the end of the shaft, opposite the notch, is set a point of steel, either broad or narrow, or a head of pewter, according to the use to be made of the particular arrow. The great weight of these shafts gives them tremendous effect when cast from a strong bow. The best target arrows are made of five parts: (1) the stele or shaft, being the main body of the missile; (2) the nock, which is a triangular bit of horn (in the end opposite the point) bearing the notch for the bowstring; (3) the feather just above the nock, consisting of three peacock or goose-wing vanes, set at equal intervals around the shaft; (4) the foot, which is a triangular bit of very hard and heavy wood set in the stele at the point end; (5) the pile or point, a steel ferrule covering the end of the foot, round, obtusely pointed and slightly tapering.

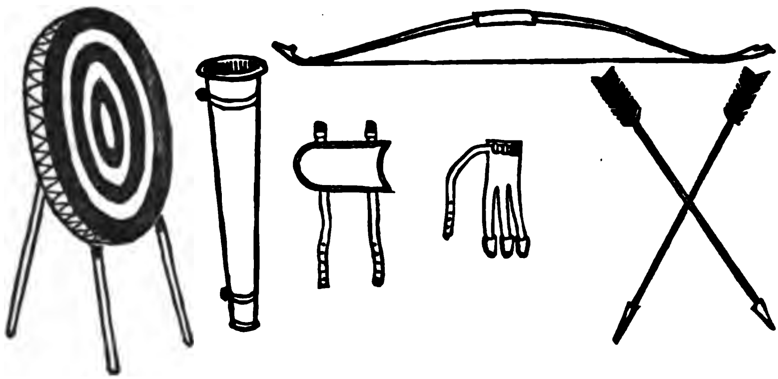
The weight of an arrow by an ancient custom is measured by that of an English shilling with fractions expressed in pence. I use target arrows marked at the nock, 4.9., which means that the weight is 4 shillings nine pence, the proper missile for a fifty pound bow.

Arrows are feathered after two styles. In one the vanes are cut into triangular form; in the other their outline is a parabola. The latter, which I like better, is called "balloon feathering," and is used by a majority of the best archers in England and America.

Most bowmen use bracers; I do not: and I believe them to be a decided hindrance to good shooting. If the bow is held correctly and the sleeve of the shooting coat be made to fit closely, there is no need for any wrist or arm protection from the stroke of the bow-string. Mr. Ford condemned the bracer. W. H. Thompson, one of the finest shots in the world, does not use it. The bracer is simply a shield of smooth hard leather, furnished with straps and buckles so as to be fastened on the shooter's left wrist and fore-arm, to guard against a wound from the bow-cord.

The quiver is a leather or tin case for arrows, worn to a belt at the archer's side. Near it on the belt is fastened a tassel of worsted yarn used to wipe off dirt from the shafts at need.

Ancient archers wore a shooting-glove to protect the right hand from the abrasion of the string in drawing; but Mr. Ford perfected what



are called "tips" for the three drawing-fingers. These tips are open thimbles of firm but pliable leather, made to fit closely over about an inch of the ends of the fingers where they receive the string in drawing. They should be kept well greased to make them smooth and soft.

The target at which archers shoot is a disc of plaited straw four feet in diameter and about four inches thick. It is faced with a piece of muslin cloth whereon are set the graduated rings as follows: The central circle, about nine inches in diameter, is painted a bright yellow and is called the "gold"; around this is a red ring, then comes a blue one, then a black followed by a white one. These divisions when struck by an arrow are registered to the archer's credit as follows: Hitting the gold counts 9. Hitting the red counts 7. Hitting the blue counts 5. The black counts 3. The white counts one. Targets of excellent quality and of regulation size and proportions may be had of any dealer.

In England and America the National Associations of archers have adopted what is known as the "York Round" for the public matches. This consists of three ranges combined, namely, 60 yards, 80 yards and 100 yards. In shooting the Round, each archer shoots 24 arrows at 60 yards; 48 arrows at 80 yards; and 72 arrows at 100 yards. This round is for men only. Women shoot the "National Round," consisting of 24 arrows at 50 yards and 48 arrows at 60 yards. At the great public matches the rounds are shot twice, and this is called shooting the double York or the double National round, as the case may be. Thus a double York round will mean 48 arrows at 60 yards; 96 arrows at 80 yards; and 144 arrows at 100 yards. A double National round: 48 arrows at 50 yards, and 96 arrows at 60 yards.

The following scores at the double York round are among the best ever made:

H. A. Ford (English)	1,251
W. H. Thompson (American)	1,195
Colonel Robert Williams (American)	1,050
Major Hawkins Fisher (English)	1,060
Maurice Thompson (American)	1,209

The following are the best at the single York round:

H. A. Ford	809
Maurice Thompson	699
W. H. Thompson	707

I have not at hand data as to the best National rounds by women; but at the double round, if I remember correctly, both Mrs. Horniblow and Mrs. Marshall have reached nearly to 800, and Mrs. Legh once scored 867. The following scores, however, I take from Mr. Sharpe's English Archery Register, an annual publication of great interest to bowmen. Double National of 48 arrows at 50 yards and 96 arrows at 60 yards:

Mrs. Marshall	676
Mrs. Horniblow	674
Mrs. Pond	700
Miss Betham	633
Mrs. Legh	867
Mrs. Pinckney	729
Mrs. Marshall	708
Mrs. Dutt	744
Miss Legh	840

The next question is, How can such scores be made? In other words, What system of practice in archery will insure the best results? I answer that, for target practice, a slight modification of Ford's system is the best. In the first place, the archer must have good muscles and sound nerves. If he have not these he must train to get them. In the next place, he must master the theory or science of archery, which may be done by a careful study of several books, among which are Ascham's "Toxophilus," and H. A. Ford's "Theory and Practice of Archery," and the Encyclopædia Britannica, the article on "Archery," by Sharpe.

I cannot go deeply into the abstruse science of archery here, for want of space, but a strong sketch of it may set the reader in the right way of inquiry and study.

The first thing to learn is the habit of drawing evenly, steadily and always to the same distance. To do this, take the bow by the plush handle in the left hand, hold it nearly vertical, but slightly leaning to the right. Place the arrow on the left side of the bow just above and resting upon the knuckle of the forefinger of the clenched left hand with its nock set on the string. Hook the first three fingers of the right hand around the string with the arrow-nock between the first and second. Now, extending the left arm firmly and steadily, with the right hand draw the string and with it the arrow back to just below the chin and there loose. Do this over and over until you have mastered it, then you are ready to learn how to shot.

To take the position of an archer, stand with your left shoulder toward the target, your face looking straight over that shoulder, your legs straight but not stiff, your heels six inches apart and your toes turned well out. Now raise your bow in your left hand, draw your arrow four-fifths of its length, take aim with both eyes open by looking over the arrow point, finish drawing up the arrow and let fly. So far you have a rough sketch of drawing, aiming and loosing, as originated by Mr. Ford. There are four prime elements: (1) drawing to a certain distance (about four-fifths the length of the arrow); (2) aiming over the arrow-point; (3) finishing the draw; (4) loosing. Each of these elements involves the nicest accuracy of execution. The operation is very hard to describe. The first part of the draw to the point where the pause for aiming is made may be done very swiftly; but after the aim is fixed, the utmost nicety is required in finishing the draw, and the loose must be exactly controlled. At the moment of loosing, the whole archer must be as steady as a rock and yet as elastic as a rubber spring. What I mean is that rigidity is to be avoided as much as unsteadiness.

One of the hardest things in archery for the beginner to understand is "point of aim." By this is meant the point upon which the direct vision must be fixed in aiming. This point is the gold only in one case, namely: when shooting at point blank range, which with me is 80 yards. Therefore at 60 yards my point of aim is below the gold and at 100 yards above the gold. This variation is caused by the arrow's flight being a curve. Suppose I am shooting at the 100-yard range and I wish to hit the gold, I must choose a "point of aim" in the air above the target. If I am shooting at the 60-yards range I must find my point of aim on the ground below the target. Another difficulty is that you must always aim with your right eye and yet keep both eyes open, but this is soon mastered. Remember the following rules:

1. Draw always exactly the same distance before pausing to take aim.

2. Loose always at exactly the same point just below and to the right of your chin, that is directly under your right eye.

3. While drawing, aiming and loosing, keep always the entire length of the arrow exactly parallel with your vision, that is in the vertical plane of the sight of the right eye.

4. Loose always without the slightest jerk and yet without any hanging or hesitancy.

5. At the point of loosing hold the bow as in a vise and keep the left arm perfectly steady without rigidity. The slightest movement of this arm will destroy the aim.

One of the points next in importance to having a good bow and perfect arrows, is to see that your bow is always properly strung Buy none but the best Flemish strings, and so loop them that they will exactly fit your weapon. When braced, or strung, a six-foot bow should be bent so that the string is six inches from the belly, and the line of the string should be exactly in the central plane of the bow.

The string is from three to three and a half inches shorter than the bow; and one loop is permanently fixed in the lower "nock" or notch of the weapon; the other loop rests around the upper end of the bow below the "nock."

Now to "brace" or string the bow place the lower end in the hollow of the right foot with its back toward the leg. Grasp the handle with the right hand, while the left hand touches the upper end of the weapon just below the string-loop. Holding the right foot firmly on the ground, pull the bow with the right hand and push with

Bracing the Bow.

Position of Woman Archer.

the left, at the same time slipping the loop into the upper "nock." Now be sure that the string is straight.

It is absolutely essential to good shooting that the exact middle of the string shall be marked for the nocking point of the arrow. This I do by wrapping a little space with red or green silk floss.

Archery is one of the best forms of physical exercise that has been invented. It combines all the points of a safe, interesting and invigorating pastime and recreation. Of course, great care should be taken to avoid any overstraining by the use of overstrung bows. For women especially, archery is a sport offering every charm of grace and beauty and every advantage of perfect physical training. It is better than fencing, rowing, or tennis. Indeed, it is a combination of all the good features of the three, with none of their objectionable elements. Then, too, it is wholly in accord with the highest intellectual taste, possessing as it does the fascination drawn from centuries of history, poetry and romance. It should flourish in America far better than in England, for our climate is much dryer and dampness is the greatest enemy of archery. The present movement in our highest social circles toward a full recognition of the beauties and benefits of outdoor amusements and recreations, will cause the subject of archery to be studied, and a revival of the charming theme will be sure to enlist the interest of those who can do very much toward rendering the game popular.

There are many flourishing archery clubs in America; but there is none like those gerat old organizations in England which date back for centuries. The following are the names of some of the principal companies of England, Scotland and Wales:

Royal Toxophilites.	Robin Hood Archery Club.
Woodmen of Arden.	North Berks Archers.
The Royal Company of Archers.	Lonsdale Archers.
Bowmen of Gwent.	Herefordshire Bowmen.
Royal Forest of Dean Archery Club.	Neville's Cross Archers, &c.

"The Archery Register" of 1880 contains a list of eighty large and flourishing clubs.

At the great public meetings of English archers, as also at the meetings of the American National Association, prizes are awarded upon "points won," which may be explained as follows: Greatest gross score counts two points. Greatest number of hits (all distances added) counts two points. Best score at 100 yards counts one point; and best hits at 100 yards one point; the same for 80 yards and 60 yards, making in all ten points for the winner at the men's targets.

At the women's targets the points are eight, reckoned thus: Gross score, two points; gross hits, two points; greatest score at 50 yards, one point; greatest score at 60 yards, one point; best hit at 50 yards, one point; best hit at 60 yards, one point.

In America there are two chief prizes: The ladies' gold medal of championship and the National champion's gold medal for gentlemen. There has been a meeting of the National Association every year since its organization in 1879. The following is a table of the dates and places of the yearly meetings with the names of the medal-winners and the scores made by them:

1879	Chicago	Mrs. Brown	548
		W. H. Thompson	624
1880	Buffalo, N. Y.	L. L. Peddinghaus	706
		Mrs. Davis	593
1881	Brooklyn	F. H. Walworth	763
		Mrs. Gibbs	493
1882	Chicago	H. S. Taylor	698
		Mrs. Gibbs	509
1883	Cincinnati	R. Williams	907
		Mrs. Howell	590
1884	Pulman, Ill.	W. H. Thompson	760
		Miss Hall	448
1885	Eaton, Ohio	R. Williams	995
		Mrs. Howell	649
1886	Chautauqua, N. Y.	W. A. Clark	716
		Mrs. Howell	690

But after all the chief charm of archery as a game is in the delightful private, social meetings at the lawn-targets where the weather, the green grass, the gay colors and the lively rivalry are combined in effect with the genial interchange of bright thoughts and wholesome personal influences.

Of sylvan archery, no man knows its fascination who has not lived for a time the life of the savage. To shoot game requires an entirely different method of archery from that used at the targets. You can take no aim, you must draw to your ear, instead of your chin, and you must shoot very heavy arrows.

To show what may be done in the way of wing-shooting with the bow, I close this paper with the best score I ever made shooting at objects thrown into the air: Small green apples were cast about fifteen feet high at a distance of fifteen yards. I shot at each just as it reached the highest point of its flight, and of fifty thrown I hit forty-one. Seventeen of the hits were in succession.

HORSEMANSHIP.

BY HENRY HALL, OF NEW-YORK.*

IN the days of Washington, the best horseman of his time, travelling inland was a serious matter. The water courses were used as far as possible, but they gave access only to a limited region, and the moment the traveller left their banks he was confronted with roads, stretching away through deep forests, full of mire in the shaded spots, and rough in the open country. Streams were crossed by wading through the current. Journeys were therefore more comfortably and rapidly performed in the saddle than by wagon. The settlers were in the habit of riding into town on week-days with their bags of grain to be ground and on general marketing errands, and to church on Sundays, on the backs of the good horses, which, at other times, were engaged in the work of cultivating the farms. The longer journeys were always performed on horseback, when comfort and celerity were demanded. The mails were carried in the saddle also. In these later days of high civilization, the farmer drives to town and church in a comfortable carriage over smooth and hard roads. The mails are carried at lightning speed by railroad trains: and travellers are transported by steam conveyances to every part of the land. Riding from necessity, for

* The rules for riding and the management of the horse herein have been revised, and approved, by Captain Jacob A. Augur, 5th U. S. Cavalry, who is the Cavalry Instructor at the West Point Military Academy, and the data concerning the cavalry practice have been supplied by him. The rules have also been thoroughly revised and approved by Frank Menzdorf of the Central Park Riding Academy, New-York, one of the best riding masters in the United States.

purely utilitarian purposes, has come nearly to an end, at least in the Northern States; and the little there is left of it is substantially confined to the parson and doctor visiting their country clients and to the farm boys who go down every day to the railroad station for the newspapers and the letter mails. In the South there is more general riding than in the North; but it is growing less in extent yearly. It is in the army and among the cowboys on the plains that in this period the principal applications of horsemanship on an extended scale to purely practical purposes are found. Once a leading resource for rapid locomotion over long distances among an active people engaged in clearing up a vast wilderness, the art is now no longer of general practical utility in the new republic; and it has become, instead, so far as the majority of the population are concerned, merely an elegant accomplishment, and a means to the acquisition of health and the enjoyment of exciting open air recreation.

Twenty years ago there was very little riding even for recreation in the Northern States. It is the new feature of horsemanship in America that the number of horses employed under the saddle is now growing rapidly, the demand for them increasing every year. It may be that the war of 1861 developed the art of horseback riding. It may be that the sedentary lives of the dwellers of our growing cities has created the more general necessity for this healthful form of exrcise. It may be that the current imitation of English fashions has had something to do with the new tendency. Whatever the cause, the fact remains that the popularity of this noble form of amusement is constantly gaining among our people, and that every year sees more riders, and better riders, in all the cities of the United States.

That riding is one of the best forms of physical exercise is a fact, proved by common sense, experience, and the testimony of the best physicians. The late Dr. Frank Hamilton, of New-York City, one of the medical attendants of President Garfield, told the writer that the principal drug-store to which he was in the habit of sending his patients was the riding school at Central Park; that which his patients obtained on the back of a good horse was worth more to them than any drugs he could prescribe. This species of exercise takes place in the open air. It expands the chest, it quickens the circulation, strengthens nearly all the muscles, increases the healthy action of the liver, awakens the mind, calls the rider's attention away from himself and his business cares, and gives him while in the saddle a feeling of power and an exhilaration of the spirits which have no evil reaction and which are especially captivating to every ardent and noble nature. To a woman, the exercise is remarkably beneficial, if enjoyed in moderation and with judgment. A woman, if not too large in person, never appears to better advantage than when on horseback. The well-fitting dress, the glowing cheeks and eyes, the natural timidity of her manner overcome by the generous exercise, and the appearance of health and strength, all lend enchantment to a comely face and figure. And it should encourage all women to practise horsemanship, to remember, that human beings invariably prefer those specimens of the other sex who are full of the beauty and vigor of health.

In studying the rules of horsemanship, let us begin with the horse himself. His height is measured by "hands" from the ground under foot to the top of his withers. A "hand" is four inches. A full-grown horse suitable for hunting is from 14 to 18 hands high (an average of 16 hands or 5 1-3 feet) to the top of his withers. A pony is 12 hands high, or 4 feet. For cavalry service, the regulation in buying horses is that they shall be geldings, from 15 to 16 hands high—from five to nine years old. In the half-breed horses of California and Southern Texas, not less than 14 1-2 hands. Few horses are bought over eight years of age. Various parts of the horse go by special names, as follows: The withers, are the bony ridge in front of the saddle. Croup, the part between the saddle and the tail. Crest, the upper part of the horse's neck. Forelock, the lock of hair which falls upon the forehead. Fetlock, the shaggy bunch of hair at the ankle. Chestnut, the rough lump on the inside of the foreleg above the knee. Flanks, the sides back of the ribs. Hock, the bony middle joint of the hind leg. Pastern, that part of each foot between the fetlock and the hoof. Coronet, or crown of the hoof, the ring around the upper edge of the hoof. Hoof, the horny part of the foot. Frog, the horny prominence on the sole of the foot. Near side, the left-hand side of the horse, upon which the rider mounts. Off side, the right-hand side. Other parts of the horse go by the same names as in the human anatomy. Dividing the whole horse into three parts, the head, neck, shoulders and forelegs are called the Forehand; the back and belly, the Middle Part: the haunches, hocks, hind legs and tail, the Hind Quarter or Croup.

How to tell a good horse: Every horse has a conformation of his own, and few are free from some departure from the best standard. Any horse can be placed under the saddle, his deficiencies can be somewhat corrected by training, and the steed be ridden fairly well if his rider understands how to guard against his defects. But enjoyment and safety come from selecting a horse which is properly built and has the largest number of desirable "points." The best style of horse, the hunter, which can be taken anywhere, on the road, across the fields, and over a fence, will be known as follows:

HEAD.—Neat and light, with straight nose, the head well set on a thin neck. The Roman nose is not desirable in a horse. With a large head, his nature will be headstrong. Forehead, broad and flat. Good width between the nostrils; the nostrils large, open, and dilating. The ears small, firm and mobile, turning readily backward and forward. Hearing good. The eyes full, clear, and sparkling, free from specks and blindness. Perfect sight is an absolute necessity. Small round eyes are often a sign of bad temper while near-sightedness is the cause of most of the shying.

NECK.—Moderate in length, not too long or too short. Wide, muscular, thin, and straight. The neck should be thin where it connects with the head; this shows a tender mouth; a thick neck means a stiff neck. The muscle along the crest is important, and should be strong. Crest thin. Windpipe spacious.

WITHERS.—Fairly high, thin, and arched. In some horses the withers are low, and the whole forehead the same. A horse so made is unfit for the saddle.

CHEST.—Broad and deep. It is preferable to have the chest deep in a hunter, rather than broad, because in the latter case the girth is too great. Good wind is a necessity. A deep chest gives beauty.

SHOULDERS.—Muscular; the shoulder blade wide, placed obliquely on the chest so as to withstand concussion in galloping and jumping.

RIBS—Well rounded and extending well back toward the hips, making room inside for good lungs.

BACK.—Muscular, straight, and short. A short back does not mean a short horse: but the length should be in the shoulders and haunches.

LOINS.—Great breadth and substance are vital. Hips, long and wide. The tail should be set high, the croup being nearly straight and not falling away in a downward curve to a low-set tail. A tail set high shows blood and gives beauty.

LEGS.—The upper and lower arms long and very muscular, the muscle standing out in bunches. The knees and hocks broad, strong and bony. The lower legs below the knees and hocks, broad, when looked at sidewise; thin, the other way; this shows that the tendons are large and strong. Fetlocks, not too long; when long the horse is easily lamed; if too short his action will not be elastic. Hoof, well rounded; not long, but wide; the frog should be perfectly round and very wide; as the frog bears on the ground, it should never be trimmed, except to remove a part which is decayed and ready to drop off anyhow; the heels open, not contracted. Pasterns, strong and moderate in length.

If one part of a horse is so good and handsome that it attracts especial attention, it will be found frequently that some other part is badly constructed, or deficient. It is desirable that every part of the animal shall be equally well developed. Make a study of the general harmony of the parts.

The vital points are strong legs, wide hips, deep chest, and short back, the wind and eyes perfectly sound. In England it is claimed that a hunter is not injured by using him as a carriage horse. Indeed, they have often been used in the hard work of the farms.

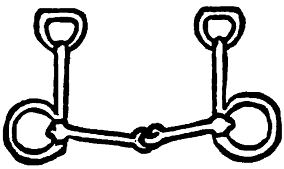
A word with reference to disposition. A man who has never had anything to do with a horse clothes him in imagination with the terrible attributes which Job gave him, pawing the valley, rejoicing in his strength, and mocking at fear. Measuring his own physical strength, which will perhaps lift a hundred pounds, with that of an animal which can drag 2,000 pounds over the ground with ease, it seems to many people a perilous affair to intrust oneself and especially one's child to the mercy of such an irresistible animal. The idea of a horse, entertained by many, was well embodied in the German machine horse, so well described by Whyte-Melville:

> This horse was remarkable for its ingenuity and the wonderful accuracy with which it imitated in an exaggerated degree, the kicks, plunges, and other outrages, practised by the most restive of the species to unseat their riders. Shaped in the truest symmetry, clad in a real horse's skin, with flowing mane and tail, the automaton represented the live animal in every particular, but for the pivot on which it turned, a shaft entering the belly below the girths and communicating through the floor with the machinery that set in motion and regulated its astonishing vagaries. On mounting, the illusion was complete. Its very neck was so constructed with hinges that, on pulling the bridle, it gave you its head without changing the direction of its body, exactly like an unbroken colt as yet intractable to the bit. At a word from the inventor, spoken in his own language [German] this artificial charger committed every kind of wickedness that could be devised by a fiend in equine shape. It reared straight on end; it lunged forward with its nose between its fore-feet, and its tail elevated to a perpendicular, awkward and ungainly as that of a swan in reverse. It lay down on its side; it rose to its legs with a bounce, and finally, if the rider's strength and dexterity enabled him still to remain in the saddle, it wheeled round and round with a velocity that could not fail at last to shoot him out of his seat on to the floor, humanely spread with mattresses, in anticipation of this inevitable catastrophe.

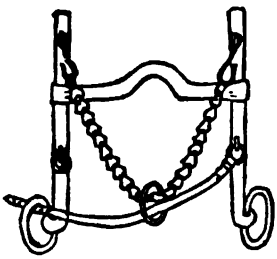
The best riders in England were thrown out of the saddle by this automaton. With many minds, this automaton expresses exactly their idea of a horse. But the automaton was not a real horse at all. The difference is that one is a horse, loving his master, if the latter is kind, and willing and anxious to obey, his mouth and sides feeling the slightest pressure and yielding thereto instantly, and himself just as happy when he has carried his rider safely as the rider is himself. The other was an automaton, his sides insensible to pressure, his mouth devoid of feeling, and his operator resolved to throw off the rider at all hazards.

No horse is naturally vicious. The green colt, if handled with patience and kindness, grows up perfectly free from temper, sunny and affectionate in disposition, and obedient as a child. It is bad handling and the vices of the master that spoil a horse. Take it as an axiom, that the moment any horse, that has not been spoiled, understands what is wanted of him, if he feels at ease, and has the necessary skill and strength, he will obey the will of his master at once. A spirited horse is not a vicious one, he is simply gamey, full of life and anxious to exert his powers. There are occasions when a horse will resist the will of his master. He is subject to the same occasional lapses from grace as the superior organism which bestrides him. He must occasionally be taught by peremptory measures that he is the horse, and that you are the master. All the same, his resistance frequently comes from some perfectly innocent source, and it must not be taken as exhibitions of bad temper. A colt sometimes resists, because he has grown up wild, and he is startled at coming under the domination of a will not his own. A horse sometimes resists and refuses because he is not trained yet. Take a man who can pitch hay and swing an axe all day, with comfort and joy in his work; place him in a dancing school, and ask him to make a series of slow and exact motions which are entirely new to him. His muscles will rebel; he will do nothing well; and in half an hour he will be more fatigued by the exercise than in a day's harvesting or felling timber. This is exactly the case with a horse, young or old, who is asked to do that which his muscles and mind have never been trained to perform. A colt will be awkward in his motions anyhow. A horse sometimes resists when he is not at ease, that is to say when frightened, hurt, worried by a failure to comprehend, or hungry and anxious to return to his stable. I have seen a man injured for life by trying carelessly to mount a horse, having a sore spot under the saddle. The writer returned one day to the stable, himself disgusted and fatigued, the horse (a perfectly trained, spirited, but amiable creature) in a lather, having behaved like a fiend for nearly an hour, and having been dreadfully thrashed, and all because the rider was ignorant that the curb chain had slipped into the horse's mouth and was resting against the gums of the lower jaw. An apology was due to the horse. A rider should always look for the fault in himself, first, before he charges bad temper and wickedness to the horse. All the riding-masters testify that a horse means to do right always. A horse is sometimes prompted to resist the will of his master by habits. If he has been accustomed to trotting around the arena of a riding-school, keeping close to the wall, he will, when taken out on the road, ride up toward the curb-stone, instead of keeping the middle of the road. In all these cases of resistance the opposition of the horse does not arise from vicious temperament. Give him the credit of a naturally amiable disposition; if it is ever spoiled, you or some other man is to blame. Accustom the horse gently to the objects which offend his eyes, ears, or nose. Make him understand little by little what is required of him. Never confuse him. Impel him firmly but gently and steadily to his various performances, and he can be handled under all circumstances in entire subordination to your will. Of course, as said before, an obstinate disposition will occasionally develop itself, and the animal will positively refuse to obey. But these cases are rare, and they are generally due not to faults of disposition, but to errors in handling.

The equipments for riding are important. The bridle is an arrangement of leather straps, whose main purpose is to keep the bit in a horse's mouth. Three kinds of bits are used. With most ponies and horses, it is sufficient to use the snaffle bit. This bit lies easily in a horse's mouth. If it is large and smooth, as it ought to be, it causes no annoyance, the rider can bear hard against it sometimes, and even the colt will champ at it with his jaws in perfect contentment. The bit should lie loosely in the mouth, back of the teeth. Adjust the bridle so as to avoid keeping a constant pressure on the corners of the mouth, for that will make the lips tender, and the animal will pull at the reins and toss and shake his head. On the other hand, do not leave the bridle too slack, because if the horse takes the bit between his teeth and should then take a notion to bolt, off he will go and the rider will have to summon all his coolness, skill, and strength for what will follow. The snaffle bit has one rein, the head-piece being then called a single bridle.



Snaffle Bit.



Curb Bit, with Leather Strap to prevent Curb Chain entering Horse's Mouth.

The curb bit has a bend or mouth-piece called the port, which, in action, presses the tender bars in a horse's mouth, causing him great pain. Each of the perpendicular bars, or cheek-pieces outside of the mouth has a ring in the lower end of the rein, and a hook at the upper end for the curb chain. The chain passes under the jaw of the horse, and should be neither too tight nor too loose. There should be room for introducing the finger between the chain and the horse's chin. In the cavalry service the curb is of leather. In some curb bits there is no port in the bit, control being had with the pressure of the chain only. Except in the army, a horse is never ridden with the curb alone. The snaffle and the curb are both put into the mouth of a saddle horse, each bit having a separate rein; this is what is called the double bridle.

Sometimes the snaffle and the curb are combined in one bit, called the Pelham. In the United States cavalry there is but one rein, the curb.

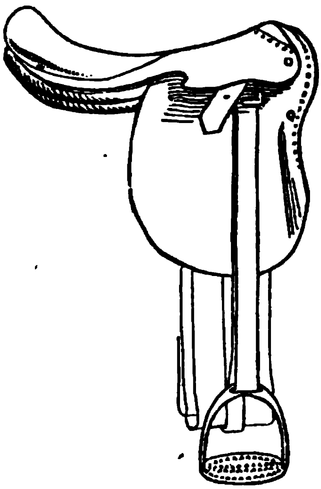
In hunting across country, or when riding a powerful and spirited steed, the double bridle is best employed. In the pleasure riding of the large cities, the double bridle is always used. The curb causes the horse to arch his neck, and throw his nose down into place, and the snaffle holds him there, in which position of the head the rider has a powerful purchase on the lower jaw and can control him at will. A touch of the curb brings the horse's haunches under him, from which position his most powerful efforts are made. In ordinary riding, it is best to slacken the curb-rein a trifle so that the two reins shall not have the same tension. Either the curb-rein or the snaffle should be loose. To take up the slack of the loose rein and change off to the other, use the right hand.

A martingale is sometimes used to keep a horse's nose down and his head perpendicular. With a single bridle, it is usually best to have a martingale. This strap tends to prevent a horse from throwing his head up and rearing; and if he is at all headstrong it will make him perfectly amenable to reason. There are two kinds, the standing martingale, which is used when the horse is spoiled: and the ring martingale, which is milder and is simply required to make the horse more manageable. A trained horse needs no martingale.

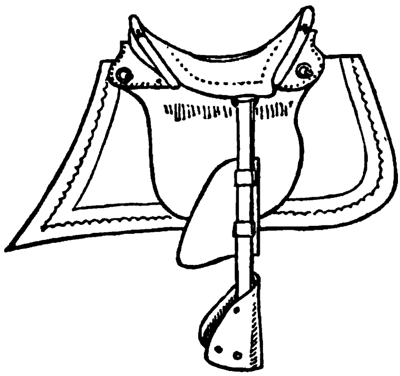
Saddles are made of several different patterns. In the army, nothing is used except either the McClellan or the Whitman saddle, in both of which there is a wooden frame, with high pommel and cantle. On the plains, the cowboys and rangers use the Mexican saddle, which is similar to the Whitman. The wooden saddle is of Cossack origin and comes to the United States through Austria and Spain, and the troopers of Cortez in Mexico. No such saddle should ever be seen under a civilian, riding for pleasure or hunting across the country if he wishes to be thought a horseman. He should sit upon a good leathern saddle, well-padded and fitted to his horse's back, with leather flaps, and having preferably, a small pad on the front edge of each flap to steady his knee. It is not true that any saddle is good enough. Always have a good and handsome saddle. In the bearing of even a shabby horse, there will be a certain style if he is properly equipped. The only leather suitable for a good saddle is hog skin, on account of its durability.

In the cavalry service, the McClellan saddle (the only one now authorized) has been modified by making the bars, in rear of the stirrup loops, thinner, and the rear portion of the seat between the bars and cantle, hollowed slightly, so as to conform more to the seat of the man—a trifle further to the rear. This gives a different seat than either the English or the Whitman saddle.

A woman's saddle is made longer from front to rear, than a man's, owing to her position on the horse's back. Its size should be adapted to the length of her upper leg from knee to thigh. The pommel is crescent shaped ; and on the left side there is an extra crutch or leaping

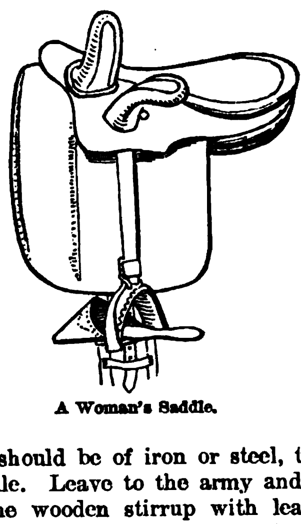


The Leather Saddle.



Army Saddle.

horn, to steady the left knee. A leathern pocket is provided on the right-hand side of the seat for her handkerchief. It is of the utmost importance that a woman's saddle should fit her perfectly.



A Woman's Saddle.

A man's stirrups should be of iron or steel, the foot-rest corrugated and fretted like a file. Leave to the army and the men of the plains the monopoly of the wooden stirrup with leathern covers. A good many riders cover the foot-rest of their stirrups with india-rubber, which gives security to those who prefer long stirrups or who ride across country. The stirrup leathers should be round and strong with holes an inch apart; and they should be attached to the saddle, or in Whitman's safety patent, by being hung on a horizontal steel bar or spring opening backward. If the rider falls, the stirrup comes off bodily at once, and the horse escapes without dragging his rider a foot. Make it a rule, after every ride, to change the stirrups from one side of the saddle to the other; this will keep the leathers flat.

A woman rides with one stirrup, which hangs on the near side of the saddle. Slippered stirrups have been used to some extent, but they have now been discarded in the best schools and pupils are taught from the beginning to ride with the same open iron pattern employed by the men.

Do not buckle the girths too tightly. They are fatiguing and irritating if strapped too closely. To make the saddle secure is enough. Two girths of webbing are now buckled upon all saddles, for safety. The hair "cincha" is far preferable to a webbing girth. Only one is required. It is more durable, never ruffs up from dirt, mud, or saturation with water; and it never rubs or chafes the sides or body of the horse.

For ordinary riding and hunting, a whip is the only instrument of coercion required, in addition to the curb. A woman carries a light whip. A man's whip should be long and strong enough to administer a good sound stinger if required. Always hold the whip (except in mounting) in the right hand, butt uppermost, and apply it upon the horse's flank. To hold it forward where he can see it will startle him, and in bringing it down from that position the whip would have to pass his eye and would distract his attention just at the moment when his eyes should be riveted on the road or fence before him. The best riders prefer the whip to the cane, as an aid in riding, and they also prefer it to the spur as an instrument of coercion.

In the cavalry, the spur is necessary, in part because the rider cannot handle whip and sword both. The value of the spur lies first, in the time it saves in emergencies. A horse must obey instantly, when this instrument of torture is applied with a vigorous heel. In the next place, spurs bring a horse's haunches under him instinctively, and are of great service when a powerful effort must be made. It is claimed by expert masters that by skilful management, closing the legs gently and bringing the rowels just in contact with the flank, checking the horse's head with the reins, an animal can be made to endure a great deal of delicate spurring without excitement; but this requires a master of the art. In spurring always sit firm, and in the plunge which follows take care to withdraw the rowels from the horse's side. As a rule no one should wear spurs except the man or woman who can ride so well as to do without them. Considerable danger arises from the spurs of an inexperienced rider from the vicious jabs which he is liable to inflict without intention. A good horse may be made frantic in a moment by the bungling heels of a careless rider. In England women are said to be more merciless than men in the use of the spur. They have only one, and they sit in such a way that every kick goes home. Never spur with violence. And remember that in every ordinary situation a horse can be made without either whip or spur to obey promptly with hand, voice and pressure of the leg, by the aid of that mutual good-will and perfect understanding which ought to exist between horse and rider. The great masters of the art employ the spur delicately to bring a horse from a full gallop to an instant halt. Touching him with the spur to bring his haunches under him, they lean upon the reins at the right moment; the general centre of gravity is thrown back and the horse comes to a dead halt with comfort both to himself and rider.

In riding a man requires a short coat and a pair of tight trousers made of a strong special cloth, with leathern straps under the instep to hold them down. Linings of buckskin are often sewed on to aid adhesion to the saddle. High top boots can be worn if desired; but the best taste requires that a gentleman on horseback shall look as nearly as possible like a gentleman on foot. A high hat is accepted both for men and women as the proper style in fashionable circles. The Derby hat is more convenient, however, and a jockey cap is very pretty and proper for the young. In the South the soft felt hat is generally worn.

Women must wear a tightly fitting tailor-made waist, with small sleeves, loose at the shoulder joints, and a skirt reaching just below the feet when in the saddle. The long skirt of a former period has been abandoned. The short skirt is kept down by sewing (not too many) bits of lead into the hem, and by two elastic straps which are brought down under the feet after mounting. One passes over the right instep; the other under the left heel. Specially made trousers of dark material are made as an essential part of every riding habit; but they should not come to the instep; high boots should be worn, and the trousers made just to meet the tops of the boots.

The qualities that make a good rider can be stated definitely. Experience shows that a horse can be made to yield up his will completely, contentedly and without reservation, if his rider will only exercise patience, calmness, firmness and unfailing kindness. It would seem to be desirable, therefore, for the horseman to cultivate these four cardinal virtues in himself. The horse will struggle in vain against this combination of moral qualities on the part of his rider, or, more accurately, he will not want to struggle at all. The remarkable success that women and children have with horses comes undoubtedly from their gentleness of manner and natural kindness and sympathy. Their very fearlessness springs from the same source. Inspired with good-will themselves, they unconsciously expect a return of the same from their animal; and they give themselves up without timidity to the enjoyment of this noble exercise. Firmness and steadiness will always win when kindness fails and the horse is obstinate, as he is likely to be once in a while. Possessed of the four qualities mentioned, there is imparted to the manner of a rider a quiet confidence which is felt by every horse he mounts and which goes far toward securing obedience at once.

LEARNING TO RIDE.

It is not necessary, but it is best, to go to a riding school for instruction. Even if one learns to ride at home it will be profitable to finish with a few lessons under a good master. Defects in position and handling are more quickly seen by the critical judge who is looking on than by the performer himself. Furthermore, every large school presents to one's observation a number of other pupils, good and bad. Their performances will show without further words what graces to imitate and what defects to avoid. The chief drawback to the riding school is the expense. Boucher would have the pupil take 250 lessons, and this is not perhaps too many to make a finished rider; few masters are content with less than forty; the pupil will have to pay from $50 to $300. Besides this practical difficulty of cost, there is another, namely, that in many places there are no riding schools at all, in which case the horseman must necessarily either go without riding or be dependent on his own private efforts. These difficulties are best solved by learning to ride without a master, and by finishing under one as opportunity affords. The rules are certainly simple. This essay is written to show what they are. By paying diligent attention to them as set forth in this book, any one can acquire the art of horsemanship without the great expense of tuition in the schools. The great object in horsemanship is to strive to win the good-will of the horse and to secure the perfect subservience of his powers to the wishes of the master.

From the very start pay the strictest attention to the matter of learning the simple nature of your horse. It is this nature the perfect control of which comprises the whole art of horsemanship. Remember, too, that the creature will look to you for his whole guidance; and that every sound you utter, every motion you make, comes in time to have a meaning to him. He must never be confused by your making significant signs and motions without intending them. If you click with your tongue and he springs forward, taking you by surprise, never halt him suddenly or whip him. It was not his fault; you asked him to go. An important principle is this, that the education of both the horse and rider often goes forward simultaneously. So true is this that the best course the rider can take is to begin as though he were training the horse. Even if the creature is already broken, no harm can come to the horse from going through the motions again; and it is indispensable for the rider himself to take every step in the process in order to acquire a perfect mastery over his noble and intelligent servant.

Begin by learning to vault upon the saddle without stirrups. An old and steady horse, tied to a post or held by a groom, is best for this. Stand opposite his left shoulder. Take a large lock of the mane in your left hand, holding it close to the roots but without twisting. Place the right hand holding the reins on the pommel. Bend the knees. Then spring up lightly close to the horse, raise yourself with your arms, and, when the body is high enough, throw the right leg horizontally over the back of the horse and fall gently into the saddle. Dismount by reversing the process. Do this three times. Then after having practised something else, do it three times more. After having learned to hold the reins, you can vault into the saddle exactly as before, but with the addition of holding the snaffle rein in the left hand. Vaulting is an excellent practice, even after you have learned to ride. It is believed that young Louis Napoleon would never have been slain with the spears of the Zulus, if he had known how to vault into the saddle.

The next process in the education of the rider is the practise of gymnastics in the saddle. Some masters wait until after the reins and seat have been taught. No matter where they come in, gymnastics belong to the early lessons. The more timid the rider the sooner the gymnastics will be in order. These exercises are regarded as one of the essentials in making a good rider, in order to supple the body, making it lithe and active and readily accustoming it to all the movements of the horse, besides giving the rider that confidence which leads to ease and grace. These exercises cannot be practised too often. A short time spent in them before riding will be of great benefit always. Expand the chest, the head well up, and sit motionless in that manner for a minute or two at a time. Repeat the practice frequently. Then holding firmly with the knees, move the arms in every direction as in calisthenics, first with the hands empty and then holding light weights. Keep the body perfectly motionless while so doing, the shoulders thrown back and down, and the head up, neck stiff. Then swing the legs from the knees, until the heels touch the cantle of the saddle. Bring up the knees until they touch above the pommel, keeping the seat meanwhile. Then lie down on the back of the horse, noticing as you do so whether the shoulders touch at the same time; if they do not, you have not been sitting squarely to the front as you ought. Return to a vertical position, holding firmly with the knees. Place the left hand on the mane and the right on the neck of the horse, and lean over to the right as ar as possible. Reverse and lean over to the left. Place one hand on the back of the horse, the other on the neck, and rise and turn as far backward as possible. A man can remove the thighs alternately from the saddle and replace them gently and slowly with a twisting motion so as to gain adhesion to the saddle. Another exercise is to grasp the cantle with the right hand, the pommel with the left; raise the body until the arms are at full length; face to the rear, and while turning, let go with the hands, crossing the legs between the arms; you will then be facing the croup. Reverse and face to the front. Also mount at a trot and gallop. As some of these motions will be fatiguing, the beginner should not attempt them all at once, and should use moderation at all times, in order that he may escape lameness of muscles next day. Properly conducted, these exercises will impart great suppleness and strength to the rider. Remember always while moving one part, to keep all the rest stationary.

These exercises can be continued with benefit even after having learned the management of the horse. Fifteen lessons in gymnastics are not too many before passing on to other exercises. At West Point, these exercises are practised igidly. Now take the horse you intend to ride and teach him to come to you. Approach him in front, without roughness or timidity, having the whip under your arm. Pat his cheeks, soothe him, and speak to him. Let him look at you and get used to you. Perhaps, give him a lump of sugar. Let there be no offensive smells about your person. The smell of hogs frightens him. Rarey used to put smelling oils on his hands, because horses are fond of cinnamon, honey, and cumin. Approach the horse from the windward side, when your hands are thus perfumed. Be gentle and easy in every motion, and thus secure his good will from the start. Feel of the bridle, and see that the bit is properly adjusted. Then with the left hand, take the reins firmly a few inches from the bit. With the right hand, lower the whip slowly to the ground; then raise it and tap his chest with it gently but rapidly, saying at the same time "come." A horse, like a man, withdraws from annoyance. He will at once back away. Hold him firmly; but follow him, and keep up the gentle action of the whip. Finding that he does not escape the annoyance by backing, he will change his tactics and come forward to you. Instantly, but not abruptly, stop the whip and caress the horse. Reward him by soothing words, which a horse always likes. When he comes to you, by a downward pressure of your hand, gently bend his neck. He will soon come to you, at the least gesture, when you take him by the rein, and even perhaps when you say "come." If he is unruly, be patient. You will win in time. Rarey lets the horse loose in a small stall, and whips his hind legs; the horse backs away, but soon finds that he is safest when close to you. This first exercise will greatly benefit both parties, and will be a step in teaching the horse to yield his will to that of his master. It will also make him steady to mount.

You must now exercise the muscles of the horse, as you have already exercised your own. Standing near his left shoulder, take the right snaffle rein in your right hand, letting it come to you over the back part of the horse's neck. Hold it firmly. Take the left snaffle rein in the left hand and feel the horse's mouth with it. Then draw gently but firmly upon the right rein, until, to escape the annoyance of the pull, the horse turns his head to the right. Let the left rein slip through the hand, as the head goes around. Hold the head to the right, until the horse champs his bit (which is a sign of ease and contentment) keeping the head perpendicular with the left rein. Then bring the head gently into its former position. Do not be discouraged by failure in the first attempt. Do not try to bring his head clear around at once. At first you may have to exert a good deal of gentle strength, but in time he will comprehend what you want, and will turn his head at the lightest pull. Now bend his head to the left. After each operation, soothe the horse and speak to him. If he moves his body to avoid the tension of the rein, check him instantly with the other rein. He must be taught to move only the member you desire moved. Next exercise him in bending his neck, up and down. The downward and backward movement is the important one, because it brings his head into position. These exercises limber the horse's muscles, and give the rider great control. Repeat them until the horse obeys readily at the slightest pull of the reins. If the horse's neck is thick and stiff, do not be impatient; it is not his fault.

The pupil can now mount. Let the horse look at you, caress him, and speak to him. Examine his bridle, and put the hands under the girths to see that they are properly fastened. Never, at any time, mount a horse without this inspection. If you do not know when a horse is properly saddled and bridled, learn how it should be. Stand at his left shoulder, so as to be safe if he kicks. With the right hand, draw the snaffle reins backward until you feel the horse's mouth, but do not pull on them because that would make him step backward. Carry the whip in the left hand, butt uppermost. Separate the snaffle reins over the back of the horse's neck, by putting the last three fingers of the left hand between them, and grasp them between the thumb and first finger, throwing the slack of the reins over the right side of the horse. Do not touch the horse with the whip. With the left hand, which now holds the whip and the reins, seize a lock of hair of the mane, close to the roots, without twisting. Catch the stirrup with the right hand, swing it toward you and put your foot into the stirrup, without kicking the horse. Catch the cantle of the saddle with the right hand, and spring straight up, close to the horse. Pause a second, then throw the right leg over the back of the horse, taking care not to touch him with the spur. As you turn, change the right hand to the pommel of the saddle, and drop gently into the seat. Then place the right foot in the stirrup. Always turn the heel outward in putting the foot into the stirrup. Lastly take up the curb rein. In dismounting, reverse the operation of mounting.

The rule for mounting in the cavalry service is a good one, and omitting a few details would be preferable for a civilian, in the opinion of the cavalry instructor at West Point. Standing on the near side of the horse, take the reins in the right, aided with the left hand, the reins coming into the right hand between the thumb and forefinger. Placing the right hand on the pommel, insert the left foot in the stirrup, with the aid of the left hand. Seize a lock of the mane with the left hand, coming out between the thumb and forefinger. Spring from the ground, holding firmly to the mane and keeping the right hand on the pommel; bring the heels together, the knees resting against the saddle, the body erect. Then pass the right leg over the croup, and come gently into the saddle. Let go the mane, insert the right foot into the stirrup, and pass the reins into the left hand and adjust them. In dismounting, reverse the operation. In this plan of mounting the left hand is free to aid in inserting the left foot in the stirrup; the rider does not have to loosen his grasp on the saddle, when his leg passes over the croup; and the right hand is free to check the horse if he starts before you are fairly seated. With the reins in the left hand, there is a chance of your fingers being entangled in the mane.

When a woman mounts, the horse's head will be held by the groom or her assistant. The rider places her right hand on the pommel of the saddle, and her left foot in the left hand of the assistant, which is held about fifteen inches from the ground for the purpose. Her left hand is placed on his right shoulder, and his right hand under her left armpit. To secure unity of action, he counts, "One, Two, Three." At "Three," the rider springs; and the man, rising, bears her bodily upward, bringing his left knee up to assist his left hand. A little experience will teach the proper degree of force to put into the mount. The rider instantly places the right knee over the pommel. The assistant places her left foot in the stirrup; adjusts the straps of her dress; sees that the stirrup is of proper length; and pulls down any folds of the dress that might be uncomfortable, the rider rising slightly for the purpose. In dismounting, the rider drops the reins, and frees herself from stirrup, and pommels, while the assistant loosens the straps. Sitting sidewise, she drops her arms at full length along her side, to hold her dress. The assistant reaching up takes her weight by putting his hands under her armpits, and as she slips down, he must see that she alights on the ground without a shock.

The first action after mounting is to take the reins properly into the hands. In hunting, the left reins are held in the left hand, the right reins in the right hand; the whip is held in the right hand, butt uppermost. In ordinary pleasure riding, however, a different manner is preferable. The snaffle is already in the left hand, when you have mounted, the reins being separated by the last three fingers of the left hand, and coming out between the first finger and thumb, the thumb being pressed upon them firmly. Do not hold them between the ends of the fingers, but take a strong grasp of them with the fingers pushed through as far as they will go. Now take up the curb reins gently with the right hand; draw them out and gather them into the left hand, the near rein passing between the third and fourth finger, the off rein between the second and third. The right comes out between the thumb and forefinger, and is firmly held with the thumb. The four reins are now gathered into the left hand, each one separated by a finger. Now place the right hand, (which holds the whip, butt uppermost) on the right snaffle rein, hooking the third and fourth fingers over it and pulling the rein through the left hand, so as to get a play of about six inches between the hands. There are other methods of holding the reins, but this is the ordinary style for pleasure riding. The horse is completely within control, and you can quickly bear on the curb or the snaffle as you please. Always close the hands firmly, making fists of them, and bend the wrists so that the hands shall come toward your body. Ride with the curb reins a little slack, except over rough ground, or when moving at speed. After short practice, the pupil will acquire a perfect mastery of the reins, and can pull upon the curb bit or the snaffle bit at pleasure.

In the cavalry service there is only one rein, the curb. The reins come into the left hand, and the little finger separates them. They pass out over the forefinger on which the thumb is pressed, the bight end falling to the front on the horse's neck. The left forearm is held horizontal, the hand six inches from the body, the little finger nearer the body. With double reins, Captain Augur prefers to let the little finger separate the curb reins, the middle finger separating the snaffle reins, both reins passing over the forefinger on which the thumb is pressed.

Remember that the reins are merely to guide and control the horse. They are not intended to hold on by. It is true that with a large and comfortable snaffle bit, the reins often give the rider much support in emergencies and rough riding, without pain to the horse. But the rider should not learn to seek safety in the reins or depend upon them for his seat. Cultivate an easy bridle hand, and carry as long a rein as you conveniently can. The wrists must play freely, forward and backward as the horse moves his head. "Give and take." Woman's success in riding is largely due to her flexible wrist and the easy rein with which she rides.

Seat is all important. Throw back the shoulders and expand the chest. Keep both shoulders equally square to the front. This is harder for a woman than a man, but it is a point which should never be forgotten. Keep the head up and the neck stiff—though not in appearance. Sit well down in the saddle, never resting on the cantle. Let the weight come straight down on the two seat bones and end of the spine. A man will close his legs firmly on the saddle, holding on with his knees and upper leg and gaining a little adhesion also with his calves. The grip of the knees makes the rider. It is not necessary to hold on like a vice every moment; but no matter what the pace is, the knees must remain steadily in position, aided by the little pad in front of them, and they must be ready to grasp the horse with great power at any moment. George Washington could make a horse tremble by the simple pressure of his knees. The lower leg should hang naturally, straight down in a perpendicular line. The ball of the foot will rest upon the stirrup, the heel pushed down and outward, the foot being carried nearly parallel to the sides of the horse. Only a lubber rides with his toes pointed outward, and the seat is not secure if the toes are either too far out or too far in. The rule is: parallel to the horse. In hunting, the foot is pushed in to the instep, the stirrup leathers being shortened one or two holes. The surest way to gain a firm and unshaken grasp of the knees is to practise frequently without stirrups. Hold the arms down the sides, the elbows just touching the sides, but without pressure. The lower arm should be horizontal, the wrists bent, bringing the hands inward.

The shape of a saddle varies, of course the seat, either forward or backward. The rule for the military seat in the American army is as follows: The buttocks bear equally upon the saddle, supporting the weight of the body, and insuring steadiness and stability. The flat of the thigh is turned toward the horse, without effort, the leg from the knee perpendicular and falling naturally. The bridle hand in position, the right hand behind the thigh, the arm falling naturally. The seat is thrown more forward than with the civilian rider, the legs are more directly under the body, and consequently the stirrups are longer. The heel is lower than the toe, so that in rising in the stirrups there should be from three to four inches clear space between the saddle and the seat. The thighs are turned toward the horse in order to clasp the horse, and in that position, without any effort the feet will be nearly parallel to the horse's sides. In that position, the rider preserves his stability and does not derange the position of the seat. The exercises will tend to make the seat easy and comfortable. In this manner without stirrups, after practice, it will be seen that the stability of the rider is insured, while the seat is maintained and not deranged. To those who have tried it, this explanation will be readily understood and appreciated. In military riding, both hands are occupied, one with the reins, the other with pistol or sabre. It is very important to keep the rider's stability and preserve steadiness. The whole body of the rider must be supple and active, the clasp of the thighs must not be rigid or else there will be constraint. The whole body must be free from constraint. The aim, of both military and civilian riders, is to have and keep perfect control of the horse. This can be accomplished only by knowing what is required of each, by experience, in the use of prescribed means, learning practically what has been read and studied theoretically. In the cavalry service the feet are never pushed home in the stirrups; it would not be admissible for a military seat.

Each seat, civilian and military, is a proper one for the service demanded of it, and neither one should be decried by the other.

A woman needs to pay great attention to keeping both her shoulders and her hips squarely to the front and to sit in the middle of the saddle. These things are awkward for a woman, but they are absolutely necessary, and can be soon learned. The right upper leg must lie flat upon the saddle, and parallel with the horse's neck; the right knee flat in the pommel and grasping it firmly; the lower leg drawn back; the toes of the foot bent down, the heel up and pressed against the horse. The upper left leg will lie flat against the saddle; the knee close to the saddle and pressing it; the lower leg hanging straight down, perpendicularly; the ball of the foot resting on the stirrup, and the foot parallel to the horse's side. Many people regard the absence of leg power as a disadvantage to a woman; and while there is just enough truth in this to make it desirable for women to ride well-trained animals, all the same, according to the best masters, their seat is as secure as that of a man. With the leaping horn or second pommel, women can go anywhere with a good horse; and, as a matter of fact, they do hunt with an energy and apparent recklessness that sometimes eclipses the sterner sex. Certainly they use the whip and spur in a way that no man would.

Now, seated in the saddle, the pupil resumes the mutual education of his horse and himself. The first lessons are in "turnings on the spot." Turn the horse's head to the right and the left, pulling it around with the snaffle rein firmly but gently, and holding it in each position until the horse champs his bit contentedly. Do not pull his nose upward. Keep it down. Persevere, until his neck is thoroughly supple, and he will bring his head clear around without moving his body Do not abandon one exercise until it is thoroughly learned. The horse will be confused by your changing to a new exercise, before he has learned the old. Change off, next, to the curb rein. Then teach him to bend his neck, and bring his nose backward until his head is in a vertical position. The rider must acquire the skill to bring a horse's head into this position, for while it is not necessary to keep the horse gathered like this all the time, yet delicate and important manœuvres cannot be properly performed without it; and if the animal is disposed to be unmanageable, his head must be brought into position anyhow to be entirely within control. To bring the horse's head into place, hold the snaffle reins in the left hand. Resting the edge of the right hand upon them, press the reins down to the pommel, raising the left hand if necessary. Press the horse with the legs to prevent backing. He will probably resist the tension; but, when he is tired, he will drop his nose and bend his neck. Instantly relax the reins, and soothe and reward him. A slight pressure of the curb will bring his nose down when nothing else will. This exercise should be practised until it becomes easy for him to hold his head steadily in position, as will be shown by his resignedly and contentedly champing his bit. In every exercise, the horse must move only the part of his body desired.

The next exercise is to teach him to move his croup to the right or left without changing the position of his fore feet. To move the croup to the right: Carry your left leg back of the girths a little and press his flank gently, pulling the left rein at the same time. The horse yields to the double impulse; he withdraws from the annoyance of your left leg, and moves his croup to the right. Steady him with the right rein. In time, he can be made to bring his head clear around to the right and, as it were, to see his croup coming toward him. Reverse the operation, to move the croup to the left. Do not require too much of him at first. If he has done well, reward him. The complete manœuvre is to make him perform an entire pirouette, describing a complete circle with his croup.

The turnings on the spot can now be executed with the horse at a walk. Before starting the horse on a walk, make sure that he stands straight, resting equally on all four legs. When tired, a horse will perhaps put one of the hind feet forward of the other. In such a case, rein back slightly and he will put his foot back into place. The horse standing on all four legs, his head straight, to start him into the walk, lean back for a moment a little in the saddle, press him gently with the knees, and give him the rein. Do not speak to him. Learn to make him obey without uttering a sound. Your action will start him off in a walk without a word. Sit quietly in the saddle, paying close attention to every point that makes a good seat, expanding the chest and holding up your head especially. Feel the saddle with the knees and keep them firm but do not vary the pressure. Keep the heels away from his sides. Let your body sway easily in harmony with his motions, the wrists playing easily with the movements of his head. This is the operation of walking. To stop, gather the horse, lean back a little in the saddle, raise the hand gently bringing it toward the body, until the horse obeys and close the legs to hold him straight and prevent him from backing; he will stop at once. The military rider does not lean back in starting. He closes both legs and raises the hand until the horse feels the bit: he then lowers the hand and increases the pressure of the legs until the horse steps out.

To execute the turning to the right on a walk. Start the horse at a walk. Let him take one step. Then pull in the right rein, turning his head so as to see the sparkle of his eye, and at the same time hold his hind part steady with the pressure of the left leg. Keep him at a walk, turning continually to the right in a small circle. The pressure of the left leg keeps his body straight as he moves around the circle. Next, try the turning to the left, which is the exact reverse of the preceding operation. In turning a corner, never turn short off at a right angle; begin to turn when one length away from the wall.

Two weeks can profitably be spent in these simple turnings. Riders are generally in a hurry, and wish to pass at once to the trot and gallop often long before they know how to do anything whatever well. Experience shows that a better horseman can be made by making haste slowly, mastering the fundamental principles thoroughly, taking one thing at a time and conquering its difficulties before taking the next step forward. If you learn to ride, you will ride all your life. What are a few weeks at the start? The turnings and the gymnastics of the early lessons are exercises of the greatest value, simple as they appear. They limber the horse, and they limber the rider and give him great confidence; and if kindly and patiently performed, they give the rider great control and establish that good understanding between horse and master which must be sought for from the very beginning and which will enable both parties to do all their work with entire ease and mutual enjoyment. It is to be noted that women perform these turnings the same as the men, except that where a man has to use the pressure of the right leg, women use the pressure of the whip.

To back a horse gracefully and naturally is an art that must be learned in due time. The horse must go backward easily, preserving his equilibrium at every step. See that he stands straight, resting equally on all four feet. Close the legs to prompt him to raise one fore hoof. Then lean back a little and pull him back gently. To regain his balance he must take a backward step. Begin gently and do not try to force him too far backward. Soothe him if he is excited. With patience and good management of reins and legs he can finally be made to back as far as desired, and then to stop and resume the forward motion.

Now for the trot. Start the horse in a walk, first making sure that your position in the saddle is correct. Sit well down. Walk fifty or sixty steps. Then lean back a little for just a moment, give him the rein by a motion of the wrists and press him with the legs. If he does not understand, or is tired, urge him gently with the whip on the flank. It is better not to urge him with the voice. The reason is that if other horses are in company your voice will start them all. Keep a firm grasp of the saddle with the knees and the flat of the calves of the lower leg. All your motion up and down should be with the knee as the pivot, not the stirrup. Keep the shoulders and hips square to the front, the wrists playing the horse's mouth easily, the hands three inches above the pommel and the lower legs as nearly perpendicular as possible. A good rider never flaps his elbows like wings, and never swings his foot backward and forward like a pendulum; and he always keeps the shoulders back and down, and the head up, with the neck stiff, but without the appearance of stiffness.

In the close sitting trot the rider gives himself up to the motions of the horse, rising and falling with every step. This is good exercise, but makes rough work of long distance riding. Too much of it entails fatigue and abrasions of the cuticle for the time being, and stiffness of muscles for next day, upon all except the experienced horseman.

In the jockey trot the method is to spring up at every other step of the horse, using the knees as a pivot, aided by a slight pressure upon the stirrups. The rider thus escapes the shock of every alternate fall into the saddle of the other style of trot. Do not try to rise until in perfect accord with the step of the horse. This rising in the saddle is easily acquired, and has become very popular for the reason that it promotes comfort and safety both. But the rider will do well to look to his position, unless he is indifferent to his own safety and the ridicule of spectators. In rising the tendency of men is to lean forward, and to ascend as though about to dive over the horse's head. To prevent this, keep the head and shoulders well back, and in rising bring the waist forward and not the head. The position will then be erect, comfortable and attractive. Rise easily and only enough to clear the saddle. If a horse changes his step while trotting, sit closely for a few steps until in perfect accord again with his motions; then resume the jockey motion.

With women the tendency is to lean sideways toward the lift, and in rising to stand straight up from the stirrup. To become a graceful rider, this tendency must be counteracted and conquered. Look between the horse's ears, keep the shoulders and hips squarely to the front, glue the left knee firmly to the saddle, and while holding the pommel firmly with the right knee, press it upon the saddle as though about to kneel. Rise from the right knee perpendicularly.

To gallop, begin by gathering yourself firmly in the seat. Hold the reins firmly. Draw in the right rein slightly until you can see the flash of the horse's eye. Press the right flank of the horse with your leg, at the same time throwing your weight backward to the left. This brings the weight of the horse in that direction and causes him to throw his right shoulder forward. Steady him with the left rein and hold both reins firmly, which will cause him to bend his neck and bring the head down. Simultaneously, urge him forward with the pressure of both legs. He will at once break into a canter with the right leg forward. Sometimes an obstinate pony or tired-out horse will not yield to these indications of his rider's will. If necessary he can be made to throw his head down and break away by giving his ear a sudden twist with the right hand. Pain secures the result. But ear-twisting is not a dignified resource for a good rider. Proceed in the proper manner and add a touch of the whip on the right shoulder. If all else fails, the spurs will bring his haunches under him and send him off without further ceremony.

During the gallop, sit well down in the saddle, holding well with the knees. Push the stirrups forward a little and with the heels down brace against the stirrups to obviate the consequences of a sudden halt.

Bend your spine backward a little and throw the head a trifle forward, to bring the general centre of gravity into the right place. All horses extend in galloping, and position must be taken accordingly. By leaning backward and bracing hard against the knees and stirrups, the rider will have a safe, graceful and comfortable seat.

When the horse is started with his right leg forward, the gallop is the most comfortable to the majority of riders, especially for women. Women should always gallop with the horse's right leg forward. Men, however, should practise by starting with the left leg as well as the right, and in changing from one to the other. In galloping around a corner or in a circle, take care that the leg on the inside of the curve is forward, otherwise he may trip. The run is the gallop pushed to its uttermost.

In the schools the pupils are drilled in coming from a full gallop to a sudden halt. Lean well back while doing so, pull in the horse's head with the reins and brace hard with the knees and the stirrups.

Practice alone secures comfort and style in the trot and gallop.

As for jumping, if a horse can be taught to jump before he is mounted, and to do it with good will, half of the trouble and danger is already overcome. There seems to be no better plan for this than the English one of always feeding the young horse in one place. To obtain his meals he must come over a bar in the gate or doorway. A strong bar is used. It is laid on the ground until the horse is used to it. It is then gradually raised until the animal finds that he can jump more easily than he can clamber over. It is then placed an inch higher per week until a jump of four and a half or five feet will be taken two or three times a day without thinking about it. However, a horse can also be taught to jump, even after he is broken, in the following manner: Saddle and bridle him. Standing near his head, take snaffle reins in the hand and lead him around the field. The bar having been placed on the ground, you walk over it with your horse back and forth many times, until he has ceased to notice the bar. Then raise it a little, and again lead him over it. Then come up to it, still leading him, on a run, and jump over it with him, until he is entirely used to it. Mount him and begin all over again. The bar can be raised little by little until he jumps it at any height.

The action of the jump is the same as the gallop, excepting that more force is put into a single bound in order to clear the obstacle. The beginner usually jumps over ditches and pools of water first; over bars and fences afterward. If care is taken not to disgust the horse, he will enjoy this new exercise of his powers as much as his rider does.

Different riders have different ways of getting over fences. Some lunge at it without hesitation. Others pause a second to gather the powers of their horses. Some use whip or spur as they approach it. Others do not. Every horseman can experiment for himself. The best plan, however, is to approach at an easy canter or trot. The near reins are taken in the left hand, the off reins in the right hand. They are firmly held but not so as to pull the horse back. While sitting firmly in the saddle, the rider keeps his horse straight for the fence, and does not vary his hands or the pressure of his legs or make any other demonstration to confuse or hurry his animal. In jumping Captain Augur regards it as preferable and more natural to take the reins in the left hand, unless the horse has to be steered over an obstacle; it is better to teach the horse to jump with one hand. With a good rider and a good horse, the jump might be taken with one hand, but if the horse is likely to have little heart for his work it requires both hands to keep him straight at the fence. Let the horse jump the fence his own way, provided that it is not sidewise. As he gathers for the bound the rider leans backward first to bring all the weight back over the haunches; he holds hard to the saddle, and if he chooses gives him the whip, voice or spur. As he rises he is given an easy rein and the rider leans forward. As the horse descends the rider leans well back, holding hard with his knees, bracing against the stirrups and sitting firmly all the while, so as to meet the shock of reaching the ground quietly. The reins are held firmly so as to support the horse against a possible stumble until he dashes forward again, but he must not be pulled in at that moment, because that would make it hard for him to recover.

It is essential that the rider shall not be in a hurry himself, shall know what he is about and not be flurried. His animal makes the leap in strict obedience to his master's will; and if that will is vacillating and undecided there will be trouble. If the jump is taken quietly and firmly it is a pleasure to both parties; the horse enjoys putting forth his powers as much as the man does, and certainly the man exults in the joy of vigorous action when crowned with success.

A veteran hunter who has had many a fall at a difficult fence, lays down the rule that if there is to be a fall, wait until the last moment and then roll off rapidly in a sitting position, with your face toward the horse, holding hard on the reins.

Women need never fall. They take a fence with wonderful ease and success.

The Spanish walk (or piaffer) is a movement belonging to the higher mysteries of the art. Generally instruction in this difficult but beautiful step is taken under a master. Nevertheless, the untaught horseman can attain to it unaided by anything except his own tact and skill, if he is patient and persevering. The horse advances with the same step as in a trot, flinging the right foreleg and left hind leg diagonally forward, placing them on the ground and balancing on them for a few seconds while the other pair of legs are flung forward in the same movement. The action is bold, but the actual progress is slow. This is an imposing and elegant movement, suited to the display of fine horsemanship on stately occasions, such as the review of troops by the commanding general.

Success is won by patience, tact, and the ability to be contented with slow advances. The horse is started at a walk, soothed, but led to expect something. The legs are then tightly closed, which causes him to take one long stride. He is held with legs in air a brief interval, balancing on the other two legs. The moment the fore leg comes down, the horse is obliged to throw his weight over to that side, in order to preserve his equilibrium. The rider adds to the inclination in each direction by himself leaning sidewise, and he sustains him by pressing that side of the horse with his leg. It is by the slow alternate pressure of the rider's legs and the weight of his body, that the movement is kept up. The horse is kept well gathered, and the cadence is regulated by the rider. He can make the walk slow or fast, at will.

To make the steed paw the air with one of his fore legs, he must be well gathered. Draw his head slightly to the right, and throw your weight to the left side. When this is properly done, the horse raises his right fore foot to maintain his equilibrium and keeps it in the air as long as you wish. A slight variation of your weight will cause him to stamp and paw the earth.

There are a variety of fancy movements, in school riding, in which the rider may go on and exercise his horse, if he chooses. Among them are the trot backward, the gallop backward, the instant halt with the aid of the spurs, and changing foot in the gallop at every step. None of these exercises, except the last, has any practical value, and they are very difficult. They serve merely as illustrations of the unlimited dominion that man has over the power of the horse. It is in the City of Paris chiefly that these higher things are taught. They are however understood in the riding schools of America, the majority of these establishments being under the management of Europeans. But the American mind is practical and prefers the acquirement of skill which can be put to actual use. No one is considered a horseman, until he can trot, gallop, run, and leap a fence; but when he can do those things, he is a horseman, and the American is satisfied.

VICES OF A HORSE.

When a horse balks, obstinately insisting upon stoppage in the road, the best way is to wait calmly the moment when he chooses to resume the march. It is probable that when he is tired of standing and shows a willingness to go on, the reason is that he has begun to realize that the longer he halts the longer it will be before he reaches his stable again with its stores of oats and hay. If he should be kept standing, in the road, until he is thoroughly hungry, he would in a short time abandon the practice of balking. Sometimes, he can be started by filling his mouth with sand or gravel. It gives him something new to think about.

If the horse stumbles, sit well back, hold him hard, and press him with the knees, which gives him energy to recover.

Rearing and whirling round and round are usually caused by a tender mouth, or at any rate by too great a tension of the reins. It follows, and experience proves, that to continue to pull on the reins is only to make matters worse. Relax the reins. If the horse persists in rearing, the safest plan for the rider, if he cannot throw himself from the saddle safely, is to drop the reins and clasp his arms around the horse's neck.

To cure kicking, Rarey was in the habit of fastening a rope around the horse's lower jaw, passing it backward under a collar, and fastening it to one of the hind feet. One good kick generally cured the worst horse forever. Other trainers back the horse against a board fence and tickle his hind legs with a whip. Again, one kick generally effects a cure.

Shying may come from temper, but it is usually due to alarm growing out of nearsightedness. If the latter is the cause, the horse can be cured by being allowed to see and examine the object. When a horse shies, in passing an object, it increases his terror, after the cause is left behind, to strike him with a whip. The better plan is to soothe him.

The most dangerous vice is bolting, or running away. No horse can bolt if his neck is bent, the bits are in their proper place, and the rider has a firm grasp of the lines. But if the bits are in the horse's teeth and his nose is in the air, a struggle is inevitable. By sitting firmly and letting him go, it is frequently practicable, by a sudden pull, to regain control and bring him to reason. A good plan is to confuse the horse by turning him round and round, and then starting him off into a gallop and urging him until he is weary. One good lesson of this sort may cure him for life.

Obstinate refusal to obey can generally be cured, in one lesson, by a course of procedure similar to the last. When patience and kindness have failed, and it is a clear issue as to which is the master, there is only one thing to do. Quietly take the reins up short, gather in the horse's head, without warning administer two or three good stingers on his flanks, and bracing firmly against the inevitable plunge, let him go a few steps; then turn him round and round; confuse him, and tire him out by a good gallop. "Once will be enough for him."

RIDING ACROSS COUNTRY.

For a year or two after he has learned to ride, the horseman will gallop along the country roads, parade in the park when the world is out for its afternoon drives, and explore the unfrequented and lovely byways of the country around him. In this occupation he will find abundant exhilaration and opportunity for the exercise of his newly acquired powers. But he will soon want to do more.

Some day, while out in the country, he will wheel his horse and leap over a low fence into a rolling field, and gallop about on its uneven surface, jumping the ditches, steering clear of the stumps, and dodging the branches of the trees. There will be opened up to him at once a whole hitherto untried field of endeavor, which will fascinate and fill him with a wonderful new delight. He will at last know the feeling of power which true riding brings.

But suppose he were in the South, the guest of a large farmer with a pack of hounds and enjoying the fine, ungrudging and delightful hospitality which a Southern gentleman knows so well how to bestow. Suppose he were to join his host some cool forenoon in the fall, or on a bright moonlight night, in a tearing race across the fields after a wild fox, the hounds away in advance giving voice in a manner that would thrill every fibre in his being; his host flying like a wild Indian over fences and ditches and dashing through laurel and rhododendron as though he never saw them; and perhaps other hunters galloping furiously around behind and in front of him; and he too with his gallant horse carried away with the frenzy of the occasion and taking leaps that he would never have dreamed of in cold blood; the hounds finally running the fox to his death and killing him—then the horseman will at last know what it is to ride. He will realize that this dull earth has sport, more exhilarating, healthful and romantic in nature than anything he had ever conceived.

Hunting on horseback has always been known in America, although in the Northern States scarce anything has been seen of it since the Revolution up to ten years ago. Before the Revolution, hunting across country was popular on Long Island; and in the South nearly every country gentleman was a born hunter and kept hounds enough to enjoy the sport whenever he desired. And he desired it often. The game (both fox and deer) virtually disappeared from the Northern States fifty years ago. The deer were killed, or driven to mountains inaccessible to people on horseback. The foxes were exterminated as a pest; and though a few scattered specimens of the fox still lurk in the woods, even at this late day, yet their number is too small now to be depended upon for sport. The divided ownership of the land in the Northern States would have proved a bar to general hunting, even if the game had been plenty. In the South, however, cross country hunting has survived to the present day. There are plenty of foxes, both gray and red. Nearly every large farmer has from two to a dozen hounds. And the passion for the sport is universal.

Three kinds of game have been pursued on horseback in America. The largest animal has been the buffalo. It has sometimes been practicable to shoot one of these great creatures on foot; and the Indians, clad with buffalo skins, have often stalked a herd, and brought low some mighty king of the plains by their excellent marksmanship. All the same, the rule has been to hunt him on horseback. The buffalo feeds on the open plain, where there are no hiding-places either for himself or the hunter. The animal is timid and flees at the unconcealed approach of man; and the arrow is a short range missile. Owing also to the large size of the creature, the Indians could seldom fill one full enough of their deadly arrows to kill him on the spot where found; and they have been obliged usually to follow the herd for several miles to catch and kill enough of them to answer the demands of their camps for food. As a rule, too, the hunters have always had to ride considerable distances from camp in order to reach the game at all. The white men have been obliged to imitate the example of the Indians, in spite of their more effective weapon—the rifle with its heavy bullet. Buffalo hunting has now come nearly to an end in the United States. The game is nearly exterminated. The old flocks reaching for miles across the plains, before whose march even our cavalry companies, who never fled from Indian tribe, have been glad to get out of the way, are now no longer seen. To find the game the hunter must go to Manitoba. The buffalo chase will soon have passed entirely into history.

DEER HUNTING.

In former times, the staple of the chase was the deer, which swarmed in the forests in countless numbers. They could be shot, any day, on foot, at first. When they became scarcer, they were often pursued by gentlemen with hounds and horses. The trail was taken and followed to the death. This was the old way, embalmed in verse and story. The fashion which prevails to-day in the South is a different one. The hunting party sallies forth on horseback, armed with shot-guns, and provided with horns. The hounds are placed in the care of drivers, who ascend to the wooded hill-tops and search for the fresh trails. The hunters take their stands at places where woodcraft teaches them the deer is likely to seek refuge in the water-courses, or cross the wagon roads. The hounds are then sent off on the trail, the course of the hunt being signalled to the different members of the party by the baying of the pack. Every hunter remains with gun at a cock, listening keenly to the thrilling music of the dogs, and watching for the appearance of the deer from cover. If the course changes, so that any particular hunter is left out of the sport, he must mount and ride at full speed to some other station. If he is fortunate, he will finally hear the exciting tumult of the chase, the baying and the hallooing coming his way. If his heart is not in his throat, and his muscles are not shaking too much with the tumult of his own feelings, he may soon sight the game and have the pleasure of blowing the triumphant blast upon his horn that notifies the whole hunt of the death of the deer. If he wounds the creature, he must mount and dash after him.

Sometimes, the hunters in a body are compelled to ride at the top of their speed, for several miles, along the roads, following the chase which travels parallel to the road. This enables them to enjoy the music of the hounds and to have a shot at the deer when he breaks cover.

In the North deer-hunting usually takes place on foot without the accompaniment of riding; but in the South, the horses are always saddled for this sport.

Organized deer-hunting is carried on in Virginia chiefly by the Albemarle Hunting Club, which, under the title of the Armstead Hunt, was founded in 1856, by Peyton S. Coles and nine or ten associates. A sketch of the operations of this important club will illustrate the manner in which the sport is carried on in these times. This hunt was an offshoot of the old company at Crawford Springs, which had been in existence since 1841. Among the pioneer members of the new club were Mr. Coles, Richard Durrett, William M. Morris, John Harland, Markus Durrett and Shepherd Moore. The first hunt took place in September, 1856. The party camped in tents. Many new members joined the party the next year. Yearly hunts took place regularly. In 1865, Mr. Coles purchased the property on which since 1856 the club had been hunting. On this property, which lies in Augusta County, twenty miles from Staunton at the headquarters of the Calf Pasture River, there is a house of seven rooms. It is not large enough for all of the annual party, so that a goodly company must lodge in tents every year. Here, for the last thirty years, the members of the hunt have met annually, and have given themselves up to ten days of excellent sport. The date of meeting is generally fixed at the October court, and is usually the last week in October or the first week in November. There are twenty-two stockholders now, each of whom can invite one guest. The president of the hunt can invite any number. All the provisions are sent up in advance. In addition, the camp requires eight or ten servants, twenty horses and fifty hounds. As the parties arrive at the camp for the first meet, the occasion is marked by the cordial greetings of old friends and companions who have not seen each other through the busy year which has passed. The camp resounds with jolly laughter, and many questions are asked about the guests and members who have arrived and others who are to come. Every one spends a little time getting settled in the tents and club-house.

The hunt is organized by the election of a president and three vice-presidents, who have charge of the sport, direct what ground is to be worked each day, and assign the hunters to their stands; a secretary, who records the game killed and by whom; a treasurer, who divides the expense of the hunt, collects the money and pays the bills; two masters of the hounds, who take charge of all the dogs and select from the kennels, daily, the hounds they require, without regard to owners; a commissary, who attends to the purchase and giving out of the provisions; and a quartermaster (sometimes two) to take charge of all the horses and see that they are well fed and groomed. At 10 p. m., lights are out and sound sleep is the order of the night. Everyone is up bright and early. At daybreak, breakfast is eaten; and the two drivers, accompanied by men leading the dogs in couples, are off to the mountains. Not more than two or three dogs are ever liberated on the track of one deer. Horses are saddled, and the hunters scatter to their respective stands. Each one must remain where he is placed until called for in the evening, or drawn away by a deer he has wounded. A penalty attaches to a violation of the rule. Some of the standers are located near the water-courses; others at the low points of ridges. Does and fawns frequent the brush of the lowlands. The very large deer are found on the highest parts of the ridges. A large fat buck, pressed hard by the dogs, will take to the water in fifteen or twenty minutes.

The thrilling music of the hounds tells when the chase is started. The drivers follow the trail hallooing, encouraging the dogs, and pressing the deer toward the stands. When the game crosses within range, and the stander draws blood, he is expected to follow the deer to the best of his ability some distance. If he wants a good scamper, now is his time. Formerly, it was the rule that the one who drew first blood had the credit of killing the deer. At present, the man who actually kills him secures the coveted prize of the head and skin. While on stands, no shots can be fired except at deer, bear, or wild turkeys. Luncheon is eaten while on post, and consists of such good things as the hunter has taken with him from the breakfast table.

If he has forgotten to fortify his pockets before he leaves camp, he must console himself with philosophy.

At 3 or 4 o'clock in the afternoon, the signal is sounded that the hunt is over. Upon the return to camp, every man is required to take the caps from his gun, or, if he carries a breechloader, to draw the charge. A fine of one dollar for the benefit of the servants is imposed for entering the camp with the gun capped or loaded. Dinner is served about 6 o'clock. Then the roll is called in the largest room of the club-house, and each member relates his individual experience during the day. This occupation generally affords much amusement, especially to the old hunters, and the occasion is a jolly one indeed. The ignorance of the city men and their mishaps and misdeeds often prove very comical. Then the hunt for the next day is arranged. Every man who has fired at game must take a back place. The best stands next day are given to those who have not had a shot at all. Many of these good stands are named after the successful hunters who have found them. As a rule, the rougher the stand the better the chance for game. Early to bed and early to rise is the rule of the hunt; and soon the camp is again buried in slumber. This programme is continued until the end of the hunt.

The president and vice-presidents appoint two members who take charge of all the game brought in. Each day the commissary enriches the table with choice morsels. At the end of the hunt, the deer are divided into as many lots as there are gunners in the party, and each man obtains his share by drawing a gun-wad or number from a hat. It is on record that forty-eight deer have been killed during a hunt. Mr. Cole states that in all between 1,000 and 1,200 deer have been killed in that region in the last thirty-five years, during which period he has himself never missed a hunt, and few, if any, deer. He is the best authority on this subject in the country.

One of the amusing features of these hunts is the experience of the city men, who come out often heavily armed and ready to depopulate the mountains. They often have excellent luck; but on the other hand, that peculiar emotion, known as buck fever, often afflicts them. It is related that one of them came into camp one night, morally certain that he had desperately wounded a deer during the day; the next day, an old hunter found his twelve buckshot deeply imbedded in the top of a pine tree.

Sometimes a deer runs into the river or passes the camp when the day's hunt is over. Such an incident creates a tremendous stir. The hunters vie with one another in the effort to kill the wandering animal. Experienced hounds will bay the deer, six or ten miles away. The dogs often run the game off and do not return for several days. Grey and Scotch stag hounds have been taken out to the mountains, but they are found inferior to the Virginia fox-hound. A mixture of hound and cur makes a very good deer dog. Most of the hunters carry breech-loaders; but three Westley Richards muzzle-loaders, 14 gauge bore, have been the most successful ever used. As a matter of fairness, the drivers are allowed more liberty in shooting at game, than the standers. The deer are away ahead of them, as a rule, and as a compensation they can fire at other things than deer, bear, and wild turkey.

HUNTING THE FOX.

It is the hunting of the fox which possesses the most excitement and calls for the most daring horsemanship. The buffalo gallops across an open plain, full of prairie-dog holes, it is true, but with no obstacles to leap and no trees to tear the hunter from the saddle. The deer occupies ground which few horses can cover, and as a rule the horseback part of the hunt is confined to a gallop along the country roads.

The fox, however, runs generally in the open country. If he takes to the woods, the hounds soon have him out again. The whole of the excitement comes from following the hounds, as closely as practicable, and trailing after them whithersoever they may lead, over fence and brook, through bush and brake, until he is run to his death.

Fox-hunting, too, possesses one element which the deer and the buffalo hunts lack. Or, rather, it lacks one element which the others possess, and which tends to deprive them of the character of sport pure and simple. Both varieties of the graminivorous game are good for food, and their death has the utilitarian value of supplying the larder with provisions. On the other hand, the fox has no value whatever for food; and although his handsome brush is serviceable as a trophy, yet his head and pads would subserve that object equally well. The killing of the fox has only one practical purpose, and that is the protection of the farms from the loss of their domestic fowls. Still that does not deprive the hunt of its fine character as sport pure and simple. Indeed, it only lends zest to the killing of the fox. Reynard, too, is better worth hunting, for hunting's sake, on account of his wonderful swiftness, endurance, and ingenuity. The tricks he will play to avoid capture are without number. The deer's only device is to take to the water; but a fox will take to the top of the fences, the soft earth of the ploughed fields, the ledges of limestone and granite, the holes in the ground, and even to the trees; and he will run straight away at the first alarm with a speed that gives him time to meditate over his strategy and devise something to the point.

Southern men pay great attention not only to the nose and keenness of smell, but to the voices of their hounds. They breed with a view to deep and musical voices, and some of them have packs whose music thrills the man who hears it.

How far, fast, and long a fox will run is a disputed question. It is claimed by many hunters in North Carolina, that a red fox will run from five to six hours at a speed part of the time, of twenty miles per hour; and that a gray fox will run from one to five hours at a speed part of the time, of fifteen to twenty miles per hour. The wild gray fox is more easily caught than the red, for he wastes time in doubling, sauntering along the tops of fences, and devising other forms of strategy. The wild red fox is off straight away for twelve to fifteen miles before he thinks of the various quaint devices with which Reynard is proverbially identified. But both of them, when they do run, go like the wind. Without meddling with the disputed question of his exact speed, suffice it to say that any one who follows him will be obliged to go as fast as he can, if he expects to reap any honor from his day's exertions.

Old hunters believe that no fox can run more than eight hours. The animal may escape immediate capture by throwing the hounds off the scent; and cases are on record in which he has roamed the country, constantly on the move, for from twenty-four to forty-eight hours, the hounds slowly following the trail until thoroughly exhausted. The period of actual running is, however, confined to the first few hours of the hunt.

As a rule, the dogs overtake the game in from two to four hours. The average time is three. If a fox has just eaten he will be quickly caught.

It need hardly be said that in fox-hunting the riders do not carry guns. The killing is done by the dogs; and it is done, too, without ceremony when the eager pack catches the game. It is astonishing how quickly the animal will be torn to pieces and swallowed, after the leading hound has had one good snap at him.

As stated before, the wild fox is now found principally in the South. He abounds in the great region all along the Blue and Alleghany mountain ranges, especially in the counties which have not yet come under complete cultivation. He is hunted in the old way in the chivalric fashion in Maryland, Virginia, West Virginia, North Carolina, South Carolina, Alabama, Tennessee, and Kentucky.

In Virginia, this sport has diminished within the last few years owing to the operation of a law passed by the Legislature, allowing any county to offer a reward for fox scalps. A great number of scalps have been brought in, in consequence of this measure, generally by persons who seek the reward and not the sport, and who trap the foxes, lie in wait for them, dig them out of their holes, and kill the young and old indiscriminately. In Rockingham County, D. S. Lewis is probably now the only man who keeps a pack of hounds for running foxes. A few men near the mountains keep one or two dogs each, but none of them have a pack. In running the fox, the plan of Mr. Lewis, when he is alone, is not to follow the trail all the way to the death, for three reasons, namely, the farmers object to the devastation of their fields; the fences are generally too high to jump, being usually what are called staked and ridered fences; and thirdly, few horses could live through a red fox chase, as the fox will run ten miles away from where he is started and will locate a part of his route through a very rough country. The usual process is to start the fox, and then to gallop along the roads making an occasional dash across country and through the woods, enjoying the music of a good part of the run and sometimes being in at the death. The red fox is so swift, however, that it is not unusual for the pack of hounds to be out of hearing in ten or fifteen minutes after Reynard is started. Mr. Lewis's dogs have splendid speed, bottom, and nose, and sometimes give good mouth and tongue. If the day is good and the scent lies well, they will never quit the fox until they catch him or drive him into a hole. The country in that district, in the Valley of Virginia, abounds in limestone ridges, and every few miles holes can be found in which Reynard finds a refuge and from which it is impossible to dig him out.

In Albemarle County, they have the gray fox, and there is some hunting. In Eastern Virginia, before the war, a large number of gentlemen kept hounds; and even yet there is a good deal of excellent hunting in pursuit of game.

In the Southern tier of Virginia counties, especially around Danville, there has always been satisfactory hunting. The foxes are of the gray variety, and the hunters, as a general thing, are able to follow the dogs closely and to be in at the death. The fences are not very high, and the sportsmen take them as they come whenever the chase is hot. It is a rare thing for a gray fox to get away, if the dogs fairly have the trail. There are also some red foxes in that district. In earlier times, ladies frequently went out with the hunting parties and followed the field over the fences, whenever not too stiff for them.

Across the mountains in West Virginia, there are foxes and deer enough to afford a chase at any time. Ordinarily the deer cannot be followed on horseback, because they keep to the mountains; but the foxes can be. The only obstacle is the enclosing of the farms with staked and ridered fences; but the sportsmen have ample scope for a good run on horseback, without trying to leap over impracticable barriers. The best region for following the hounds is that part of Randolph County lying around Beverly. In Pocahontas County, around Huntersville, foxes and deer are so numerous that a man can stand in his own door and see the game off on the hill sides. There is a good deal of fox-hunting on horseback, and sometimes deer are chased in the same way along the brooks into which they dash to hide their trail.

In North Carolina, there are many districts where huntsmen follow the hounds in pursuit of fox. One is upon the upper waters of the Nantahala River, in the extreme western end of the State on the borders of Cherokee and Macon counties. It is rough riding there through the laurel and rhododendron coverts, but the good horseman will go anywhere, and women have often dashed through these thickets in the saddle as freely as the men.

In the mountain region on the western border of North Carolina, the forests swarm with game (deer, fox, bear, panther, quail, squirrels, and other varieties). In nearly every county west of Raleigh, there are four or five, often more, well-to-do farmers who keep a pack of hounds and are devoted to the fox chase. Women very often join them in the sport on horseback and seem to enjoy the hunt as much as the men. All the hunting in that section is done by people living there. Strangers seldom take any part in work that requires riding.

In the middle section of North Carolina, the fox-hunting centres around Salisbury, Hillsborough and Durham, but principally around the place first named. Reynard can be started within a thousand yards of that town; and between sunrise and sunset a party can get three or four good runs. Both red and gray foxes are abundant. The rolling country is perfect for the sport. Ladies frequently ride there. Christian Reid (Miss Fannie Fisher), a native and resident of Salisbury, has been out many times; and her vivid description of a fox-hunt on the upper Nantahala was a picture of her personal experience. Many excellent packs of hounds are kept. Colonel John A. Holt and Colonel Thomas Sumner have fine packs, and they are happy to go out with acquaintances fond of the sport. In bad weather, the real hunters wear riding leggings, and most of them wear corduroy suits. Their head covering is the soft felt hat. At Hillsborough, James M. Norwood and other gentlemen own fine packs of hounds. In Durham, the fox-hunter is W. T. Blackwell, the tobacco millionaire, who keeps a number of excellent cross country hunters and is always ready for the sport. He puts his dogs into a wagon and drives out fifteen to twenty miles to find the game.

North Carolina foxes are proverbially game and cunning. They have been seen to cross a ploughed field in front of the plough horse, so that the scent might be buried in the furrow by the fresh earth turned over it.

In South Carolina, Tennessee and Kentucky a great many gentlemen keep hounds and good hunters and follow both the fox and the deer which abound in various sections of the State. General Wade Hampton broke his leg while hunting in the Wateree Swamp in Richland County, between Camden and Columbia. The swamp is about five miles wide and is filled with cane brakes on the islands, in which the deer breed and graze. General Hampton was riding a mule and became separated from the rest of the hunting party when the animal threw him and broke his leg. It was several hours before he attracted the attention of the party by firing his gun.

ORGANIZED FOX-HUNTING.

Fox-hunting in the North necessarily takes a different form from the genuine sport in the South. The passion exists for the hunt; but the absence of the fox creates a difficulty. The men of the North have solved the problem in their own way. The sport which they enjoy may not have the zest which comes from chasing a genuine wild fox, rudely roused from his lair in the forest, desperately running for his life over leagues of hills and valleys, and playing all the tricks at his command to puzzle and throw the hunters off the scent. Nevertheless, the Northern men get what they go out for. They have a jolly meeting and a rousing ride across the country. They compete for the honors of successful effort, they have the exhilaration of the moment, and they carry back to business next day strong and hearty bodies for the work they have to perform in the practical business of life.

The first attempt in the United States to revive organized fox-hunting was made at Hackensack, N. J., in 1875, by a number of the young men of New-York City. Educated in the riding schools, expert horsemen, and fully qualified to enter into the sport in the best manner, they longed for something more than the decorous canter in the Park on a summer's afternoon. A pack of hounds was obtained, and the members of the club enjoyed many gallant rides. In 1877 the club moved to Long Island and located at Queens. Moved by the success of the pioneer club, a number of men organized a second hunt in the fall of 1879, and established their kennels at Lawrence, on Long Island. J. D. Cheever, a young man of social standing and great personal energy, was the Master of the Hounds; and he hunted them until 1882, when other interests compelled him to resign. The two clubs, one called the Queens County Hounds, the other the Rockaway Hunt Club, then consolidated, with the understanding that the two names should be retained. The new club adopted for itself the title of "The Rockaway Hunting Club," and the kennels became the "Queens County Hounds of The Rockaway Hunting Club." F. Gray Griswold, former Master of the Hounds of the second club, accepted the Mastership of the consolidated pack. In 1885 the club moved into headquarters at Cedarhurst, L. I., where an elegant club house and large kennels and stables had been built. The club house is of the Queen Anne style and is without doubt the most perfect in the land, both with regard to beauty of architectural design and internal comfort. It is well situated on a slight elevation overlooking the course of the Rockaway Steeplechase Association and facing Hempstead Bay. The club has a membership of about 200; and fifty of them ride after the hounds. The hounds, fifty-three in number, are all imported and constitute a pack the most even and efficient for its size in the country, owing to the skill of the Master, Mr. Griswold, a very competent man both as a horseman and huntsman. The hounds meet twice a week from the first week in September until the frost puts a stop to hunting in Queens County, when they are sent down to Ronkonkoma, in Suffolk County, which being a sandy county does not freeze hard and is well stocked with foxes. Queens County is nearly all grass and a "post and rail" country. When the ground is not too hard, the scent, whether that of a fox or of an anise seed bag, is very strong, so that the hounds are enabled to run very fast. This requires clean high jumping and good hands and seat to follow them. The success of this club is due in a great measure to the energy, skill and keen love of sport on the part of John D. Cheever, who is also one of the pluckiest riders in the hunt. Around the nucleus of active riders of the Rockaway Club have gathered the large membership referred to. A large number of men are members for purely social reasons. The membership is as follows:

Henry Alexandre	William M. Harriman	Frederick Neilson
John E. Alexandre	Charles M. Heald	Louis Neilson
Alphonso H. Alker	John G. Heckscher	Victor H. Newcomb
Joseph S. Auerbach	William H. Henriques	De Lancy Nicoll
Charles C. Beaman	H. L. Herbert	Francis Payson
Heber R. Bishop	P. Cooper Hewitt	Chas. Grenville Peters
Benjamin Blum	Eugene Higgins	F. S. Pinkus
Lonsdale Boardman	Samuel P. Hinckley	Bruce Price
S. W. Bocock	Thomas Hitchcock, Jr.	Percy R. Pyne, Jr.
John H. Bradford	Center Hitchcock	George C. Rand
Alex. Brown	Amory G. Hodges	Dr. A. L. Ranney
Frank G. Brown	William H. Hollister	Nicholas Rath
Lloyd S. Bryce	Louis M. Howland	Whitelaw Reid
W. T. Buckley	Winfield Scott Hoyt	Sidney Dillon Ripley
Middleton A. Burrill	Robert P. Huntington	J. B. Russell
William V. Burrill	Henry B. Hyde	Winthrop Rutherford

McCoskry Butt
Francis D. Carley
Henry Phelps Case
Henry Chauncey, jr.
Charles A. Cheever
H. Durant Cheever
John D. Cheever
John H. Cheever
P. F. Collier
Caldwell H. Colt
Austin Corbin
John Elliot Cowdin
Winthrop Cowdin
F. Bruckholst Cutting
Charles C. Delmonico
Edward N. Dickerson
Edward N. Dickerson, jr.
E. W. Dixon
Arthur M. Dodge
Alex. Dougan
William P. Douglas
J. Coleman Drayton
A. Butler Duncan
Ralph N. Ellis
Frederic Gebhard
Jefferson George
Warren N. Goddard
Charles W. Gould
Clendenen Graydon
Dr. James O. Green
F. Gray Griswold
W. C. Gulliver
Dr. David L. Haight
George Edward Harding
Edward H. Harriman
J. Low Harriman
William E. Iselin
Leonard Jacob, jr.
Nathaniel Jarvis, jr.
Walter Jennings
Woodbury Kane
Foxhall Keene
James R. Keene
McPherson Kennedy
Edward Kessler
R. F. Knoedler
Edward La Montagne
Edward La Montagne, jr.
Ernest C. La Montagne
Maurice La Montague
Pierre La Montagne
Rene La Montagne
Adolf Ladenburg
James F. D. Lanier
T. Swan Latrobe
John L. Lawrence
Newbold T. Lawrence
Prescott Lawrence
Dr. C. L. Lindley
Carroll Livingston,
Dan'l D. Lord
N. Griswold Lorillard
Pierre Lorillard, jr.
Rich'd P. Lounsberry
DeForest Manice
Frank Morehead
Marquis DeMores
Edwin D. Morgan
W. H. Morgan
A. H. Morris
Stanley Mortimer
Alfonso De Navarro
Andrew H. Sands
Sam'l S. Sands, jr.
A. Wright Sanford
John Sanford
Wm. C. Sanford
E. W. Saportas
Carl Schefer
Ernest Schefer
J. Frederic Schenck
F. Augustus Schermerhorn
Edwards Spencer
Alex. H. Stevens
Frank Storrs
Marion Story
Wm. L. Stow
F. K. Sturgis
Wm. P. Taber
Wm K. Thorn, jr.
A. Clifford Tower
Lawrence Turnure, jr.
H. McKay Twombly
A. Ernest Vanderpool
Wm. Vass
Wm. E. D. Vyse
E. Berry Wall
Raymond L. Ward
Horace Lee Washington
James M. Waterbury
A. Gordon Weld
Wm. F. Wharton
Frank Worth White
Walter C. Witherbee
James T. Woodward
George Work
Dr. G. H. Wynkoop
Elliot Zborowski

The Meadow Brook Hunt was formed by men of New-York City upon exactly the same plan as the other organization. E. D. Morgan is Master of the Hounds. The packs meet twice a week in fall and spring. Ladies often ride; and there is always a gathering of interested spectators to watch the start. The kennels are at Hempstead on Long Island. The membership is as follows:

George C. Allen
Francis R. Appleton
C. C. Baldwin
J. W. Beekman
August Belmont, jr.
O. H. P. Belmont
Arthur Bender
James G. Bennett
Alexander Brown, jr.
Lloyd S. Bryce
Middleton S. Burrill
George C. Clausen
P. F. Collier
J. S. Oram
E. T. Cushing
Alexander Dougan
Henry W. O. Edye
Chas. G. Francklyn
Henry L. Herbert
Thomas Hitchcock, jr.
C. Oliver Iselin
William Jay
J. L. Kernochan
Chauncey F. Kerr
Adolf Ladenburg
J. F. D. Lanier
N. G. Lorillard
Pierre Lorillard, jr.
Edwin D. Morgan
Richard Mortimer
Stanley Mortimer
Francis Payson
Howard N. Potter
A. Belmont Purdy
Homer B. Richardson
Sidney Dillon Ripley
Archibald Rogers
Elliott Roosevelt
Theodore Roosevelt
Winthrop Rutherford
S. S. Sands, jr.
John Sanford
William C. Sanford
A. W. Sanford
William Cary Sanger
Robert Sedgwick
William E. Dodge Stokes
R. W. Stuart
W. K. Thorn, jr.
William R. Travers
F. T. Underhill
W. K. Vanderbilt
E. Berry Wall
James M. Waterbury

HONORARY MEMBERS.

P. C. Barnum
Austin Corbin
A. H. Gardner

In these clubs the packs meet in the early morning during the early part of the season, the ground being so hard that the scent will not lie after the dew dries. Later on, when the ground grows softer, the meet takes place in the afternoon. If a course is laid out for a run with a drag, its length depends on circumstances, the weather, the condition of hounds and horses, etc. It will vary from four to twelve miles. From personal observations in England a member of the Rockaway Hunt says that after a fast forty minutes, covering a distance of about ten miles, the fox grows very tired in the last few fields, and could not go ten miles further in an hour. Riders and horses are often nearly in the same condition. Ladies join in the hunting constantly.

A third hunt, which is composed largely of New-York men, is called the Essex County Hunt. This organization operates in the county in New-Jersey after which it is named. It is a uniformed club and has a membership of sixty-eight, as follows.

NEW-YORK.
Wm. D. Baldwin
John Burke
David Bingham
Theo. B. Bronson
M. W. Bronson
Geo. F. Basset
P. F. Collier
Powers Farr
John Firth
Geo. F. Hecker
Frank Hendricks
Wm. F. Kidder
Ed. Kelly
Julian H. Kean
Chas. H. Lee
W. C. Lee
F. E. Martin
H. N. Munn
Chas. A. Munn
D. McKeever
C. W. Nann
A. L. Phillips
Chas. Power
J. R. Rand
D. Robinson
C. A. Robbins

NEW-YORK.
W. Emlen Roosevelt
E. W. Sadler
A. Louis Seymour
Louis A. Thebaud
E. P. Thebaud
Paul L. Thebaud
Oliver S. Teall
John R. Townsend
J. N. Van Ness
F. M. Wheeler
C. W. Wheeler
C. F. Watson
Ed. Winslow

NEWARK, N. J.
S. S. Batten, jr.
W. Campbell Clark
Geo. W. Campbell
Henry Durand
W. B. Durand
W. S. Skinkle

ENGLEWOOD, N. J.
Dr. H. M. Banks

ELIZABETH, N. J.
B. H. Campbell

HAVERHILL, MASS.
H. H. Hall

MONTCLAIR, N. J.
Henry A. Dike
H. W. Nason
Captain Tarr

MORRISTOWN, N. J.
R. Fry
R. D. Foote

ORANGE, N. J.
J. P. Gillies
Chas. A. Heckaher
Major C. G. Hutton
E. W. Hine
F. M. Hoag
R. Pancoast
F. C. O'Reilly
S. Van Rensselaer
Harrison Whittingham
J. O. Ward, jr.
John C. Wilmerding

SOUTH ORANGE, N. J.
Henry A. Page

SHORT HILLS, N. J.
J. R. Pitcher

BROOKLYN, N. Y.
L. B. Ward

NEW-BRIGHTON, N. Y.
A. Vanderbilt.

Philadelphia has two organized hunts, the "Radnor" and the "Rosetree." The Radnor Hunt is an active club and musters at Bryn Mawr a large party for the pleasures of the field. Its roll of membership contains the names of many well-known men, the majority of whom, however, are attracted by the social features of the club rather than the riding. The members are:

PHILADELPHIA.
C. T. Creswell
T. P. Chandler, jr.
G. K. Dougherty
P. M. Graham
Chas. E. Haines
Thos. C. Harris
Robert E. Hastings

ARDMORE.
A. D. Acheson
Thomas Boyd
T. A. Glenn
Lewis Wister

RADNOR, PENN.
L. T. Brooke
P. C. Erben

BRYN MAWR, PENN.
Geo. W. Childs
H. L. Comfort
W. S. Ellis
Dr. C. T. Goetner
Anderson Kirk
Benj. F. Kirk
W. M. Lycett

W. A. Kirkpatrick
J. Dundas Lippincott
E. H. McCullough
J. Chester Morris, jr
Geo. W. Morse
H. P. McKean, jr.
Herbert Priestly
Lewis A. Riley
Harold M. Sill
Cooper Smith
Dr. Louis Starr
Thos. R. Tunis
A. P. Thompson
T. B. Twibill
Andrew Wheeler
PAOLI, PENN.
H. W. Biddle
W. Wayne, jr.
OVERBROOK, PENN.
A. L. Wilson
J. S. Wilson
Barclay Hall
Murray Rush
W. M. Runk
HAVERFORD, PENN.
Samuel B. Brown
E. F. Beale, jr.
A. J. Cassatt
E. B. Cassatt
Rowland Evans
C. A. Griscom
Charles E. Mather
J. S. Waln
Jas. D. Winsor
Wm. D. Winsor
Charlton Yarnell
WYNNEWOOD, PENN.
Richard Norris
VILLA NOVA, PENN.
J. Hunter Ewing
Marshall Ewing
H. L. Geyelin
Herbert J. Lycett
H. B. Montgomery
A. R. Montgomery
John L. Mather
James Rawle
Thomas Ryan
W. T. Tiers
W. W. Whitney
PITTSBURG, PENN.
Chas. Wharton, jr.
GEN. WAYNE, PENN.
J. M. Froenfield
W. D. Hughes
Theo. F. Ramsey
William Siter
MERION, PENN.
Lincoln Godfrey
DEVON, PENN.
Henry Whelen, jr.

The Rosetree Hunt has a membership as follows:

Vanderbilt Allen
Humphrey Ash
Richard L. Ashhurst
W. G. Abbott
J. M. Baker
Dr. S. P. Bartleson
R. D. Barclay
Edward F. Beale
Harry W. Biddle
John T. Bailey
General Edward F. Beale
Spencer F. B. Biddle
W. Ross Brown
S. J. Cochran
Herbert Coxe
Thomas Clyde, jr.
W. H. Corlies
A. J. Cassatt
B. F. Clyde
George E. Darlington
Jared Darlington
John T. Dahon
William P. Eyre
George W. Eachus
H. B. Edwards
James L. Fisher
Walter R. Furness
Frederick W. Fatterall
Ellicott Fisher
M. M. Fitler
Lincoln Godfrey
Dr. Kingston Goddard, jr.
Alex. E. Harvey
R. S. Huidekoper
George W. Hill
William H. Horstman
H. R. Hatfield
James C. Hall
James S. Hill
G. de Saumarez Hamilton
J. H. Irwin
Isaac Johnson
B. K. Jamison
Herbert I. Keen
Samuel C Lewis
George M. Lewis
S. L. Levy
J. H. Lewis, jr.
J. Howard Lewis
J. W. Mercur
J. W. Mlvin
W. H. McCallum
Charles E. Mather
William H. Miller
Walter S. Massey
J. Wilkes O'Neile
Harry Peale
Richard Peters, jr.
Dunbar Price
S. Harlan Price
Philip P. Peace
Charles B. Rhodes
Fairman Rogers
James Rawle
James D. Rhoads
Dr. Francis F. Rowland
Samuel D. Riddle
Walter M. Sharpless
Rufus E. Shapley
Samuel H. Seeds
Carroll Smyth
James P. Scott
William Struthers
Henry E. Saulnier
George M. Tyler
A. H. Tyson
Frank Thompson
C. H. Townsend
Edward Worth
Joseph Lapsley Wilson
Charles B. Wright, jr.
John Wyeth
Philip J. Walsh
A. L. Wetherill
Walter G. Wilson
William Wayne, jr.
Alex. D. Young

Boston has one club, the "Myopia," with club house and kennels at the Gibney Farm in Hamilton County, about thirty miles out of the city. The meets take place principally at Hamilton, but sometimes at Dedham and Southboro. Forty or fifty men join in the riding. The hunting is principally with beagles on the trail of a drag in the early fall, but in November the fox hounds are taken out to follow a fox. Hunting must be suspended in winter, so that the club makes the most of the fine weather while it lasts, often meeting four or five times a week. The average fence is the characteristic New-England stone wall, three or four feet high, although there are many which range up to four and a half feet, a few even higher. Most of the country is rolling and beautiful and well adapted to the sport. The actual membership of the club is as follows:

Bryce J. Allan	Henry S. Hunnewell	James Parker
Dr. William Appleton	Edward B. Haven	Dudley C. Pickman
Hugh A. Allan	Henry S. Hovey	Francis Peabody
John S. Allan	Augustus Hemenway	Frederick H. Prince
M. K. Abbott	Henry Cabot Lodge	Arthur Rotch
Henry D. Burnham	Amory A. Lawrence	Lucius M. Sargent
James H. Blake	T. Wattson Merrill	Frank Seabury
Alexander Cochrane	Charles J. Morse	Eugene V. R. Thayer
T. Jefferson Coolidge	George A. Nickerson	Herbert Timmins
J. Murray Forbes	Albert W. Nickerson	Eben Wright
Joseph P. Gardner	Hugh K. Norman	George H. Warren
John L. Gardner	George H. Norman, Jr.	William F. Weld

The Myopia Hunt is practically a part of The Country Club, an organization which has a fine club house at Clyde Park, in Brookline, a suburb of Boston. The membership of the club is nearly 600.

Maryland has two organized clubs. In this State the sport is more genuine. The farmers are nearly all passionately fond of fox-hunting, and although the game is growing scarce, rural fox-hunting is engaged in in nearly every county in the State. Every farmer has from three to a dozen dogs, and the enthusiasm of them all is so great that they have been known to leave their ploughs and mount their horses when hearing of a hunt in progress. The Eastern shore of Maryland (that is the peninsula east of Chesapeake Bay) is level and the sport is very popular in that section. There are no organized clubs, but hunts are of frequent occurrence. On the west shore the counties most given to the sport are Prince George, Baltimore, Carroll, Harford, Frederick, Anne Arundel, Howard and Montgomery. The rest of the State has a surface not adapted to riding across country. Maryland foxes are all red. When a run is made to start a wild fox, it generally lasts the entire day. The party go out early in the morning and they follow the trail until the fox is killed or irretrievably lost. As a rule, the practice is for a farmer to invite his friends to a meet. After a good run they return to the house of their host, relate the day's adventures and close the occasion with a good dinner or supper. Hunting parties generally consist of about twenty-five members; but they are often larger. Governor Carroll once had a party of sixty at his residence (Doughoregan Manor) in Howard County, many of them being ladies, and gave a hunt which lasted all day.

Of the two organized clubs of the State, one is located in the suburbs of Baltimore and is known as The Elkridge Hunt. It is composed, with one or two exceptions, entirely of city men. T. Swann Latrobe is Master of the Hounds. The uniform of the club is a scarlet coat, black trousers, top boots and high hat. A number of women ride after the hounds; but they have no uniform other than a good riding habit. The stables of the club contain many excellent hunters, all good jumpers. Twice each week between October and April, unless the weather forbids, there is a meet; and notices are published in advance announcing that all damage done by the members in following the chase will be paid for by the club. Very little damage is done, however, and the farmers are as a rule so much interested in the sport that the bills which come in are few.

The Prince Georges County Club numbers about forty members, who are mostly residents of the City of Washington. They have no regular kennel and wear no uniform. Among their active members are ex-Governor Oden Bowie, Lieutenant Emory of the Greely expedition, and a number of National and State officers. Women usually ride with the hunters.

The Elkridge Club has frequently made twenty miles in an hour. The Prince Georges Club has done even better.

Maryland farms are large, but foxes are growing scarce. It is frequently necessary even here to improvise a trail. There are three kinds of hunts in the State: (1) the chase of a wild fox; (2) a run after a fox liberated from a bag, in which case the hunt seldom lasts more than two hours; and (3) a drag hunt, in which the trail is made by a bag of anise seed, dragged over the ground for several miles the day before, this variety of hunt lasting about an hour. The Elkridge Club is frequently obliged to adopt the last-named plan, owing to the scarcity of wild foxes in the county. The pursuit of the trail of an anise seed bag is not hunting in the proper sense of the term. Nevertheless, the hunters have an invigorating scamper across the fields and a jolly day, and they conclude the affair with an oyster or terrapin supper which is itself worth a hard ride to secure.

Ladies frequently attend the meets, and they make daring and successful riders. They usually wear the ordinary riding habit.

The members of the Elkridge Club are as follows:

Walter B. Brooks
Alexander Brown
George S. Brown
George Brown
Frank Brown
Sydney C. Cary
Thomas C. Chappell
Dr. A. F. Dulin
Thomas Deford
B. F. Deford
Charles Denison
Stewart Diffenderfer
Frederick G. Fry
D. S. Fitzgerald
J. H. Ferguson, Jr.
John Gill
A. L. Gostee
John Gill
Robert Garrett
T. H. Garrett
A. de G:nquier
F. S Hambleton
T. E. Hambleton
F. H. Hambleton
Frank K. Howard
John E. Hurst
Thomas Janney
E. S. Jackson
R. G. Keene
H. B. Keyser
T. Swann Latrobe
F. L. Latrobe
S. H. Lyon
Osmun Latrobe
E. G. Merryman
E M. Murray
H. Munnekhuysen
J. B. Morris, Jr.
W. I. Montague
W. Cary McHenry
H. J. Morris
J. C. Morris
S. Hoffman McLane
Louis McLane
Sterrett McKim
John Mason
Robert Ober
T. H. Oliver
W. de C. Poultney
H. A. Parr
C. P. Paine
Prof. H. A. Rowland
Forney Reese
L. de Roche
T. A. Symington
Thomas Swann
C. Morton Stewart
Sherlock Swann
R. N. Sloan
Decourcey W. Thorn
Jesse Tyson
Isaac Tyson
B. Howard Tyson
Joseph H. Voss
Harry Walters
Ross M. Whistler
W. S. G. Williams
Winslow Williams
William Whittredge, M. D.
Ross Winans

In addition to these clubs, there is an excellent one in Western New-York, called the Genesee Valley Hunt.

Toronto has a hunt of 53 members. Montreal has another of 114 members.

A hunt is organized with the usual executive officers and a Governing Committee, who manage the affairs of the club as a social organization. There is also a Master of the Hounds, who has entire control of the hunt employes, the horses, and the hounds, and who appoints the meets.

It is in field work, that the excellence of the early education of the horseman is tested. His general gymnastics and his repeated practice in riding without stirrups, will now be of immense service to him. After a man's muscles have become strong and hard, should he ride an hour, three times a week for two months, without putting his feet into the stirrups, trotting, galloping and leaping low obstacles, he will discover that he has gained astonishingly in firmness of seat. He will go at a fence in the hunting field without thinking of it, whereas before that his heart would thump in a most uncomfortable fashion, every fence would appear tremendously high to his agitated senses, and his nerve might possibly give out just at the moment when his gallant charger is preparing to go over the obstacle like a thunderbolt. The gymnastics are of the greatest value in enabling the rider to alter his position when neces ary and to throw himself off comfortably if he ever has to do that. These suggestions are hardly needed by the country gentlemen who have spent nearly all their years in the saddle; but the city rider does need them. His occupation is sedentary and the strength of his muscles is due, not to his daily employments, but entirely to the exercises of his hours of relaxation. The bar exercises in a general gymnasium and walking to and from business aid materially to make a good horseman. In the field, the qualities required are concentration, constant good nature, careful attention to seat and reining, gentleness when the horse is doing well, and inflexible will, with good nature, when he is not.

POLO.

This exciting game is substantially hockey on horseback. It was played originally by the rajahs and upper caste people of India, and comes to America by way of England. It was introduced into the British Isles by one of the cavalry regiments about twenty years ago. The scene of the first polo game was a field near Folkestone. The civilians were quick to adopt the new sport and a polo team was soon organized in Monmouthshire. After that, the game was taken up by the students at Oxford and Cambridge. Polo has been played in Paris and Dieppe, and, for a few years past, at Pau in the south of France, a resort much frequented by Englishmen. There are now teams all over England and Ireland.

The Indians of Arizona play a game something like polo, riding the hardy ponies of their region, and using any kind of a stick, straight or crooked, and any kind of an object for a ball, a white stone, a dead rat, or anything else that is convenient. Each player acts for himself, there being no organization as in polo. The game has always been played by them in this way. There has always been a native game of polo, therefore, in America. Nevertheless, the sport was introduced into the States from England, as before stated.

The first club was the Westchester, organized by young men in New-York City, who played first on the beautiful grounds of the Jerome Park Racing Association, a few miles north of the city. They afterward played in Prospect Park in Brooklyn; then had regular grounds at One-hundred-and-tenth-st. and Fifth-ave., in New-York City, before that region was in demand for dwellings; and finally, a few years ago, they moved to Newport and have established permanent headquarters there.

The game is only possible where there are a number of young men who are good riders and enthusiastic lovers of horsemanship. There

are clubs now at Meadow Brook, N. Y.; Cedarhurst, N. Y.; Buffalo, N. Y.: Orange, N. J.; and in Texas and Mexico.

The following are the rules of the game:*

In all matches the sides are distinguished by the first and second club colors. The dress consists of jerseys, quartered in the club colors, forage caps, white breeches and butcher boots.

A captain is selected for each team, and he has the direction of the positions and plays of his men. The captain is not allowed to have any of his men appear in the game except in club uniform.

One or more umpires are chosen by the captains. All points of issue between the teams are decided by the umpire, who acts as starter and timer. In case there are two umpires they shall, as stated above, choose a referee, who shall perform the usual duties of that office. (It is only in *matches*, in the strict sense of the term, that umpires or referees are deemed necessary.

Mustangs are used, and the height of ponies must not exceed fourteen hands one inch. Anything under that size is allowed. The grounds allotted for play are about 250 yards long,

---

*These rules have been prepared by John Gilpin, the Newport correspondent of THE TRIBUNE, who has been present at every game in Newport since the sport was introduced there, more than ten years ago. They have received the approval of S. H. Robbins, W. K. Thorn, jr., T. Hitchcock, jr., Stanley Mortimer, F. Gray Griswold, L. M. Rutherford, E. L. Winthrop, Elliott Roosevelt, Alexander Brown, S. S. Sands, and others.

and if possible should be two-thirds as wide as they are long. In order to qualify ponies to play for any match games or cups they have to be measured before the governors of the club, and their name and height, together with owner's name, registered.

Each side must take up its position behind a chalk or whitewash line, within a dozen yards of goal posts. Upon the ball (which is made of light wood) being thrown into the centre of the field by the umpire the game commences. Each player must keep to the centre of the field in the charge until the ball has been touched. Charging is now, except in the opening game of a match, omitted. The ball is placed in the centre, and the sides, which are located a few feet from it, make a dash for it as soon as the word "play" is heard. The "charging" was always in vogue during the years that the game was played by James Gordon Bennett, Jr., who introduced the game in America. It tends to use the ponies up. Charging in the recent International matches in New-York occurred at the opening of the two days' match, but it was omitted after the first game had been decided.

None but proper mallets and balls, approved by the stewards, are allowed. The mallets are from forty-nine to fifty-two inches in length. The head of each mallet is of willow, and the handle, which is small and "willowy," is covered at the end with string and wrapped with buckskin.

It is contrary to rule ever to touch your adversary, his pony, or mallet, with the hand or with the mallet; but the "hooking" of mallets while striving to gain possession of the ball is allowed.

Foul riding consists of careless and dangerous horsemanship, and lack of consideration for the safety of others, and is not tolerated. A disregard of these requirements is sufficient cause for suspension and expulsion.

If a player is off side (*id est*) he is in front of the player of his own side who hits the ball, he is "sneaking," and out of the game, and cannot hit the ball until behind the last striker, or until he has at least one player between him and the hostile goal.

No player is allowed to strike the ball when dismounted.

Touching your adversary, or his pony, or mallet, foul riding, etc., or "sneaking," mention of which is made above, constitutes "foul play."

The umpire is required to note and call "foul play," and may declare the game lost by the team, a member of which shall have made such a play; or he may declare the same player out of the game until it shall have been finished. In case of off side the umpire must see that the ball is returned to the place where the foul occurred. A player may, however, interpose his pony before his antagonist, so as to prevent the latter from reaching the ball, whether in full career or otherwise; but he is not allowed to cross another player in possession of the ball, unless at such a distance as to avoid the possibility of a collision.

In case a claim of "foul" is not allowed the ball is placed and mallets crossed where the foul occurred, and at the word "play" the game is continued.

When the ball is hit out of bounds at the side it must be thrown into the playground by an impartial person (providing no umpire has been selected), who may be near the spot, between the competing teams, which shall, before the ball is tossed in, be drawn off in a line facing each other.

When the ball is hit "off ends" (the goals are located at the ends) the person defending the goal is entitled to the privilege, unmolested, of stationing himself on the boundary line and knocking it in the opposite direction. Knock-outs, for safety or otherwise, are numerous and are allowed.

Ten minutes is usually allowed after each game, but any limit of time can be agreed upon.

In matches for prizes each game is usually for three intervals of twenty minutes each, with two minutes' rest between each goal, the side making the largest number of goals in the sixty-minutes of *actual* play is declared the winner. The rest periods are *added* to the time. The referee has the power to declare the goal lost to any team failing to be in position when "time" is called for play to begin. In case of an equal number of goals having been made at the end of the third interval the game is continued until one side makes the winning goal. Each team selects an umpire, and the umpires appoint a referee, whose decision is final.

Should a player break his mallet, or have it broken, he must ride to the appointed place where extra ones are kept and take one. No persons, except players and umpires, are allowed within the space devoted to the sport while the games are in progress.

A player may ride on his antagonist, whether in possession of the ball or not, providing he does so at an angle which does not endanger a fall, but a player in possession of the ball, viz.: the one who has struck, has the right of way, and must not be crossed, unless at a distance which will avoid collision.

The penalties for violating the above are: *First*—The antagonist of the side committing the foul to have a free hit from the spot where the foul occurred. *Second*—The side which caused the foul take the ball back and hit it off from behind their own goal line.

THE COWBOYS.

BY EDGAR B. BRONSON, CATTLE RANCHMAN OF EL PASO, TEXAS.

For the finest horsemanship which is not taught within the schools of the large cities, or under the tuition of the officers of the United States Army, we must go West to the great plains. There, grace is somewhat sacrificed, but the horsemanship is magnificent.

The stock-rider of the plains is called in California and Idaho a vaquero; in Wyoming and Colorado a cow-puncher; in Kansas a cowboy; and in Texas a cow-hunter. He is a horseman who excites the curiosity, amusement and admiration of those to whom the genus is unfamiliar. Seen on foot at some little plain railway station of one of the great overland routes, his uncouth figure, with its rolling, awkward gait, his heavy leather leggings worn in the North to protect the person against inclement weather and in the South against the *mesquite, tornilla and una de gato* thorns, his enormous Spanish spurs, wide-brimmed, flapping sombrero, and flaming silk handkerchief tied loosely around the neck, stir the curiosity and amusement of the average traveller, mixed perhaps with some awe if, as usual till recently, this quaint figure wears belted to his side, as its proudest ornament, a long Colt's 45 calibre six-shooter.

Mount him on a favorite cow pony and a transformation takes place. You forget the uncouthness; the awkwardness is all gone. He sits close and erect. There is little of knee or thigh grip on the saddle in his seat. He maintains his position mainly by swing, balance and poise. His stirrup leathers are set so nearly midway between cantle and horn that his position is almost as erect as if standing on the ground.

His saddle is made for strength, ease to the horse's back and comfort to the rider. It is very heavy, weighing from thirty to forty-five pounds. The "rigging," i. e., the leather covering of the wooden tree to which the straps and rings of the cinchas or girths are fastened, is of heavy oil-tanned leather. The stirrups are of wood, four to seven inches wide. In California and some of the northern Territories tapaderos are generally used, a heavy leather housing for the stirrup, hanging from four to eighteen inches beneath the stirrup, and designed to protect the foot against weather and thorns, and also with broncho or wild horse riders to give weight to the stirrup and hold it in position.

With this equipment a cowboy of average dexterity will defy the most vicious buck-jumper. Well mounted on a favorite pony, he will master the wildest Spanish bull. His weapon of offence against both is the lariat, a rope of grass or rawhide thirty to sixty feet long, with a running noose at one end. In breaking and riding a wild horse, he will, if in a hurry, go into the corral, rope the horse by both fore feet while running, and taking a turn of the end of the rope round his body and bracing himself, turn the horse a somersault to his side as the rope tightens. In one instant he has tied the horse's feet securely so that he cannot rise. A *jaquemo,* or headstall, usually of braided horsehair with horsehair rope and reins attached, is then put on the horse's head while still lying on the ground. The saddle is then securely cinched on his back. A "blind" covering both eyes (sometimes a leather band hung over the ears but more often merely a handkerchief loosely twisted in the headstall) is then put in position, after which the ropes are taken from the horse's feet and he is allowed to rise. He stands blindfold, trembling, not daring to move. The rider grasps the headstall securely with his left hand to prevent the horse jumping from under him or whirling to kick: and seizing reins and saddle-horn in his right hand, he swings slowly and easily into his seat. He then ties his lariat to the saddle-horn, gathers up his reins and reaches forward and lifts the blind. The horse is frightened and, if a nervy fellow, angry. He tries every possible jump into the air and to one side, every twist, turn and contortion to unseat the rider. Sometimes if held in with too close a rein he will rear and fall backward. This is the greatest danger a rider has to encounter. This struggle goes on until the horse (or the man) is mastered. When the horse's violence is over, he is gradually taught the application of the rein and a few simple words of command. After two or three turns under the saddle, with two or three days' interval usually between each, he is bitted with an easy snaffle, and in a week or ten days is a moderately tractable, serviceable horse.

The cowboy is essentialy a nomad. From early spring to early winter he is almost constantly in moving camp and rarely sees the inside of the ranch house. With the great ranches of the North, an "outfit" is made up of a foreman and five to twelve men. The cook drives a four-horse wagon which hauls the provisions, the men's blankets and the simple camp furniture. Each rider is assigned from three to ten horses for his individual use, the number varying according to the work he is expected to do. By day the herd of horses used by the outfit is driven with the cattle; and at night a herder specially assigned takes them out on good grass and holds them till break of day, when he brings them into camp. Those desired for morning use are then roped out of the bunch. At noon, the horses used under saddle in the morning are released and others are caught for the afternoon work. Night horse-herders sometimes become very expert. Most of the night horses are content either to rest or quietly to graze, it is only at certain hours that they are disposed to wander. I now have a negro who will night-herd horses indefinitely and then work all day in a branding pen or on the range. He knows their habits so well that, except at hours when they are disposed to stray away, he is down upon the grass sleeping. Tents are rarely used. Each man has a canvas cover for his blankets which keeps him tolerably dry. The fare is simple but wholesome. The life is in all respects a healthy one, except that the exposure is sure sooner or later to bring on rheumatism.

In the Southwest the old Texas style is sometimes followed, where cowboy "outfits" are sent out with their whole camp furniture and outfit on a pack-horse. The mild climate makes this possible. Each man rarely has more than one pair of blankets; and the camp equipment and commissary is limited to a coffee-pot, frying-pan and stew-kettle, with coffee, a small sack of flour and a few beans.

The cowboy character is very different from the commonly received idea of him in the East. Very often he has been well educated and well bred. More often still his manners are good and his morals excellent. As a class, drunken ruffianism is the rare exception. As a rule, the cowboys are remarkably faithful to their employer and tireless in their service. Until recently they have had to go armed with rifle and pistol in many parts of the frontier for self-protection against hostile Indians. And, as with all men who habitually carry arms, a dispute among them generally results in bloodshed; a pistol or a knife is more convenient, handy and natural to them than fists, that is all. This is only a natural result of their hazardous daring life.

The cowboy's daily routine is one of ever-present peril to life or limb. No fencer ever took greater risk at five oak bars or solid wall and water, than the cowboy has daily to encounter in his wild, hard rides after wild cattle through brush or heavy timber, among gaping holes of a prairie-dog town or over the treacherous undermining of rat beds. To be sure the native ponies become very clever at dodging and leaping these obstacles; but a tired horse is often unable to avoid them and then down comes horse and rider and the latter is lucky to come off with nothing worse than a broken leg or collar-bone.

USEFUL DATA.

The ordinary food for horses consists of hay, oats, corn, carrots, and bran. For light work, 10 to 12 pounds of hay, and 8 to 10 pounds of oats per day, are ample. In the United States cavalry, 14 pounds of hay and 12 pounds of oats constitute the day's ration. Beans are considered heating and should not be fed frequently, and when fed, they should be given usually at midday or night. Corn has so little nutriment that it is not fit for hunters or heavy work. A horse will drink from 8 to 10 gallons of water per day. A few carrots now and then purify the blood and allay fever.

It is considered proper to feed a horse lightly in the morning, but heartily at night. On the road, from 20 to 25 miles can be made without feeding. It is, of course, on record that cavalry horses have gone day after day 25 to 30 miles without feeding, and at times 40 or 50 miles; and there are instances where longer distances have been covered; but no civilian owner would want to serve his horse like that.

The relative value of foods is indicated by the following data: Ten pounds of hay are equivalent to about 30 pounds of green forage. Three pounds of bran are as good as 2 pounds of oats. One hundred pounds of good hay are equal to 59 pounds of oats or corn; or 54 pounds of rye or barley; or 45 pounds of wheat; 105 pounds of wheat bran; 275 pounds of carrots; 275 pounds of green corn; 375 pounds of wheat straw; or 400 pounds of green cloves.

Hay should smell sweet and be free from dirt. It ceases to be new hay about three months after being cut. To estimate the quantity of hay in a stack, allow 440 to 500 cubic feet per gross ton, if it is old hay; 550 cubic feet to the ton if it is new hay; and from 575 to 600 cubic feet, if it is clover hay. Hay can be compressed to weigh 11 pounds to the cubic foot.

The average stride of an ordinary horse is 2 3-4 feet, at a walk; 3 3-4 feet at a trot; ten feet at a gallop. He will go about 125 feet per minute at a walk; 600 feet at a trot; and from about 1,200 to 1,500 feet per minute at a gallop. Cavalry will charge at the rate of from 1,800 to 2,000 feet per minute.

One horse-power is rated as equal to 33,000 pounds raised one foot in one minute. A good horse can carry 225 pounds 25 miles in a day of eight hours.

Cavalry marches 20 miles a day, the most of the time at a walk. Several halts are made to adjust saddles, to ease the horses, and allow them to graze, but no grain is fed until the day's march is ended.

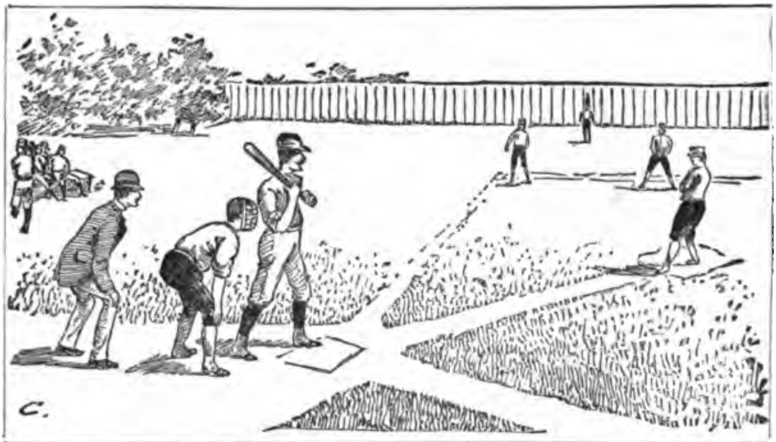
On a forced march, it is the practice not to halt the horses, but to relieve them every hour by dismounting the men, and marching them on foot for ten or fifteen minutes. A cavalry command of about 200 strong in our army has marched 135 miles in about forty marching hours, viz.: from noon of one day (Thursday) until daybreak about 5 o'clock, the following Sunday. This was accomplished with the loss of very few horses—and the remainder were in good condition for service. A single horse has made 110 miles in twenty-five hours—in an emergency, and, after a rest, was in perfect condition. There are other instances in which cavalry commands have marched fifty to sixty miles in a day, and where single horses with riders have travelled seventy to eighty miles.

A horse will live about thirty years. To tell his age, inspect his teeth (guarding against frauds, however, because teeth are occasionally operated upon by owners with a view to concealing the real age). At six months of age, a colt has three grinders on each side in each jaw and six nipppers, with a cavity in each. At one year, there are four grinders on a side. At two years, one of the milk grinders is gone and the front teeth have their cavities filled up. At about three years, two nippers are gone on each jaw. At four years, there are six grinders on a side, the permanent nippers are in place, and the tushes are in sight. When five years old, there is a black colored cavity in the centre of all the lower nippers. A year later, this cavity has disappeared in the front two lower nippers. At seven years, the cavities of the next two nippers have disappeared, and the tushes are blunted. At eight years, the cavities of the two lower teeth are filled up. At ten years, the cavities in the upper nippers are all gone.

When men and women ride in company, each man should take the right-hand side, in order not to crush the feet of his companion by awkward motions of his own horse. He also prevents his horse from being startled by sudden contact with the lady's skirts. It is best to ride with a few feet of distance between the horses: the man rides the larger and heavier horse, and the shying or stumbling of the greater bulk might overthrow the smaller one, especially if both are moving at great speed.

A horseman keeps his strength for riding and his freedom from lameness, by the simple exercise of walking three or four miles a day. By means of this exercise his muscles remain hard and strong. Light gymnastics at home tend to keep him strong, supple, and qualified to spring upon the back of a horse at any moment and ride with comfort and freedom from excessive fatigue.

The number of horses on the farms of the United States is now, judging by the census of 1880, nearly 11,000,000. In the cities, there are supposed to be about 2,000,000 more. This, however, being an estimate, as the census took no account of horses in cities. There are, in addition, about 2,000,000 mules and donkeys.



GAMES OF BALL.

BALL-PLAYING comes down to this age from the period of classic antiquity.

Among the Egyptians the youth played with the ball and the jugglers employed a number of dexterous devices for amusing the populace by keeping several globes moving in the air above their head simultaneously.

Among the Greeks, tossing of the ball from one player to another in the hours of relaxation was a favorite plan of obtaining moderate exercise, of giving the muscles great suppleness and elasticity, and imparting to the gesture and motions of the body the grace of action which the Greeks adored. Philosophers and poets, rulers and great civilians, resorted to this leisurely and gentle form of the game, as well as the youths of both sexes.

The Romans played ball in the same general manner by tossing from one player to another. It can well be believed, however, that they sent the ball with more force than their Grecian predecessors.

In Italy and France ball-playing became more active and took more specifically the form of a game. The sport was the elegant resource of people of wealth and rank for amusement, grace and strength.

The use of the bat to strike the ball probably grew up in one or the other of these two nations

From the Continent the game was carried to England. References to ball-playing and batting there appear in the records of the fourteenth century. In England the highest science of this sport has crystallized into the games of cricket and tennis.

In America ball-playing has developed into several forms, the prominent one being the national game of baseball. What a striking contrast this last game of all presents with the leisurely tossing of a soft globe of yarn and leather back and forth among a dignified company of Grecian amateurs. What a contrast even with cricket. The American game is full of fire and intense action. No ball is too hard, no throw too violent, no batting too vigorous. The expression of a dignified Grecian's face upon receiving into his hands a modern swift ball, sent to first base, can be well imagined. The American game differs from cricket in the way one would expect after a contemplation of the different manner in which Americans and true Britons deal with other affairs. In the making of tools and machinery, the construction of a ship or an edifice, the negotiation of a contract or the waging of war, the Englishman is solid and patient. He builds to endure. He is governed too much by tradition; and he puts much useless matter, manner and time into his work, largely because his forefathers or perhaps a few titled personages have done things in that way. The American goes straight to the mark. He considers what the essential thing is which is to be done. Then he does it without circumlocution. He takes the shortest cut toward the object. In ball the essential things are running the bases and throwing, catching and batting the ball. Of what use are the wickets? The American abolishes them and develops the game from the original simple form without them, and he thus creates the sport of baseball, the most intense, daring and beautiful of all games of this class. Baseball is the amusement of our athletic youth. For circles which like a more gentle and graceful sport, tennis is the preference.

BASEBALL.

BY GEORGE E. STACKHOUSE.

Baseball is the National game in America. It occupies here the same place that Cricket does in England. And its popularity is so remarkable as to form one of the most interesting phenomena of the present time. It is played in every city and village in the country and is especially popular at all the schools and colleges.

There is a remarkable lack of literature on this subject. Well-known authors and story-writers have, singularly enough, given the game a wide berth. Nearly every lover of the game has his little ten-cent Guide always near at hand; but if he be a man of books he might look his library over without finding a volume which referred directly or indirectly to baseball. Even the encyclopædias have thought the subject of little account. The reader may be a man of wealth and may look upon baseball with more interest than anything else outside of his business and family; yet no man of brainy accomplishments has as yet written on this favorite pastime. Judging from the small number of books which have been put into circulation on the subject, one would suppose that baseball is a recent institution and that it has grown in popularity so rapidly that the writers of the day have not yet become fully impressed with its importance.

This game is not of recent origin, although its tremendous popularity has been attained only of late. The game originated nearly half a century ago, and the minor games or stepping-stones that led to the perfection of baseball were played over a century ago. The first club to play the game regularly in this or any other country was the old Knickerbocker Club, of New-York, long ago out of existence and its players under the sod. This club was organized about 1845. It can probably be justly called the pioneer baseball club of the country. Veteran followers of the game, however, though they give the Knickerbocker nine the honor of being the first regularly organized club, claim that there was a team called "The New-York" which played long before the Knickerbockers were thought of. Men who played on these ancient teams are now enjoying their eternal sleep; but the sport which they were so fond of is enjoyed by their brawny sons and grandsons.

Baseball is undoubtedly a sport which has come to stay. Even the great War of the Rebellion could not push it into oblivion. At first it was a Northern game. People of the South and West knew little of its merits or pleasures. Now the game knows no section and it is equally popular North, South, East and West. It has even crossed the borders into Canada and Mexico; and in the countries of extreme heat and cold the game, although young there, is rapidly pushing the native sports and pastimes to the wall. The game is now known all over the world and has followed in the track of every wandering Yankee. It is played in Europe and Australia. A recent clipping from a paper published in Japan shows a well-written account of a baseball game there among a few white men and their Japanese friends.

At first baseball was played simply for recreation, exercise and pleasure. Men and boys played it for its health-giving advantages and muscle-accumulating abilities. It was not until 1871 that a regular professional organization was formed. Then good players were paid regular salaries, and a regular admission fee was charged for witnessing the games. Professional clubs sprang up all over the country with great rapidity; and all of them flourished. Gamblers then acquired a strong influence over the contests, and baseball almost died a premature death. These evil influences were removed after a long and hard-fought struggle. The gamblers having been routed once have never regained their influence. Unprincipled players who had sold out their comrades and clubs in the interest of gamblers and the pool-box have been exterminated from the ranks. Baseball tottered for a time; but after all the evil influences had been removed the game began to rise in public favor again, and it has now reached a remarkable height of popularity. Now a game played by any collection of boys or men, of any age, either with or without pretensions to style, draws an interested crowd of spectators. Women take equal delight with the men in witnessing the pastime; and the old masculine ball-player, lounging on the steps of a summer hotel and watching a game in progress between hastily formed nines collected from the neighboring houses, runs the risk of being corrected on a dozen different points of the modern game by his fair companions around him. As for the professional games between the clubs of the League or American Association, they attract interest not only in the cities where the clubs belong, but throughout all the States of the Union. The score at the end of each inning is now telegraphed to every large city in the United States; and the result is awaited with equal interest by hearty farm boy and city swell.

Unlike cricket a baseball game is quickly played; and the onlookers are kept in an unusually excited state for one hour and three-quarters. It takes over two hours to play some games, while others have been played in less than one hour. The game is remarkable for drawing an enormous crowd of spectators simply for the love of the sport. There is no public betting on the game. No betting, in fact, is allowed on any of the grounds, and onlookers have been requested to leave the grounds for even making private wagers with each other.

Baseball is undoubtedly an offspring of the old English games of Rounders and Cricket, but more especially of Rounders. Our English cousins can claim that they laid the foundations of the sport. An old English work gives the following rule for playing the old game of Rounders. It was much easier to learn and play than the modern sport:

> *Rounders*—This game is played with a ball and bats, or sticks something in the form of a policeman's truncheon. A hole is first made about a foot across and a half foot deep. Four other stations are marked with pegs stuck into the ground, topped with a piece of paper so as readily to be seen. Sides are then chosen, one of which goes in. There may be five or more players on each side. Suppose that there are five. One player on the side that is out stands in the middle of the five-sided space and pitches the ball toward the hole. He is called the feeder. The batsman hits it off, if he can; in which case he drops the stick and runs to the nearest station, thence to the third and all around if the hit has been a far one. The other side are scouting and trying to put him out, either by hitting the batsman (or runner) as he is running, or by sending the ball into the hole, which is called grounding. The player at the hole may decline to strike the ball, but if he hits at it and misses twice running he is out. When a player makes the round of the station back to the hole his side counts one toward the game. When all the players are out, either by being hit or the ball being grounded, the other side gets their inning. When there are only two players left a chance is given of prolonging the inning by one of them getting three balls from the feeder: and if he can give a hit such as to enable him to run

the whole round all his side comes in again and the counting is resumed. The feeder is generally the best player on his side, much depending on his skill and art. The scouts should seldom aim at a runner from a distance, but throw the ball up to the feeder or to some one near, who will try to hit or to ground, as seems the most advisable. A caught ball will put the striker out.

This was a simple game, easily learned, designed simply for relaxation. Young boys and even girls could play it during their intervals from study in the schools. It is almost entirely devoid of the features that characterize baseball as now played in all our cities. Still "Rounders" or "Sockey," as it was sometimes called in portions of the States, was a popular game in its time and had many followers. It is still played in some of the Western and Southern States. The ball used is of course soft, and the sting when hit with it is slight. Sockey played with the hard regulation ball of the League or American Association would soon send half the players to the hospital.

The old Knickerbocker Club was the first one to abandon the old style of hitting the base runner. That club introduced the present style of touching the runner with the ball. The rules given below were the product of the active brains of the members of the Knickerbocker Club. They were drawn up about the year 1845. They were few and simple; and it will be at once perceived that the game at that period was not to be compared with the game of to-day. It lacked many of the attractive and scientific features of modern baseball. The initial rules were arranged like this:

Section 1.—The bases shall be from "Home" to second base 42 paces; from first to third base 42 paces equidistant.

Section 2.—The game shall consist of twenty-one counts, or aces, but at the conclusion an equal number of hands must have been played.

Section 3.—The ball must be pitched and not thrown for the bat.

Section 4.—A ball knocked outside the range of the first or third base is foul.

Section 5.—Three balls being struck at and missed, and the last one caught, is a hand out; if not caught, is considered fair, and the striker is bound to run.

Section 6.—A ball being struck or tipped and caught, either flying or on the first bound, is a hand out.

Section 7.—A player running the bases shall be out if the ball is in the hands of an adversary on the base or the runner is touched by it before he makes his base—it being understood, however, that in no instance is a ball to be thrown at him.

Section 8.—A player running who shall prevent an adversary from catching or getting the ball before making his base, is a hand out.

Section 9.—If two hands are already out a player running home at the time a ball is struck, cannot make an ace if the striker is caught out.

Section 10.—Three hands out, all out.

Section 11.—Players must take their strike at regular turns.

Section 12.—No ace or base can be made on a foul strike.

Section 13.—A runner cannot be put out in making one base when a balk is made by the pitcher.

Section 14.—But one base allowed when the ball bounds out of the field when struck.

The Knickerbocker team met with flattering success; and soon other clubs began to organize. In the course of a few seasons the Gotham, Eagle and Empire Clubs were formed, and also played on the old grounds at Hoboken. The Gotham Club soon became quite a formidable rival of the Knickerbocker team, and the ancient battles with the bats between these teams will probably be remembered yet by some former baseball enthusiasts. Below will be found the names of the pioneer baseball clubs, the date when organizod and the location of the grounds:

Knickerbocker	1845	Hoboken	Atlantic	1855	Jamaica, L. I.
Gotham	1850	Hoboken	Harlem	1856	New-York
Eagle	1852	Hoboken	Enterprise	1856	Bedford
Empire	1854	Hoboken	Atlantic	1856	Bedford
Excelsior	1854	So. Brooklyn	Star	1856	So. Brooklyn
Putnam	1855	Williamsburg	Independent	1857	New-York
Newark	1855	Newark	Liberty	1857	New-Brunsw'k, N.J
Baltic	1855	New-York	Metropolitan	1857	New-York
Eckford	1855	Greenpoint	Champion	1857	New-York
Union	1855	Morrisania	Hamilton	1857	Brooklyn
Continental	1855	Williamsburg	St. Nicholas	1857	Hoboken

Baseball began to loom up in 1855, as a glance at the list will show. The interest in the game increased rapidly. At the close of the season of 1856 it was decided that a revision of the rules was necessary. A meeting was held and a new code established. The outcome of this was the first actual convention of baseball clubs. That meeting was held in the spring of 1857 in New-York City. At this convention rules and regulations were adopted which were to govern the clubs. In the following year, another convention was held, and the National Association of Baseball Players was organized. This association sprang into existence at a meeting held at the Cooper Institute Building in New-York City, on March 9, 1859.

Baseball received its first blow in the season of 1860, when betting on the games became so prevalent. Not only did the spectators wager large sums on the result of the games, but so did the players, officers, and scorers. The betting, of course, had a disastrous effect, at first; but its after-effect was healthful, for the growing evil at last led several clubs to adopt stringent rules in regard to betting. The Eagle Club, always prominent in movements for the welfare of the game, was among the first to prevent betting entirely.

In the season of 1861, a series of interesting games were played, the strongest nines being picked from the clubs in New-York and Brooklyn, and contesting with each other. Three years previous a similar series of games were played on the old Fashion Course on Long Island and were witnessed by large crowds. The New-York players won two of the three games played.

On a Monday, late in October, in 1861, a famous game was played on the grounds of the Gotham Club, at Hoboken. Ancient baseball enthusiasts still claim that at least 15,000 spectators witnessed the game. The players who were originally selected to play this great game were as follows:

BROOKLYN.

Name.	*Club.*	*Position.*
Pearce	Atlantic	Catcher
Smith	Atlantic	Third base
Oliver	Atlantic	Second base
Creighton	Excelsior	Pitcher
Pearsall	Excelsior	First base
Flanley	Excelsior	Centre field
Manolt	Eckford	Left field
Beach	Eckford	Right field
Grum	Eckford	Shortstop

NEW-YORK.

Name.	*Club.*	*Position.*
Brown	Mutual	Second base
Taylor	Mutual	Left field
McMahon	Mutual	Short stop
Harris	Mutual	Centre field
McKeever	Gotham	Catcher
Van Cott	Gotham	Third base
Yates	Eagle	First base
Goldie	Jefferson	Right field

One or two changes, however, were made in this list on the day of the match. Price was substituted for Oliver and Reach for Grum. H. Wright also took Van Cott's place and Culyer took Goldie's place. The full score as it was then kept is as follows:

BATTING.

NEW-YORK.

Name.	*H.L.*	*Runs.*
Yates, 1 b.	2	2
Brown, 2 b.	3	1
McKeever, p.	3	0
McMahon, s. s.	3	1
Cohen, c.	4	0
Taylor, l. f.	4	0
Wright, 3 b.	1	1
Harris, c. f.	1	1
Culyer, r. f.	3	0
Total	..	6

BROOKLYN.

Name.	*H.L.*	*Runs.*
Pearce c.	2	3
Creighton, p.	4	2
Beach, s. s.	2	3
Price, 3 b.	4	2
Pearsall, 1 b.	2	2
Manolt, c. f.	2	2
Smith, 2 b.	2	2
Flanley, l. f.	4	1
Reach, r. f.	2	1
Total	..	18

RUNS MADE EACH INNING.

New-York	2	2	0	0	2	0	0	0	— 6
Brooklyn	2	0	0	0	7	1	0	8	—18

FIELDING.

NEW-YORK.

Name.	*Fly.*	*B'd*	*B.E.*	*Tot.*
Yates	0	0	1	1
Brown	0	1	2	3
McKeever	2	0	0	2
McMahon	0	2	0	2
Cohen	1	2	0	3
Taylor	0	2	0	2
Wright	0	5	1	6
Harris	1	3	0	4
Culyer	0	1	0	1
Total	4	16	4	24

BROOKLYN.

Name.	*Fly.*	*B'd.*	*B.E.*	*Tot.*
Pearce	3	3	0	6
Creighton	0	0	0	0
Beach	1	0	0	1
Price	0	0	0	0
Pearsall	4	1	4	9
Manolt	0	1	0	1
Smith	1	1	1	3
Flanley	1	0	0	1
Reach	0	0	0	0
Total	10	6	5	21

HOW PUT OUT.

NEW-YORK.

Name.	*Fy.*	*Bd.*	Bases. 1.	2.	3.	*Fo'l.*
Yates	1	0	0	0	0	0
Brown	1	1	0	0	0	1
McKeever	0	1	1	1	0	0
McMahon	1	0	0	0	0	0
Cohen	2	0	2	0	0	0
Taylor	0	1	0	0	0	3
Wright	1	0	0	0	0	0
Harris	0	0	0	0	0	1
Culyer	0	0	1	0	0	2
Total	6	3	4	1	0	7

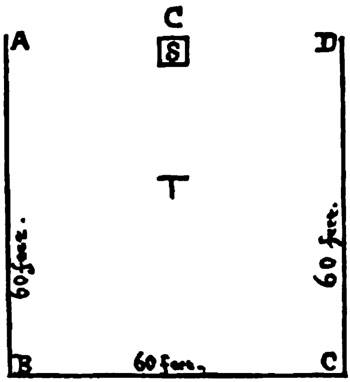
BROOKLYN.

Name.	*Fy.*	*Bd.*	Bases. 1.	2.	3.	*Fo'l.*
Pearce	0	2	0	0	0	0
Creighton	2	2	0	0	0	0
Beach	0	1	1	0	0	0
Price	1	0	0	0	0	3
Pearsall	0	1	0	1	0	0
Manolt	0	1	0	0	1	0
Smith	0	2	0	0	0	0
Flanley	0	2	0	1	0	1
Reach	0	2	0	0	0	0
Total	3	13	1	2	1	4

Passed balls on which bases were made—Pearce, 3; Cohen, 1; McMahon, 1.
Catches missed on the fly—Cohen, 1; Brown, 2; Taylor, 1; Yates, 1; Pearce, 1; Harris, 1.
Struck out—McMahon, 1; Yates, 1.
Catches missed on the bound—Brown, 2.
Run out between bases—McMahon by Creighton.
Times left on bases—McKeever, 1; Wright, 1; Harris, 1; Pearce, 1; Beach, 1; Pearsall, 1; Manolt, 1; Smith, 1; Reach, 1.
Time of game—Two hours and thirty minutes.
Umpire—Mr. J. B. Leggett, of the Excelsior Club.
Scorers—For the New-York nine, Mr. McConnell; for the Brooklyn nine, Mr. G.W. Moore

The old New-England game of baseball differed in many respects with the game played at New-York. The sport became popular in

1858 and was called "The Massachusetts Game." This game was played as follows:



A, B, C and D are the bases. The square S of four feet is at equal distance between the first and fourth base. A and D are the strikers' stand. T in the centre of the square is the pitcher's or thrower's position. D was considered the home base, and when a runner arrived at that point he was credited with a tally. The Olympic club of Boston was probably the first regularly established nine to play this game and it began its existence in 1854. When one player was put out, the side was out; and the other side came in to bat. Fourteen men could play on each side: and the dignified catcher was provided with an assistant to chase the balls which he had failed to stop. If the base-runner was struck with the ball he was declared out. Each club had its own referee or umpire; and these two always agreed upon a third whose decisions were always final. The tallyman or scorer was selected in the same manner. It was peculiarly like the New-England men to arrange for a town-meeting style of deciding disputed points in their games.

PLAYING PARAPHERNALIA.

The equipments required by any amateur baseball club are few and simple. A dozen good ashen bats and two balls, one for use in case the other is lost, are all that are required, except, of course, a large open field in which there is not only space for the game, but room for a stand for the spectators. The ball-players of a city are fortunate if there is a fair-ground or race-course in the edge of the city, or if they have open commons or squares in the town itself, upon which the local authorities will allow them to indulge their passion for this innocent and healthful sport.

With a professional club, the equipment is large and varied and the expense of a season's campaign is large in consequence. A professional club is obliged to employ its players. A club of average ability will require from thirteen to fifteen players, frequently more, but never less. Nine players are required to play a game; and besides each manager wants, or thinks he wants, two or three substitute pitchers and as many catchers. One or two general substitutes are also deemed necessary. The New-York Club at present has fourteen players under contract; and yet several new men are needed and will be secured before next season's campaign opens. According to an agreement arrived at between the club managers a year ago, the maximum salary for a player is $2,000 a year. This rule, however, has not been respected; and most of the larger professional clubs pay double that amount to some of their players. In the minor organizations the rule is observed simply because the managers cannot afford to pay more than $2,000 to each player. After securing players, the manager of a professional club must select a uniform for his men. In a season's play each man of a team will require three suits, one for travelling, one for home grounds, and a general utility uniform. The uniforms include shoes, caps and stockings, and will cost on an average $20 each. The three suits, for say fifteen men, will cost during the season about $900. The manager now has his players and his suits. His grounds will cost him in the vicinity of $8,000 a year rental.

Now, he must purchase the paraphernalia for playing the game. In a League season, a manager will utilize between 400 and 500 bats. These figures may look large; but when it is known that to fastidious players there are only one or two suitable bats in a dozen, the correctness of the figures will be seen. Sometimes a player has been known to look over 100 bats before he could find one to suit him. Many players have their bats made to order; yet even then the workmen seldom produce the exact weight and curve wanted. The cost of the bats used by the League and American Association players runs from 50 to 75 cents each. Of course, inferior sticks can be purchased for from 10 to 25 cents each; but a great baseball player of to-day would disdain to use anything so cheap as that. The professional baseball player is generally an earnest, conscientious man, and he respects the law the same as other men; but human nature is weak, and if a ball-player ever does commit larceny it is for a baseball bat when some opportunity offers. The ball-player always imagines that some other player owns just the bat that will suit him; and if he does not steal it and secrete it in his bat bag, it is possibly because he has not had the chance. He may own a bat that is perfection in every respect; yet an old, almost useless bat, that he has no earthly use for, presents to him an almost irresistible temptation. As a general thing, the bat raids are made among the ranks of opposing clubs. The bats are generally made of ash. Many hundreds of them are broken by sturdy hitters during a season's campaign.

The next necessity is to purchase the balls. The ball of to-day and those of a few years ago are very different articles. Then the globe was rather soft, was full of rubber and was unusually "lively"; and a strong player, hitting the ball squarely, would knock it almost out of sight. Now the ball is hard and "dead," that is to say it has no elasticity. There are several large factories in the country where balls are made; and the manufactories are kept running night and day the year around to supply the great demand. The regulation ball of the present time could have been used by David in his sling with as deadly effect as a smooth round stone of the same size. The regulation ball costs $15 a dozen; many gross are used by each club every season. Each League club during the present year has played sixty-six games on home grounds. The home club always supplies the balls used in the game; from three to seven are generally used during a match. Each box of balls must be securely sealed and signed, and must be opened by the umpire. A ball once taken from the little box cannot be used in any other game. Many balls are consumed by the clubs in practising and in exhibition games. Over $400 are expended for balls alone by each of the eight League clubs during a season.

In the olden time, sticks and stones marked the way stations for a player when he was making the circuit of the bases. Now the bases, or bags as they are called, require considerable attention. Each club generally provides itself with two sets of bases, there being three bases in each set. They cost $15 a set. The home base is generally a plate of hard white rubber or marble and is put into the ground. The regular bases are made of heavy canvas or sail cloth and the best ones are filled with hair. Cheaper ones are also made but are not in general use. They are filled with sawdust, but this cheaper substance will swell and burst when it gets wet.

The travelling disbursements of a professional club are also a source of great expense to the stockholders.

The actual total disbursements of a League club will not materially differ from the annexed figures:

Fifteen players at an average salary of $2,500 each, $37,500; travelling expenses, $9,000; rent of grounds, $8,000; salary of manager, $5,000; incidentals, $10,000; total, $69,500. Consequently the total cost of a League campaign (supposing that the expenses of all the clubs are about alike) will not fall short of $550,000 in a year.

The following rules in regard to grounds and paraphernalia are now the standard in America:

Rule 1.—The Ground must be an nclosed field, sufficient in size to enable each player to play in his position as required by these Rules.

Rule 2.—The Infield must be a space of ground thirty yards square.

Rule 3.—The Bases must be

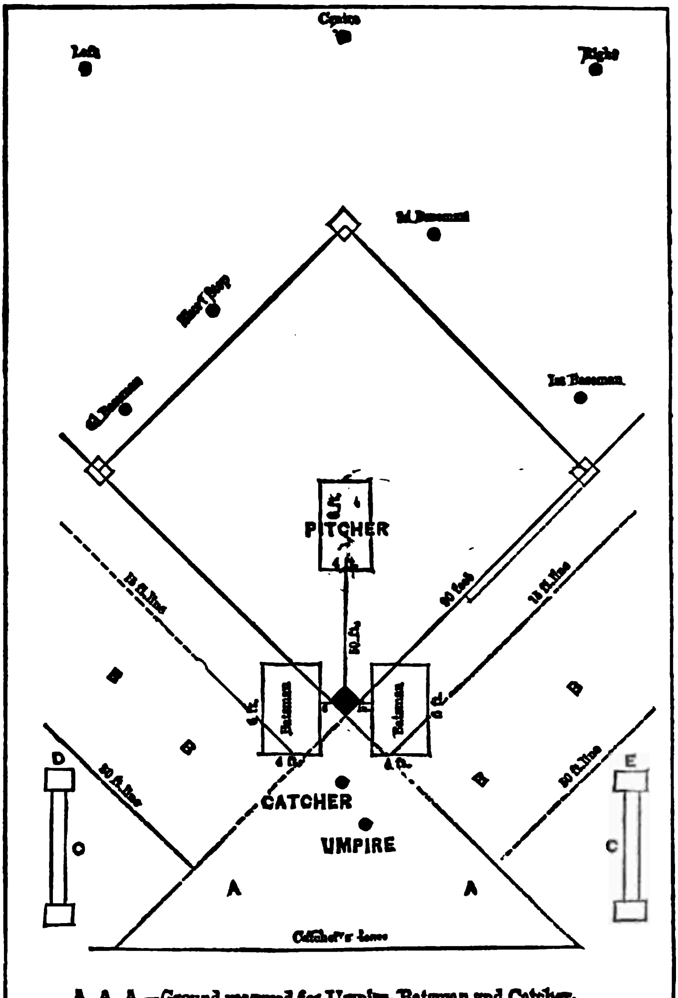
(1) Four in number, and designated as First Base, Second Base, Third Base and Home Base.

(2) The Home Base must be of white rubber or white stone, twelve inches square, so fixed in the ground as to be even with the surface, and so placed in the corner of the Infield that two of its sides will form part of the boundaries of said Infield.

(3) The First, Second and Third Bases must be canvas bags, fifteen inches square, painted white, and filled with some soft material, and so placed that the centre of each shall be upon a separate corner of the Infield, the First Base at the right, the Second Base opposite, and the Third Base at the left of the Home Base.

(4) All the Bases must be securely fastened in their positions, and so placed as to be seen distinctly by the Umpire.

Rule 4.—The Foul Lines must be drawn in straight lines from the outer corner of the Home Base, through the centre of the



A. A. A.—Ground reserved for Umpire, Batsman and Catcher.
B. B. B.—Ground reserved for Captain and Assistant.
C.—Players' Bench. D.—Visiting Players' Bat Rack.
E.—Home Players' Bat Rack.

positions of First and Third Bases, to the boundaries of the Ground.

Rule 5.—The Pitcher's Lines must be straight lines forming the boundaries of a space of ground, in the Infield, seven feet long by four feet wide, distant fifty feet from the centre of the Home Base, and so placed that the six-feet lines would each be two feet distant from and parallel with a straight line passing through the centre of the Home and Second Bases. Each corner of this space must be marked by a flat iron plate or stone, six inches square, fixed in the ground, even with the surface.

Rule 6.—The Catcher's Lines must be drawn from the outer corner of the Home Base, in continuation of the Foul Lines, straight to the limits of the Ground back of the Home Base.

Rule 7.—The Captain's Lines must be drawn from the Catcher's Lines to the limits of the Ground, fifteen feet from and parallel with the Foul Lines.

Rule 8.—The Player's Lines must be drawn from the Catcher's Lines to the limits of the Ground, fifty feet from and parallel with the Foul Lines.

Rule 9.—The Player's Benches must be furnished by the home club, and placed upon a portion of the ground outside the Player's Lines. They must be twelve feet in length, and immovably fastened to the ground. At the end of each bench must be immovably fixed a bat-rack, with fixtures for holding twenty bats; one such rack must be designated for the exclusive use of the Visiting Club, and the other for the exclusive use of the Home Club.

Rule 10.—The Batsman's Lines must be straight lines forming the boundaries of a space on the right, and of a similar space on the left of the Home Base, six feet long by three feet wide extending three feet in front of and three feet behind the centre of the Home Base, with its nearest line distant one foot from the Home Base.

Rule 11.—The Three Feet Lines must be drawn as follows: From a point on the Foul Line from Home Base to First Base, and equally distant from such bases, shall be drawn a line on Foul Ground, at a right angle to said Foul Line, and to a point three feet distant from it; thence running parallel with said Foul Line, to a point three feet distant from the centre of the First Base; thence in a straight line to the centre of the First Base, and thence upon the Foul Line to the point of beginning.

Rule 12.—The lines designated in Rules 4, 5, 6, 7, 8, 10 and 11 must be marked with chalk or other suitable material, so as to be distinctly seen by the Umpire. They must all be so marked their entire length, except the Captain's and Player's Lines, which must be so marked for a distance of at least thirty-five yards from the Catcher's Lines, or to the limits of the grounds.

Rule 13.—The Ball must not weigh less than five nor more than five and one-quarter ounces avoirdupois, and measure not less than nine nor more than nine and one-quarter inches in circumference. It must be composed of woollen yarn, and contain not more than one ounce of vulcanized rubber in mould form, and be covered with leather. It must be furnished by the Secretary of the League, whose seal shall be final evidence of the legality of the ball.

(2) In all games the ball or balls played with shall be furnished by the Home Club, and become the property of the winning club.

(3) Should the ball become out of shape, or cut or ripped so as to expose the yarn, or in any way so injured as to be unfit for fair use in the opinion of the Umpire, on being appealed to by either Captain, a new ball shall at once be called for by the Umpire.

(4) Should the ball be knocked outside of the inclosure or lost during the game, the Umpire shall at once call for another ball.

Rule 14.—The Bat must be made wholly of wood, except that the handle may be wound with twine, or a granulated substance applied, not to exceed eighteen inches from the end.

(2) It must be round, except that a portion of the surface may be flat on one side, must not exceed two and one-half inches in diameter in the thickest part, and must not exceed forty-two inches in length.

While baseball is a vigorous rough and tumble sport, and sometimes proves a little hurtful to the fingers, nose, and face, it seldom produces any injury which cannot be cured as quickly as an ordinary bruise. It is true that there is occasionally a sprained ankle, and if two players run violently against each other there may be broken bones and perhaps deeper injuries. To avoid all the dangers of baseball, the players need only to be watchful, wide-awake, and quick, and do nothing recklessly.

WONDERFUL PLAYING.

The longest game on record so far was played at Boston on May 11, 1877, between the Harvard College nine and the Manchester Club. Twenty-four innings were played before any result was arrived at.

The leaders in the batting in the National League since the organization was formed, over ten years ago, are the following: Daniel Brouthers when with the old Buffalo Club led the country for two consecutive years. Big "Baby" Anson, of the Chicago Club, also led the country for two years, but not in succession. The New-York Club has two champion batters in O'Rourke and Connor. The players and their batting averages (a batting average being the proportion between the number of times a man goes to the bat and the number of times he hits the ball) for the different years are as follows: Ross Barnes, average .403 in 1876; James White, average .385 in 1877; Dalrymple, average .356 in 1878; Anson, average .407 in 1879; Gore, average .365 in 1880; Anson again in 1881 with an average of .369; Brouthers had .367 as an average in 1882; in 1883 Brouthers improved his average of the previous year, having .371; in 1884, James O'Rourke, when a member of the Buffalo Club, led the League with an average of .350; in 1885, Roger Connor, of the New-York

Club, handled the bat with great effect and led the League, having an average of .371.

The record shows that the shortest game was the match between the Dayton and Ironton Clubs, played at Dayton, Ohio, on September 19, 1884. The game was played in exactly 47 minutes.

John Hatfield, the once famous player, still holds the authorized record for throwing the baseball. He has thrown the ball 133 yards, 1 foot and 7 1-2 inches. His record was made in Brooklyn, N. Y., on October 15, 1872. Ed. Crane, the player who pitched a few games for the Washington Club in 1886, is said to have beaten the record; but the critics will not accept the statement. Crane, when he belonged to the Boston Union Club, is alleged to have thrown a regulation ball 134 yards and 5 inches at St. Louis, Mo., on October 19, 1884. It is said that the distance was not properly measured; at any rate the throw is not a "record." Williamson, the bulky third-baseman of the Chicago Club, is also credited with a throw only a few inches short of Hatfield's record; on October 14, 1885, he threw a ball in Chicago 133 yards, 1 foot and 4 inches, just 3 1-2 inches on the wrong side of Hatfield's throw.

The American college record for throwing the ball is held by R. H. Terman, of Cornell, Ithaca, N. Y. On May 17, 1884, Terman threw a ball 379 feet, 6 1-2 inches.

There is probably no official record of the longest hit made with a bat, although probably the longest two hits ever made were seen at the Polo Grounds in New-York. O'Neil, now of the St. Louis American Club (and a great batter still, by the way) when a member of the New-York Club a few seasons ago, hit a ball that rolled nearly to the Sixth-ave. entrance of the Polo Grounds—500 feet. Roger Connor's feat of knocking the ball over the right-field fence at the Polo Grounds probably more than equals O'Neil's drive. The ball after going over the fence rolled to One-hundred-and-thirteenth-st., when it was stopped by the stout embankment. Manager Mutrie says he thinks the ball went nearly 600 feet, and that it is the longest hit ever made. Connor a few days later was presented with a handsome gold watch and chain by his admirers in honor of his unprecedented achievement. It has been the ambition of all the heavy batters to put the ball over the fence at the Polo Grounds, but Connor is the only one who has accomplished the feat.

In 1882, the Metropolitan "Indians" played the largest number of games ever played by a club in one season. Their first game was played on March 31 and the last on October 27—162 games in all.

John Kerins, of the Louisville Club, holds the record of having played in more games in one season than any other player. During the season of 1885 Kerins played in 161 games, not missing a match in which his club played during the year.

David Orr, the first-baseman of the Metropolitan Club, is credited with having performed some wonderful feats with the bat. On June 12, 1884, Orr, in a game in which the Metropolitans were contesting against the St. Louis Club, made a hit every time he went to the bat, six in all, with a total score of 13. Orr's record only stood for a short time, however, as a few days later Larkin, of the Athletic Club at Philadelphia, duplicated the feat, making six hits with a total score of 13. About a month later Strieff, of the Athletic Club, hit the ball harder but not quite so often. Strieff made five consecutive basehits, with a total of 14.

Our strategic pitchers have also performed some wonderful feats in their line during the last few years. Some of them are given below:

Reccius, of the Louisville Club, on March 25, 1885, in a game against the Augusta Club, at Augusta, put out the home team in three consecutive innings in "one, two, three" order. There were only thirteen pitched balls. The least number he could have pitched would have been nine.

Timothy Keefe, of the New-York Club, has performed some marvellous feats with the baseball. The greatest manœuvre of Keefe (although he has at times compelled nearly every man to strike out as he came to the bat in a game) is that he frequently allows the umpire to call five bad balls on him, when he will gather himself and cause the batter to strike out on the next three balls pitched. This is a more difficult feat than it seems to be; and no other pitcher in the country can perform it so successfully as Keefe.

Nichols, who did so much to win the pennant for the Harvard College Club, had also wonderful control of the diminutive globe for a young man. In one of the Intercollegiate games, in which Nichols pitched against the Brown University nine, he caused twenty of the Brown students to strike out, eleven of that number striking out in succession.

Terry, of the Brooklyn Club, a handsome youth with Adonis form, has been a great pitcher at times. In a game played at Washington Park, Brooklyn, the St. Louis American champions failed to make a single hit from Terry's curves. Many other pitchers have performed the feat, but seldom against such strong clubs as the St. Louis nine.

Clarkson, the Chicago Club's great pitcher, has also done some strategic work from the pitcher's box. Clarkson was quite a youth when he made his baseball debut, yet he showed strong muscle and great athletic ability in every move. In a game Clarkson pitched against the Providence nine at Providence on July 29, 1884, the home club failed to make a single hit. Two days later the Chicago Club again beat the pets of Rhode Island with Clarkson pitching a fourteen inning game; and the Providence players only made four hits. At Philadelphia during the same season, Ferguson, of the Philadelphia Club, retired the Providence players without a base hit having been made from his delivery.

"Phenomenal" Smith, who has made such a great record in the Newark, Eastern League, has performed some marvellous feats in twisting deceptive curves. Probably his most wonderful feat was at Newark on October 3, 1885. In a game between the Newark and Baltimore clubs, Smith not only prevented the Baltimore players from making a safe basehit, but he retired the players in "one, two, three" order in every inning, sixteen of the would-be batters going out on strikes.

Ramsey, of the Louisville Club, is a great pitcher. Ramsey, in a game his club played in St. Louis on October 11, 1885, did not allow the St. Louis players a single base hit. He also caused fifteen of the players to strike out.

CURVES IN PITCHING.

Probably no other department in baseball has advanced with such strides as pitching. The pitcher can be truthfully said to be the most important man on a baseball nine. Much depends on his work. A good catcher and good fielders are of course necessary; and good batsmen are also of use. Still, without a good pitcher, good fielders and batsmen could not win a game. In old times the pitcher was not so important a personage, but he grew in importance with the game.

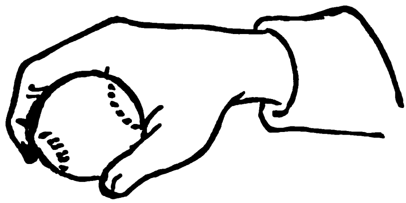
Formerly the ball was pitched to the batter generally without much speed and with no curve. If that kind of pitching were employed in a game of to-day the other nine would make base hits all day. Now the pitcher is given unlimited latitude in delivering the ball. He can toss it, jerk it, pitch it, or throw it at the batter either over or underhand. He can also use the round-arm throw, so much used in cricket; but pitchers seldom avail themselves of the latter style. The principal mode of delivering the ball to-day is the over or underhand throw. Not only has the pitcher been given power to use more speed in pitching the ball, but he has the right to employ the "curve" or twist to deceive the batter.

Curve pitching is now one of the features of baseball, although many scientific men laughed at it originally and still believe that it is impossible to curve a ball. A great pitcher not only has speed and curve to assist him in puzzling the batter, but he must employ a certain amount of strategy. The batters of to-day learn the tricks and curves of pitchers quickly, and if the pitcher is not more or less a strategist in his work he will not be successful long, no matter how great a curve he can make with a ball or with what terrific speed he can send it over the plate.

The pitcher's first effort is to deceive the eye of the batter and make him strike at balls which do not come over the plate. It is a singular fact that few pitchers are really good batters. They are often the weakest batters on a team. Knowing the curves and tricks of pitchers so well, it is surprising to observe the poor work they generally do at the bat.

Critics are still looking for the pitcher par excellence. Although they acknowledge that the point of excellence has been nearly approached at times, still their ideal twirler of the diminutive globe has not yet made his appearance. Creighton, the once famous pitcher of the ancient Excelsior Club, had no peer in his time; but if he should pitch to-day as he did then he would be relieved from the pitchers' box in a few innings. Many good pitchers are now developed every season. Martin, of the old Mutual Club, was a great pitcher in his time. Spaulding, who pitched for the old Chicago Club when it won the pennants in 1871 and 1876, was one of the ablest strategic pitchers in the history of the game.

It is still claimed by many baseball men that the curve-ball delivery was discovered by accident; yet the honor of practically developing it has been generally given to Arthur Cummings, of the old Star Club, of Brooklyn.



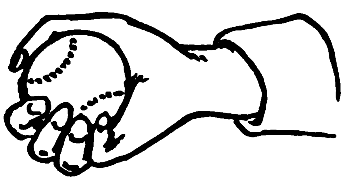
Holding the ball in straight delivery.

The straight delivery, according to the veteran Chadwick, is pitched like this: Grasp the ball securely between the first and second fingers with the thumb on the opposite side, the other fingers being closed in the palm of the hand. Deliver the ball to the batsman with all possible speed, either by a straight throw from the shoulder or by

Position of the player in straight deliverv.

an underhand throw at a level with the waist. In this, as well as all other deliveries of the ball, the pitcher should exert himself to retain absolute command of the ball, if possible.

The in and out curve and how the ball should be held is shown in the following cuts:



Holding the ball for the in-curve.

To make the in-curve, grasp the ball securely with all the fingers, the thumb pressed firmly against the opposite side. Throw the ball at a height equal to the shoulder and at the instant of releasing it from the hand, twist quickly outward, allowing the ball to twist off the ends of the first two fingers.

Pitching the in-curve.

The out-curve is probably used to a greater extent than any other. Secure the ball in the hand by pressing it firmly between the first two fingers and the thumb, with the third and little fingers closed in the palm of the hand. In delivering the ball to the plate, throw the arm forward midway between the shoulder and the waist, and, at the

Pitching the out-curve.

moment of allowing the ball to leave the hand, turn or twist the hand quickly to the left.

To make the high in-curve a youthful or aspiring twirler should hold the ball between the first two fingers and the thumb. Throw the arm forward with the hand above the shoulder. Then twist the hand downward quickly, letting the ball roll off the ends of the fingers as the grasp is released.

To make the drop ball which is now used with such wonderful effect, the pitcher should hold the ball well in the palm of the hand in the same manner as for the outshoot or rising ball. This peculiar delivery

is executed by allowing the fingers to turn under the ball as it is released from the hand, letting it roll off the ends of the fingers. The movement of the arm, whether above or below the shoulder, should be nearly as possible perpendicular.

TECHNICAL TERMS.

The game of baseball has its regular technical phraseology. An explanation of some of the terms in common use is necessary to an understanding of the game.

Assistance on Strikes in Pitching.—The pitcher is given assistance when he strikes a batsman out. In the League the record goes into the table, but in the American Association it is credited in the summary.

Box.—The "box" is the pitcher's position, or the little square in the centre of the diamond.

Balk.—A balk entitles a base-runner to a base, and is made when the pitcher performs any of the preliminary movements in delivering the ball to the bat but fails to throw the ball. This rule, however, is seldom if ever enforced. Nearly all the pitchers make numerous balks during a game, but the umpire seldom calls them.

Battery.—This technical term applies to the pitcher and catcher. What part of a battery a catcher is nobody has ever been able to find out.

Battery Errors.—Are the misplays of the pitcher and catcher, such as wild pitches, passed balls, called balls, and hitting the batsman.

Block.—A block ball is a ball stopped by an outsider. The ball has to be returned to the pitcher in his position before a base-runner can be put out.

Called balls.—When a pitcher throws six balls and they are not where the batsman wants them, the batter is sent to first base on called balls.

Change of pace.—Applies to the pitcher when he alternates in his delivery between a slow and swiftly pitched ball. Many pitchers depend largely for effectiveness upon such change of pace.

Chances.—A chance means an opportunity of a fielder to put an opponent out.

Curve.—The curve applies to the twisting or curving of the ball.

Dead ball.—A dead ball is one that strikes the batter or his clothing or the bat, without his striking at it. It is also dead if it strikes the umpire before it reaches the catcher.

Fair ball.—Is a ball pitched squarely over the plate at the height asked for by the batter, and whether that individual strikes at it or not it is called a strike by the umpire.

Strike.—When a batsman hits at the ball, but the bat and ball fail to collide. "Three strikes" retire a player if the catcher holds the ball.

Head Work.—The term is applied to a player who uses judgment in his work.

High Ball.—A batsman calls for a high ball when he wishes the pitcher to put the ball over the plate at a height above the waist but below the shoulder.

Low Ball.—A fairly pitched ball which goes over the plate at a height between the player's belt and knee.

Out of form.—Means just what one would suppose it meant. A pitcher losing his effectiveness or a batter being unable to hit the ball..

Wild Pitch.—A ball pitched out of the catcher's reach. It counts against the pitcher's record.

A. B.—In a score sheet means times at bat. Base on called balls are not counted in times at bat.

Passed Ball.—A ball fairly pitched by the pitcher but which the catcher fumbles or allows to pass him.

R.—Stands for "runs."

1B.—In a score means "single base hits."

P. O.—In a score means "put out."

A.—Stands for assists. When a player throws a ball to a baseman who puts an opponent out, the thrower gets an assist.

T. B.—Total number of base hits.

E.—The enemy of all baseball players; and under this head all blunders in fielding are credited.

Muffin.—Is a term applied to poor players or when a player drops or misjudges a batted or thrown ball.

Hot balls.—The lightning like shoots thrown or hit to the infielders.

Fly Catch.—A ball caught in the air by a player.

Foul Tip.—A foul ball caught by the catcher sharp and speedy from the ball. It is a most difficult catch to make.

Napping.—When a player through carelessness or sleepy-headedness is caught off his base.

Double Play.—Two players put out on one ball, or before the ball is pitched to the bat again.

Triple Play.—The same as above, except that three players are put out instead of two.

Run Out.—When a player is caught between the bases and put out.

Wild Throw.—A ball thrown out of the reach of a player.

Running Catch.—A ball caught while running rapidly.

Dubs.—Poor players.

RULES OF THE GAME.

The rules of the game are given below. Amateur clubs do not follow them with the rigidity with which the professional nines conform to them, especially with regard to fines; but amateurs are governed by them in all important particulars. They are as follows:

1.—A Game shall consist of nine innings to each nine, except that: (1) If the side first at bat scores less runs in nine innings than the other side has scored in eight innings, the game shall then terminate. (2) If the side last at bat in the ninth inning scores the winning run before the third man is out, the game shall then terminate. (3) If the score be a tie at the end of nine full innings, play shall only be continued until the side first at bat shall have scored more runs than the other side, in an equal number of innings; or until the other side shall score one more run than the side first at bat. (4) If the Umpire calls "Game" on account of darkness or rain at any time after five innings have been completed by both sides, the score shall be that of the last equal inning played, unless the side second at bat shall have scored one or more runs than the side first at bat, in which case the score of the game shall be the total number of runs made.

2.—A Drawn Game shall be declared by the Umpire when he terminates a game, on account of darkness or rain, after five equal innings have been played, if the score at the time is equal on the last even inning played; but if the side that went second to bat is then at the bat, and has scored the same number of runs as the other side, the Umpire shall declare the game a draw.

3.- A Forfeited Game shall be declared by the Umpire in favor of the Club not in fault, in the following cases: (1) If the nine of a club fail to appear upon the field, or, being upon the field fail to begin the game within five minutes after the Umpire has called "Play" at the hour appointed for the beginning of the game. (2) If, after the game has begun, one side refuses or fails to continue playing. (3) If, after play has been suspended by the Umpire, one side fails to resume playing within five minutes after the Umpire has called "Play." (4) If, in the opinion of the Umpire, any of the rules are wilfully violated.

4. "No game" shall be declared by the Umpire if he shall terminate play, on account of rain or darkness, before five innings on each side are completed.

5. A substitute shall not be allowed to take the place of any player in a game, unless such player be disabled in the game then being played, by reason of illness or injury.

6. The choice of first inning shall be determined by the home club invariably.

7. The Umpire must call "play" at the hour appointed for beginning the game. The game must begin when the Umpire calls "play." When he calls "time" play shall be suspended until he calls "play" again, and during the interim no player shall be put out, base be run, or run be scored. The Umpire shall suspend play only for an accident to himself or a player; but in case of accident to a fielder, time shall not be called until the ball be returned to and held by the pitcher, standing in his position; or in case rain falls so heavily that the spectators are compelled by the severity of the storm to seek shelter, in which case he shall note the time of suspension, and should such rain continue to fall thirty minutes thereafter, he shall terminate the game. The Umpire shall also declare every "dead ball," "block," "foul hit," "foul strike," and "balk."

8. The batsman, on taking his position, formerly called for a "high ball," or a "low ball," or a "high or low ball," but in November, 1886, the League abolished that system. Any ball is now fair that passes over the plate and between the shoulder and knee of the batsman. The Umpire shall call every "unfair" ball delivered by the pitcher, and every "dead ball," if also an "unfair ball," as a "ball"; and he shall also count and call every "strike." Neither a "ball" nor a "strike" shall be called or counted until the ball has passed the home base.

9. The batsman is out: (1) If he fails to take his position at the bat in his order of batting, unless the error be discovered and the proper batsman takes his position before a fair hit has been made, and in such case the balls and strikes called will be counted in the time at bat of the proper batsman. (2) If he fails to take his position within one minute after the Umpire has called for the batsman. (3) If he makes a foul hit and the ball be momentarily held by a fielder before touching the ground, provided it be not caught in a fielder's hat or cap, or touch some object other than the fielder before being caught. (4) If he makes a foul strike. (5) If he plainly attempts to hinder the

catcher from fielding the ball, evidently without effort to make a fair hit.

10. The batsman becomes a base runner: (1) Instantly after he makes a fair hit. (2) Instantly after five balls have been called by the Umpire. (3) Instantly after four strikes have been declared by the Umpire. (4) A batsman shall take his base if struck by a pitched ball. When a batsman takes his base on balls he shall be credited with a base hit.

11. The base runner must touch each base in regular order, and when obliged to return must do so on the run, and must retouch the base or bases in reverse order. He shall only be considered as holding a base after touching it.

12. The base runner shall be entitled, without being put out, to take one base, provided he do so on the run, in the following cases: (1) If, while he was batsman, the Umpire called five balls. (2) If the Umpire awards a succeeding batsman a base on five balls and the base runner is thereby forced to vacate the base held by him. (3) If the Umpire calls a balk. (4) If a ball delivered by the pitcher pass the catcher and touch any fence or building within ninety feet of the home base. (5) If he be prevented from making a base by the obstruction of an adversary. (6) If the fielder stop or catch a batted ball with his hat or any part of his dress.

13. The base runner shall return to his base and shall be entitled so to return without being put out, provided he do so on the run: (1) If the Umpire declares a foul hit and the ball be not legally caught by a fielder. (2) If the Umpire declares a foul strike. (3) If the Umpire declares a dead ball, unless it be also the fifth unfair ball, and he is thereby forced to take the next base, as provided in Rule 12.

14. A base runner shall not have a substitute run for him.

15. The base runner is out: (1) If, after four strikes have been declared against him while batsman, and the catcher fails to catch the fourth strike ball, he plainly attempts to hinder the catcher from fielding the ball. (2) If, having made a fair hit while batsman, such fair hit shall be momentarily held by a fielder, before touching the ground or any object other than a fielder, provided it be not caught in the fielder's hat or cap. (3) If, when the Umpire has declared four strikes on him while batsman, the fourth strike shall be momentarily held by a fielder before touching the ground, provided it be not caught in a fielder's hat or cap, or touch some object other than a fielder before being caught. (4) If, after four strikes or a fair hit, he be touched with the ball in the hand of a fielder before such base runner touches first base. (5) If, after four strikes or a fair hit, the ball be securely held by a fielder while touching first base with any part of his person before such base runner touches first base. (6) If, in running the last half of the distance from home base to first base, he runs outside the three feet lines, except

that he must do so if necessary to avoid a fielder attempting to field a batted ball, and in such case shall not be declared out. (7) If, in running from first base to second base, from second to third or from third to home base, he runs more than three feet from a direct line between such bases to avoid being touched by the ball in the hands of a fielder; but in case a fielder be occupying the base runner's proper path, attempting to field a batted ball, then the base runner shall run out of the path and behind said fielder, and shall not be declared out for so doing. (8) If he fails to avoid a fielder attempting to field a batted ball, in the manner prescribed in (6) and (7) of this Rule, or if he in any way obstructs a fielder attempting to field a batted ball, provided that if two or more fielders attempt to field a batted ball, and the base runner comes in contact with one or more of them, the Umpire shall determine which fielder is entitled to the benefit of this Rule, and shall not decide the base runner out for coming in contact with any other fielder. (9) If, at any time while the ball is in play, he be touched by the ball in the hand of a fielder, unless some part of his person is touching a base he is entitled to occupy, provided the ball be held by the fielder after touching him; but in running to first base he may overrun said base without being put out for being off said base after first touching it, provided he returns at once and retouches the base, after which he may be put out as at any other base. If, in overrunning first base, he also attempts to run to second base, he shall forfeit such exemption from being put out. (10) If, when a fair or foul hit ball is legally caught by a fielder, such ball is legally held by a fielder on the base occupied by the base runner when such ball was struck (or the base runner be touched with the ball in the hands of a fielder), before he retouches said base after such fair or foul hit ball was so caught, provided that the base runner shall not be out in such case if, after the ball was legally caught as above, it be delivered to the bat by the pitcher before the fielder holds it on said base or touches the base runner with it. (11) If, when a batsman becomes a base runner, the first base, or the first and second bases, or the first, second and third bases be occupied, any base runner so occupying a base shall cease to be entitled to hold it until any following base runner is put out, and may be put out at the next base or by being touched by the ball in the hands of a fielder in the same manner as in running to first base at any time before any following base runner is put out. (12) If a fair hit ball strike him he shall be declared out and in such case no base shall be run unless forced, and no run be scored. (13) If when running to a base or forced to return to a base, he fail to touch the intervening base or bases, if any, in the order prescribed, he may be put out at the base he fails to touch, or by being touched by the ball in the hand of a fielder, in the same manner as in running to first base, provided that he shall not be declared out unless the captain of the fielding side claim such decision before the ball is delivered to the bat by the pitcher. (14) If, when the Umpire calls "play" after any suspension of a game, he fails to return to and touch the base he occupied when "time" was called before touching the next base.

16. The Umpire shall declare the batsman or base runner out, without waiting for an appeal for such decision, in all cases where such player is put out in accordance with these rules, except as provided in rule 15, (10), (13) and (14).

17. In case of a foul strike, foul hit not legally caught flying, dead ball, or base runner put out for being struck by a fair-hit ball, the ball shall not be considered in play until it is held by the pitcher standing in his position.

18. Whenever a block occurs the Umpire shall declare it, and base runners may run the bases without being put out, until after the ball has been returned to and held by the pitcher standing in his position.

19. One run shall be scored every time a base runner, after having legally touched the first three bases, shall touch the home base before three men are put out. If the third man is forced out, or is put out before reaching first base, a run shall not be scored.

20. If the pitcher causes the ball to strike the batsman, and the Umpire be satisfied that he does it intentionally, he shall fine the pitcher therefor.

21. No player except the captain or his assistant shall address the Umpire concerning any point of play, and any violation of this rule shall subject the offender to a fine.

22. The Umpire shall be chosen by the captains of the two nines. In the League four Umpires are selected before May 1 each year by the Secretary of the League. The Umpire's duties, in addition to those specified in the preceding rules, are: (1) Before the commencement of a match game he shall see that the rules governing all the materials of the game are strictly observed. He shall ask the captain of the home club whether there are any special ground rules to be enforced, and if there are, he shall see that they are duly enforced, provided they do not conflict with any of these rules. He shall also ascertain whether the fence directly in the rear of the catcher's position is distant ninety feet from the home base. A fair batted ball that goes over the fence at a less distance than two hundred and ten feet from home base shall entitle the batsman to two bases, and a distinctive line shall be marked on the fence at this point. The Umpire shall not reverse his decision on any point of play upon the testimony of any player engaged in the game, or upon the testimony of any bystander. (2) It shall be the duty of the Umpire to decide whether the grounds are in proper condition and the weather suitable for play.

23. The Umpire shall not be changed during the progress of a match game, except for reason of illness or injury.

24. Any Umpire who shall be guilty of ungentlemanly conduct or of selling, or offering to sell, a game of which he is Umpire, shall thereupon be removed from his official capacity.

25. The Umpire's jurisdiction and powers, in addition to those specified in the preceding rules, are: (1) He must keep constantly in mind the fact that upon his sound discretion and promptness in conducting the game, compelling players to observe the spirit as well as the letter of the rules, and enforcing each and every one of the rules, largely depends the merit of the game as an exhibition and the satisfaction of spectators therewith. He must make his decisions distinct and clear, remembering that every spectator is anxious to hear such decision. He must keep the contesting nines playing constantly from the commencement of the game to its termination, allowing such delays only as are rendered unavoidable by accident, injury or rain. He must, until the completion of the game, require the players to change sides promptly. (2) The players of the side "at bat" must occupy the portion of the field allotted to them, subject to the condition that they must speedily vacate any portion thereof that may be in the way of the ball, or any fielder attempting to catch or field it. The triangular space behind the home base is reserved for the exclusive use of the Umpire, catcher and batsman, and the Umpire must prohibit any player of the side "at bat" from crossing the same at any time while the ball is in the hands of the pitcher or catcher, or is passing between them while standing in their positions. (3) The Umpire is master of the field from the commencement to the termination of the game and he is invested with authority to order any player to do or omit to do any act, as he may deem it necessary to give effect to the rules and, power to inflict upon any player disobeying any such order a fine, and to impose a fine upon any player who shall use abusive, threatening or improper language to the Umpire, audience, or other player, and when the Umpire shall have so punished the player he shall not have the power to revoke or omit the penalty so inflicted. (4) The Umpire shall at once notify the captain of the offending player's side of the infliction of any fine herein provided for. (5.) In case a League Umpire imposes a fine on a player, or declares a game forfeited, he shall transmit a written notice thereof to the Secretary of the League within twenty-four hours thereafter; and if he shall fail to do so, he forfeits his position as League Umpire, and is forever thereafter ineligible to umpire any League game.

26. For the special benefit of the patrons of the game, and because the offences specified are under his immediate jurisdiction, and not subject to appeal by players, the Umpire is required to pay special attention to possible violations of the

spirit of the Rules, of the following character: (1.) Laziness of players in taking their places in the field, or those allotted them by the Rules when there side is at the bat, and especially any failure to keep the bats in the racks provided for them; to be ready (two men) to take position as Batsmen, and to remain upon the Players' Bench, except when otherwise required by the Rules. (2.) Any attempt by players of the side at bat, by calling to a fielder, other than the one designated by his Captain, to field a ball, or by any other equally disreputable means seeking to disconcert a fielder. (3.) Indecent or improper language addressed by a player to the audience, the Umpire, or any player. In any of these cases the Umpire should promptly fine the offending player. (4.) The Rules make a marked distinction between hindrance of an adversary in fielding a batted or thrown ball. This has been done to rid the game of the excuses formerly made by a Fielder failing to hold a ball to put out a Base-runner, but there may be cases of a Base-runner so flagrantly violating the spirit of the Rules and of the game in obstructing a Fielder from fielding a thrown ball that it would become the duty of a League Umpire, not only to declare the Base-runner "out" (and to compel any succeeding Base-runners to hold their bases), but also to impose a heavy fine upon him. For example: If the Base-runner plainly strike the ball while passing him, to prevent its being caught by a Fielder, if he hold a Fielder's arms so as to disable him from catching the ball, or if he knock the Fielder down for the same purpose. (5.) In the case of a "Block," if the person not engaged in the game should retain possession of the ball, or throw or kick it beyond the reach of the Fielders the Umpire should call "Time," and require each Base-runner to stop at the last base touched by him, until the ball be returned to the Pitcher, standing in his position. (6.) The Umpire must call "Play" at the exact time advertised for beginning a game, and any player not then ready to take the position allotted him, must be promptly fined by the Umpire. (7.) The Umpire is only allowed, by the Rules, to call "Time" in case of an accident to himself or a player, case of rain, as defined by the Rules. The practice of players suspending the game to discuss or contest a decision of the Umpire is a gross violation of the Rules.

27. In order to promote uniformity in scoring games, the following suggestions are made:

Batting.—(1.) The first item in the tabulated score, after the player's name and position, shall be the number of times he has been at bat during the game. Any time or times where the player has been sent to base on called balls shall not be included in this column. (2.) In the second column should be set down the runs made by each player. (3.) In the third column should be placed the first-base hits made by each player. A base hit should be scored in the following cases: When the ball from the bat strikes the ground between the foul lines, and out of reach of the Fielders. When a hit is partially or wholly stopped by a Fielder in motion, but such player cannot recover himself in time to handle the ball before the striker reaches First Base. When the ball is hit so sharply to an Infielder that he cannot handle it in time to put out a man. In case of doubt over this class of hits, score a base hit and exempt fielder from the charge of an error. When a ball is hit so slowly toward a Fielder that he cannot handle it in time to put out a man. In the fourth column should be placed to the credit of each player the total bases made by him off his hits.

Fielding.—(1.) The number of opponents put out by each player shall be set down in the fifth column. Where a striker is given out by the Umpire for a foul strike, or because he struck out of his turn the put-out shall be scored to the Catcher. (2.) The number of times the player assists shall be set down in the sixth column. An assist should be given to each player who handles the ball in a run-out or other play of the kind. An assist should be given to a player who makes a play in time to put a runner out, even if the player who should complete the play fails, through no fault of the player assisting. And generally an assist should be given to each player who handles the ball from the time it leaves the bat until it reaches the player who makes the put-out, or in case of a thrown ball, to each player who throws or handles it cleanly, and in such a way that a put-out results or would result if no error were made by the receiver. An assist shall be given the Pitcher when the Batsman fails to hit the ball on the third strike, and the same shall also be entered in the summary under the head of "struck out." (3.) An error should be given for each misplay which allows the striker or Base-runner to make one or more bases, when the perfect play would have insured his being put out. An error should be given to the Pitcher when the batsman is given First Base on "called balls." In scoring errors off batted balls, bases stolen by players shall appear to their credit in the summary of the game.

LEAGUE RECORDS BY YEARS.

Along with perfection in the rules of the game has also come great growth in the proficiency of players. Amateur nines are now in existence in the colleges and among the young men of our various cities throughout the United States, which play beautiful, correct and exciting games of baseball. No sight is more pleasing to the genuine lover of ennobling athletic sports than a well contested game of baseball. The object is the same as in the great national meetings of athletes in ancient Greece, namely the laurels of victory and the applause of the people.

So great has been the interest in baseball that professional contests, as a means of amusing the people with exhibitions of extraordinary playing, have come into existence and now constitute an important and valued feature of the athletic sports of every summer season.

The League or National League of Baseball clubs was organized in 1876. Eight clubs composed the organization. At the close of the season the Chicago club was found to have won the larger number of games and was awarded the pennant. The Hartford club finished second, and St. Louis third. The famous old Mutual club of New-York finished in the sixth place, with only 21 victories out of 56 games played. The following is the record of 1876:

Clubs.	Chicago	Hartford	St. Louis	Boston	Louisville	Mutual	Athletic	Cincinnati	Games Won	Games Played
Chicago	..	6	4	9	9	7	7	10	52	66
Hartford	4	..	4	8	9	4	9	9	47	68
St. Louis	6	6	..	6	6	6	8	7	45	64
Boston	1	2	4	..	5	8	9	10	39	70
Louisville	1	1	4	5	..	5	6	8	30	66
Mutual	1	4	1	2	3	..	3	7	21	56
Athletic	1	1	0	1	2	4	..	5	14	59
Cincinnati	0	1	2	0	2	1	3	..	9	65
Games Lost	14	21	19	31	36	35	45	56		

1877.

In the second year of its existence the League was composed of five clubs, the Cincinnati, Athletic and Mutual clubs having resigned. The latter two clubs failed to meet their scheduled engagements and were dropped. Each club played 48 games during the season of 1877. The Boston nine played in fine form and captured the pennant, with Louisville second. The Chicago team, the champions of the previous year, finished last.

Clubs.	Boston	Louisville	Hartford	St. Louis	Chicago	Games Won	Games Played
Boston	..	8	7	6	10	31	48
Louisville	4	..	6	10	8	28	48
Hartford	5	6	..	5	8	24	48
St. Louis	6	2	7	..	4	19	48
Chicago	2	4	4	8	..	18	48
Games Lost	17	20	24	29	30		

1878.

The campaign of 1878 was made with six clubs in the League. The games were well played. The Boston club finally again captured the pennant, having won 41 games and lost 19 during the season. The Chicago club lost the same number of games it did the previous season, but won more and finished in fourth place.

Clubs.	Boston	Cincinnati	Providence	Chicago	Indianapolis	Milwaukee	Games Won	Games Played
Boston	..	6	6	8	10	11	41	60
Cincinnati	6	..	9	10	4	8	37	60
Providence	6	3	..	6	10	8	33	60
Chicago	4	2	6	..	8	10	30	60
Indianapolis	2	8	2	4	..	8	24	60
Milwaukee	1	4	4	2	4	..	15	60
Games Lost	19	23	27	30	36	45		

1879.

The season of 1879 was a more business-like one in many respects. It was found that eight clubs could contest for a pennant comfortably, and that number was fixed upon as the maximum of membership in the League. The Indianapolis and Milwaukee clubs were unable to keep pace with the other nines financially and otherwise, and they were dropped, the Buffalo and Cleveland nines taking their places. George Wright, a famous player, left the Boston club at this time and went over to the rival team in Providence. He also managed the "Little Rhodies." The Providence team won the pennant that year, but probably could have done just as well even without Wright. The Boston club finished a good second. Troy and Syracuse were the infants this year, and brought up the rear. The latter club disbanded before it finished its series of games.

Clubs.	Providence	Boston	Chicago	Buffalo	Cincinnati	Cleveland	Troy	Syracuse	Games Won	Games Played
Providence	..	8	7	6	10	8	10	6	55	78
Boston	4	..	4	9	7	10	11	4	49	78
Chicago	5	8	..	6	3	8	8	6	44	76
Buffalo	6	3	6	..	7	8	11	3	44	76
Cincinnati	2	5	8	3	..	8	9	3	38	74
Cleveland	4	2	4	4	4	..	5	1	24	77
Troy	2	1	3	1	2	6	..	4	19	75
Syracuse	0	2	0	3	3	5	2	..	15	42
Games Lost	23	29	32	32	36	53	56	27		

1880.

The Syracuse Stars found that they were outclassed and dropped out, the Worcester club taking their place. The League race in 1880 again had eight clubs competing for the pennant. The number of games was also greater, while the general interest in the sport also increased. In this year the Chicago club again went to the front and after an interesting season's campaign captured the much coveted trophy. The Providence club finished a good second, and Cleveland third. The Porkopolitans did poorly and came in last.

Clubs.	Chicago	Providence	Cleveland	Troy	Worcester	Boston	Buffalo	Cincinnati	Games Won	Games Played
Chicago	..	9	8	10	10	9	11	10	67	84
Providence	3	..	9	7	6	7	10	10	52	84
Cleveland	4	3	..	9	6	7	9	9	47	84
Troy	2	5	3	..	5	5	11	10	41	83
Worcester	2	6	6	7	..	8	3	8	40	83
Boston	3	5	5	7	4	..	9	7	40	84
Buffalo	1	2	3	1	0	3	..	5	24	82
Cincinnati	2	2	3	1	3	5	5	..	21	80
Games Lost	17	32	37	42	43	44	58	59		

1881.

Cincinnati was the next city to conclude that she had had a sufficiency of League battles, and the season of 1881 found them out and the Detroit club in. The great team work of the Chicago club asserted itself as usual this year, and the Garden City again won the honors of the season, turning the 84 games played into 56 victories. The Detroit club also did good work in its infant year, and came in fourth. The Providence and Buffalo clubs finished in second and third places respectively. The Worcester team did indifferently and came in last. The Boston club also did poorly and finished the season in no better position than that won in 1880.

Clubs.	Chicago	Providence	Buffalo	Detroit	Troy	Boston	Cleveland	Worcester	Games Won	Games Played
Chicago	..	9	7	7	8	10	6	9	56	84
Providence	3	..	5	8	6	7	9	9	47	84
Buffalo	5	7	..	9	3	8	7	6	45	83
Detroit	5	4	3	..	7	8	7	7	41	84
Troy	4	6	9	5	..	5	6	4	39	84
Boston	2	5	4	4	7	..	8	8	38	83
Cleveland	6	3	5	5	6	4	..	7	36	84
Worcester	3	3	5	5	8	3	5	..	32	82
Games Lost	28	37	38	43	45	45	48	50		

1882.

The same eight clubs composed the League in 1882. The campaign was similar in many respects to that of the year before. The Worcester and Troy clubs had no chance against their stronger rivals, and again made such a poor showing that at the end of the season both teams were allowed to resign. The Chicago club again captured the pennant. Second and third place were again occupied by the Providence and Buffalo clubs. The Boston club showed a slight improvement and came in fourth. The champions made nearly the same record they did the previous year, winning one less victory and losing one more game.

Clubs.	Chicago	Providence	Buffalo	Boston	Cleveland	Detroit	Troy	Worcester	Games Won	Games Played
Chicago	..	8	6	6	9	8	9	9	55	84
Providence	4	..	6	6	8	9	9	10	52	84
Buffalo	6	6	..	5	6	5	6	11	45	84
Boston	6	6	7	..	7	8	4	7	46	84
Cleveland	3	4	6	5	..	4	9	11	42	82
Detroit	4	3	7	4	7	..	8	9	42	83
Troy	3	3	6	8	2	4	..	9	35	83
Worcester	3	2	1	5	1	3	3	..	18	84
Games Lost	29	32	39	39	40	41	48	66		

1883.

The season of 1883 initiated the League membership of the New-York and Philadelphia clubs. The New-York management secured the best players of the former Troy club, while Philadelphia secured as good a team as possible under the circumstances. The New-York club in its first race for the League pennant did poorly, but the other new nine did even worse. During the greater dart of the year the old champions seemed to be having an easy thing of it, but toward the latter part of the season the Boston club made a wonderful spurt and finally captured the trophy. The Chicago club came in a good second.

Clubs.	Boston	Chicago	Providence	Cleveland	Buffalo	New-York	Detroit	Philadelphia	Games Won	Games Played
Boston	..	7	8	10	7	7	10	14	63	98
Chicago	7	..	7	6	9	9	9	12	59	98
Providence	6	7	..	6	7	9	12	11	58	98
Cleveland	4	8	8	..	7	7	9	12	55	97
Buffalo	7	5	7	7	..	8	9	9	52	97
New-York	7	5	5	6	5	..	6	12	46	96
Detroit	4	5	2	5	5	8	..	11	40	98
Philadelphia	0	2	3	2	5	2	3	..	17	98
Games Lost	35	39	40	42	45	50	53	81		

1884.

There was no change among the clubs in the League. The championship season was again lengthened and each club was scheduled to play 112 championship games. All the clubs played that number except Boston and Buffalo, and they only one game short of the full number. The Providence club this year played in model form throughout and captured the pennant after one of the most interesting seasons in the history of the game. The New-York and Philadelphia clubs had been strengthened, but still could not do better than secure fifth and sixth places. The former champions from Chicago were forced to be content with fourth place, winning and losing the same number of games the New-York club did. The Cleveland club fell off badly this year, and after a disastrous campaign resigned.

Clubs.	Providence....	Boston....	Buffalo....	Chicago....	New-York....	Philadelphia....	Cleveland....	Detroit....	Games Won....	Games Played....
Providence..............	..	9	10	11	13	13	13	15	84	112
Boston..................	7	..	9	10	8	13	14	12	73	111
Buffalo.................	6	6	..	10	5	11	14	12	64	111
Chicago.................	5	6	6	..	12	14	8	11	62	112
New-York................	3	8	11	4	..	11	11	14	62	112
Philadelphia............	3	3	5	2	5	..	10	11	39	112
Cleveland...............	3	2	2	8	5	6	..	9	35	112
Detroit.................	1	4	4	5	2	5	7	..	28	112
Games Lost............	28	38	47	50	50	73	77	84		

1885.

The season of 1885 will long be remembered by baseball enthusiasts. The great struggle for the lead during the whole season between the Chicago and New-York clubs kept the attention of all followers of the game. The final breakdown of the New-York men when the season was nearly over is well known. The local players travelled West to play off their final series, and went all to pieces in Chicago. As a result the old champions again won the pennant by barely two games, Chicago winning 87 and losing 25, while New-York won 85 and lost 27. The Philadelphia team also improved its position this year and finished the season in third place. The Cleveland club retired this year and the St. Louis team, the winners of the old Union Association pennant, took the place. The Black Diamonds came in last.

Clubs.	Chicago....	New-York....	Philadelphia....	Providence....	Boston....	Detroit....	Buffalo....	St. Louis....	Games Won....	Games Played....
Chicago.................	..	6	11	11	14	15	16	14	87	112
New-York................	10	..	11	12	13	12	15	12	85	112
Philadelphia............	5	5	..	8	9	9	11	9	56	110
Providence..............	5	4	7	..	7	9	13	8	53	110
Boston..................	2	3	7	9	..	7	10	8	46	112
Detroit.................	1	4	7	6	9	..	5	9	41	108
Buffalo.................	0	1	5	3	6	11	..	12	38	112
St. Louis...............	2	4	6	8	8	4	4	..	36	108
Games Lost............	25	27	54	57	66	67	74	72		

1886.

The League baseball season ended on Saturday, October 9. The Chicago club again won the pennant, this being the sixth time it has done so since the League was organized in 1876. The Chicago club has a percentage of .726 in victories, while the Detroit team has made a record of 87 victories and 36 defeats. The New-York club just succeeded in capturing third place, although the Giants have lost one more game than the Philadelphia club. The Boston club has virtually never been in the race since the season opened. The season ends with the clubs in this order:

Clubs.	Chicago	Detroit	New-York	Philadelphia	Boston	St. Louis	Kansas City	Washington	Games Won	Games Played
Chicago	..	11	10	10	12	13	17	17	90	124
Detroit	7	..	11	10	11	15	16	17	87	123
New-York	8	7	..	8	11	15	15	11	75	119
Philadelphia	7	7	8	..	10	12	14	13	71	114
Boston	6	6	6	3	..	11	11	13	56	117
St. Louis	4	2	8	6	6	..	12	10	43	122
Kansas City	1	2	3	2	6	5	..	11	30	110
Washington	1	1	3	4	5	8	5	..	27	119
Games Lost	34	36	44	43	61	79	90	92		

AMERICAN ASSOCIATION.

The American Baseball Association, although a younger organization than the National League, is now nearly if not fully as powerful a body. Its inception dates from an informal meeting held in Pittsburg in the fall of 1881. Little was accomplished at this meeting except that it was decided to hold a regular convention at Cincinnati on November 2, 1881. At this meeting the American Baseball Association became a reality, a constitution was adopted, playing rules were drawn up, and every arrangement was made for a series of championship games to begin early in the following spring. Clubs from Philadelphia, Pittsburg, Baltimore, Cincinnati and St. Louis were the original members. Unlike the League, the new Association thought it would be advisable to adopt a Guarantee System, thereby making each club self sustaining. Each club was allowed to fix its own price of admission and was obliged to depend upon local patronage for support.

1882.

The first season's campaign was a moderately successful one. When the second annual convention was held the success of the new organization was assured. Applications for membership poured in from a dozen cities. The New-York and Columbus clubs were admitted, making the number of clubs competing for the pennant eight. Only five clubs competed for the pennant in the inaugural season, the Cincinnati club being the successful nine, winning 55 games out of 80 played.

Clubs.	Cincinnati	Athletic	Eclipse	Allegheny	St. Louis	Baltimore	Games Won	Games Played
Cincinnati	..	10	11	10	10	14	55	80
Athletic	6	..	11	6	11	7	41	75
Eclipse	5	5	..	10	9	13	42	80
Allegheny	6	10	6	..	10	7	39	79
St. Louis	6	5	7	6	..	13	37	80
Baltimore	2	4	3	7	3	..	19	74
Games Lost	25	34	38	39	43	54		

1883.

This year the system of professional umpires was taken up and met with great success. There were then eight clubs in the organization, and all on a paying basis. The fight for the pennant this year was probably the closest and most interesting in the history of baseball. The Athletic club of Philadelphia won, but only after the closest of fights. The champions actually won the coveted trophy by one run in a game of ten innings played at Louisville against the Louisville club, in the last week of the season, the contest being the next to the final game the Athletic club had to play. The Metropolitans, of this city, finished in fourth place with 54 victories and 42 defeats—a good record for a club in its infant year.

Clubs.	Athletic	St. Louis	Cincinnati	Metropolitan	Louisville	Columbus	Allegheny	Baltimore	Games Won	Games Played
Athletic	..	9	5	9	7	13	12	11	66	98
St. Louis	5	..	6	11	8	11	12	12	65	98
Cincinnati	9	8	..	4	10	11	9	11	62	98
Metropolitan	5	3	10	..	6	11	9	10	54	96
Louisville	7	6	4	7	..	9	11	8	52	97
Columbus	1	3	3	3	5	..	10	7	32	97
Allegheny	2	2	5	5	3	4	..	9	30	98
Baltimore	3	2	3	3	6	6	5	..	28	96
Games Lost	32	33	36	42	45	65	68	68		

1884.

In the third year of its existence the Association committed a blunder that every club in the organization regretted before the season was ended. Meeting after meeting was held and it was finally decided to have twelve clubs compete for the pennant in 1884. The Toledo, Washington, Indianapolis, Virginia and Brooklyn clubs were admitted. In the previous year the Brooklyn club had won the pennant of the Inter-State Association, and flushed with triumph the managers aspired to even higher honors than winning a trophy of a minor league. The club was not as successful as expected and finished the season in ninth place. The Metropolitan club had been greatly strengthened this year for the race, and captured the pennant to their great joy. The Columbus and Louisville clubs also made a good fight and finished in second and third place respectively. The Washington and Indianapolis clubs were outclassed and brought up the rear. The success of the Metropolitan club was mainly due to the great pitching of Keefe and Lynch. The Metropolitans were given a rousing reception at the end of the season and a parade was organized in their honor. The parade was made at night and attracted considerable attention. The players were seated on the top of a tally ho coach and were loudly applauded all along the route. Many carriages and every amateur and semi-professional club in this vicinity followed the victorious baseball players. The clubs finished the season as follows.

Clubs.	Metropolitan	Columbus	Louisville	St. Louis	Cincinnati	Baltimore	Athletic	Toledo	Brooklyn	Virginia	Pittsburg	Indianapolis	Washington	Games Won	Games Played
Metropolitan	..	5	7	5	6	5	8	5	9	2	9	8	6	75	107
Columbus	4	..	5	5	7	4	5	8	7	2	9	8	5	69	108
Louisville	3	5	..	5	5	4	6	9	6	4	8	9	4	68	108
St. Louis	4	5	5	..	6	5	7	5	7	3	9	6	5	67	107
Cincinnati	4	3	5	4	..	6	4	7	8	4	8	9	6	68	109
Baltimore	5	6	6	5	4	..	3	5	5	5	9	9	2	63	106
Athletic	2	5	3	3	6	7	..	6	6	2	8	6	7	61	108
Toledo	4	1	1	5	3	5	3	..	4	4	5	6	5	46	104
Brooklyn	1	3	3	2	2	5	3	4	..	3	4	7	3	40	104
Virginia	0	2	1	1	0	0	0	0	2	..	4	2	0	12	43
Pittsburg	1	1	2	1	1	0	2	5	6	1	..	6	4	30	108
Indianapolis	2	2	1	3	1	1	4	3	3	1	4	..	4	29	107
Washington	2	1	1	1	0	1	1	1	1	0	1	2	..	12	63
Games Lost	32	39	40	40	41	43	47	58	64	31	78	78	51		

1885.

During the season of 1885 the Association recognized that the dozen club idea was a failure. All except eight of the clubs were dropped. Columbus, Toledo, Virginia, Indianapolis and Washington quietly withdrew. The struggle for the pennant this year was not so close as in previous seasons, the St. Louis Brown Stockings winning with ease. Their record was 79 victories out of 112 games played. The Metropolitans did wretchedly this year and finished seventh. Many people thought that when the manager left the club, taking with him pitcher Keefe and third baseman Esterbrook, he virtually took the backbone out of the Metropolitans. The Brooklyn club also did indifferently this season, and although it finished ahead of the "Indians," still it was far from the leader. The St. Louis club played a remarkably brilliant game all through the season and won the series from each of the other seven clubs. The glorious victory aroused the ardor of the city of St. Louis and the club was given a tremendous reception with a parade at the close of the season. The crush in St. Louis on that night will never be forgotten. The clubs finished the season with the annexed victories and defeats:

Clubs.	St. Louis	Cincinnati	Pittsburg	Athletic	Brooklyn	Louisville	Metropolitan	Baltimore	Games Won	Games Played
St. Louis	..	10	10	12	12	9	12	14	79	112
Cincinnati	6	..	9	9	11	8	10	10	63	112
Pittsburg	6	7	..	6	10	10	7	10	56	111
Athletic	4	7	10	..	5	8	11	10	55	112
Brooklyn	4	5	6	11	..	10	8	9	53	112
Louisville	7	8	6	8	6	..	9	9	53	112
Metropolitan	4	6	8	5	8	7	..	6	44	108
Baltimore	2	6	6	6	7	7	7	..	41	109
Games Lost	33	49	55	57	59	59	64	68		

1886.

The race for the American Association pennant ended on Monday, October 11, the clubs winding up the regular season in the West. The St. Louis Brown Stockings again showed their immense superiority over their seven opponents and won easily with a dozen victories to spare. The champions won the series from every club except the Louisville. The Pittsburg club finished second after a severe struggle with the Brooklyn nine. The latter played in good form during most of the season, and the enthusiasts in Brooklyn seemed to be satisfied with the honors gained. The record is as follows:

Clubs.	St. Louis	Pittsburg	Brooklyn	Louisville	Cincinnati	Athletic	Metropolitan	Baltimore	Games Won	Games Played
St. Louis	..	12	13	9	15	15	16	13	93	139
Pittsburg	8	..	12	12	13	10	12	12	79	136
Brooklyn	7	8	..	13	13	12	10	14	77	138
Louisville	10	7	7	..	10	9	10	12	65	130
Cincinnati	5	7	7	10	..	10	13	13	65	138
Athletic	5	8	7	11	10	..	11	9	61	132
Metropolitan	4	8	9	8	7	7	..	9	52	132
Baltimore	7	7	6	7	5	8	8	..	48	130
Games Lost	46	57	61	70	73	71	80	82		

COURT AND LAWN TENNIS.

BY W. S. ROSSITER.

Court Tennis, from which the popular modern game of Lawn Tennis claims immediate descent, has been aptly described as "the king of games and the game of kings"

In quaint, extended and important record, Court Tennis is unapproached by any historic regular game. It has remained almost unchanged for four hundred years, the court, its dimensions.

methods of scoring and even the terms of the game being the same to-day as when bluff King Henry VIII crossed rackets with the Emperor Charles V or Queen Elizabeth watched her favorite nobles do battle across the net.

The most rudimentary athletic sport requires opponents and some ball or object to be tossed between or striven for by the opposing parties. This idea is primary in all nations. As illustrating what a natural game Tennis is, some sport that closely resembles it is found among all races from China to Peru.

Without following the early games which led up to Court Tennis itself, we find that by the close of the fourteenth century great advances had been made.

In France Court Tennis was the favorite amusement of the Court, the game being considered as a pastime for the King and his favorites only. Royal edicts during the reign of Charles V and succeeding kings confined Tennis to the upper classes; and the Tennis Courts of the palaces were the favorite lounging and betting places for the King and the nobles of his court. The statecraft of the age blended with the recreation of the Tennis Court.

The Court and game at that period were nearly the same as they are now. At first, instead of a net a string was hung across the court and then a fringe was attached. In returning balls simply the hand was used, primarily; next a glove with strings across it; and then a racket with rude stringing. For the strings parchment was occasionally used, being sold by illiterate monks from the libraries in their charge. There is one case on record where a racket was strung with part of a lost book of Livy.

Louis XI, Louis XII and Francis I of France were fond of Tennis. Henry II was the best player of all the French kings. He practised chiefly in the Louvre, where there were two courts.

Charles IX of France was in the midst of an interesting set of Tennis in August, 1572, when word was brought him of Coligny's assassination. "Par la mort dieu," he exclaimed petulantly as he returned to his game; "will they then never leave me at peace?"

Henry of Navarre, afterward Henry IV of France, was also passionately fond of Tennis.

Though taking its rise in France the game was generally popular in Europe, being a favorite court game in Spain and Italy. It was, at an early period, brought to England and became at once popular.

Chaucer mentions tennis in 1380 as though it were a well-known game; and from that date it begins to figure in literature as well as in history.

Henry VIII was devoted to tennis and always attended on his progresses and journeys by the royal marker, Anthony Ansley.

Queen Elizabeth was fond of watching the players.

Of her, an interesting anecdote is related by Marshall, taken from a contemporary letter: "Latlye, the Duke of Norfolk, and my L. of Leicester were playinge at tennes the Q. beholdinge of them, and my L. being verie hotte and swetinge tooke the Q. napken owte of her hande and wyped his face, wch the Duke seinge saide that he was to sawcie and swhore yt he would laye his racket vpon his face. Here-vpon rose a great troble and the Q. offendit sore wth the Duke.''

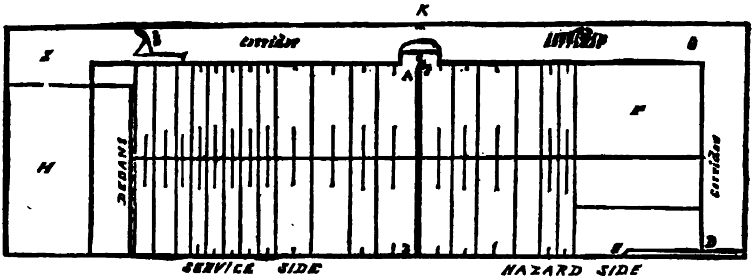
The popularity of the game with all classes continued during the reigns of the Stuarts and the Georges. It is now recognized in England and France as a standard and permanent game.

The necessity of a well-built court, and thus the great expense of the game confines it to the few. In addition to the expense is the fact that the game requires the greatest skill and endurance.

It should be remembered that the game is really very different from lawn tennis. An entire building is required for the court, the walls of which are used as part of the playing area as well as the court. Caroming thus complicates the game. It is a sport of untold possibility, and court tennis enthusiasts look with disdain upon lawn tennis, which they regard as a weak derivative.

America boasts but one good court, the Hunniwell Court in Boston, belonging to the Boston Court Tennis Club. In spite of our small

[DIAGRAM OF COURT.]



AB.—Net.
C.—Entrance to Court from the Corridor.
D.—Grille.
E.—Tambour.
F.—Receiving Court.
G.—Portion of Penthouse (or roof of corridor) and wall where ball must strike in the service before falling in Receiving Court.
H.—Lockers, Washrooms, etc.
I.—Dressing rooms.
J.—Well in the Court for unused balls to be stowed in.
K.—Entrance to building.
L.—Entrances to Dedans, dressing-rooms, etc.

showing, however, America holds the championship of the world. Thomas Pettit, of Boston, who is the professional in charge of the Hunniwell Court, has defeated all the best English players. The following particulars of the game were given the writer by Mr. Pettit, and the Hunniwell Court is the one referred to: The rackets used in the game are usually of French make, Brouaye, of Paris, being the popular manufacturer. They are heavy, slightly curved, with woodwork stained red, and strung with black gut. The balls are solid yarn or cloth and yarn, 2 1-4 to 2 5-8 inches in diameter, and covered with cloth. The terms used in the game are old and quaint, savoring of castle court-yards and the Middle Ages.

The Boston Court Tennis building is a brick structure without windows except a tier near the ground where they will not interfere with the court, which is lighted by skylights. The court itself is 96 feet long and 32 feet in width. It occupies all the space within the four walls except the necessary room for bath and dressing rooms, and a gallery about six feet wide which extends along three sides of the building. This gallery, called the Penthouse, is covered with a strong roof sloping toward the court and about seven feet above the asphalt flooring. This roof and the wall above it around three sides of the court, and the blank wall of the fourth side, are all used in the game as part of the field of play, as well as the court proper. The floor is of asphalt painted red, and very smooth, necessitating rubber soled shoes. The walls are of Portland cement, and are painted black to a height of eighteen feet where the playing area ends. The court is entered from the penthouse, at the net-poles. The court to the right on entering is the Service Court; that to the left the Hazard (or receiving) Court. In the blank wall of the latter court there is a projection like a chimney, and in the penthouse at the back of the same court is a square opening called the grille. The back part of the Service Court and forward part of the Hazard Court are divided by black lines into yard and half-yard spaces, each distance of a yard being numbered on the wall from one to six (the numbers increasing toward the net). The yard spaces are called chases. A chase is an undetermined point; that is, where a properly returned ball falls in the court and is untouched by the defender of the court.

The game begins by serving the ball upon the left wall of the Hazard Court (which the server faces); that is, over the penthouse, on the roof of which the ball strikes and drops into a square of court below. This process must be carried out or the ball is a fault.

The first bound after striking the court puts the ball in play, and the player in the Hazard Court then returns it as he sees fit, perhaps hitting it hard into the nearest wall, so that it caroms to the walls of the opposite court and thus keeps in play.

The grille is an objective point for the server, as a ball placed therein counts as a point for him. The dedans is the place in the penthouse where the spectators stand to watch the game through a grating, the word dedans standing for spectators, also.

If a ball in play bounds twice without return, it is a chase as explained, and the number of the chase is noted. When two chases have been made (one in case the score is vantage) the players change sides and play for the chases. A chase may be won in either of two ways; a ball sent by either player into a winning opening (grille, for example) wins any chase for which the striker may be playing. The second way is by playing the ball so that it shall fall better, i. e., further from the net than the chase was marked.

With respect to sets and scoring court tennis is the same as lawn tennis.

LAWN TENNIS.

Lawn Tennis is the worthy descendant of the historic and interesting game already described. It seems odd that its invention should have been delayed until this century. Its astonishing popularity and rapid growth, now that it is in vogue, make it nearly certain that the game has come to stay. In the United States Lawn Tennis is now as popular as in England. Messrs. Sears and Dwight brought the first set to this country in 1875, and now no country-seat or summer resort is complete without an ample tennis outfit.

The game has the great advantage of being free from gambling and rough professionalism. Tennis clubs have sprung up all over the country; playing continually improves; and numerous tournaments with valuable prizes are held each season. The elegant character of the game holds off the professionals; and lawn tennis continues the game of polite society, essentially one for ladies and gentlemen. The original game was the pastime of kings and nobles; and though the modern game is simple, fascinating and inexpensive, there still lingers about it the odor of aristocracy.

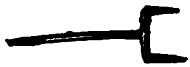
During the past season 450 clubs have obtained courts at Prospect Park in Brooklyn. Some idea of the popularity of the game may be gained by remembering that every club which is allowed a court in that park must have a regular organization, with president, secretary, etc., and at least twelve members.

The great popularity of lawn tennis no doubt arises from its simplicity, small expense, and the excellent exercise for all parts of the body. In this respect the game commends itself to both sexes, and it always proves so fascinating that few who once play the game are indifferent to it thereafter.

Turf and earth courts are the favorites. Asphalt or wooden courts are sometimes built; but usually for local reasons. Have a turf court if you can have a good one, although it is more difficult to keep in condition, and requires constant care. If you cannot have a good turf court, lay out an earth court. This is easily done by ploughing a level piece of ground, removing the stones and harrowing thoroughly; then rolling well. Remember, however, that the ground is still soft and needs repeated rolling, and the exclusion of all players except those wearing tennis shoes.

In laying out a court be careful to run it north and south, and to leave a margin of at least fifteen feet at the ends and ten feet at the sides. If the base or side lines adjoin a gully or a boulder, the court is a distressing place to play in. In making a court measure it out roughly, lining it with strings at first, and then go over the lines with white paint, slaked lime, whiting or marble dust. The latter is the best material. It is simply pounded marble and does not wash out. A simple marker is made by laying two thin boards about three feet long, parallel and an inch apart, and nailing upon them two narrow strips of wood to hold the boards in position. Lay this on the proposed line and sift marble dust into the opening between the boards. Always lay out double and single court lines, then you are ready for both games. The only difference is that the court is 4 1-2 feet broader each side in the double game.

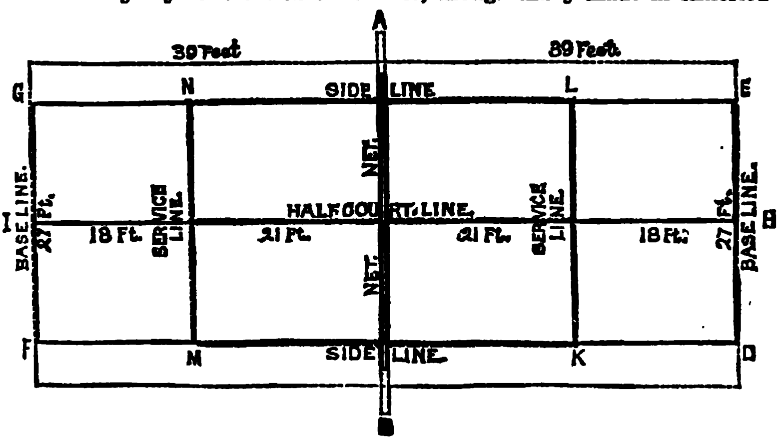
Having your court marked out, do not send off and buy a "set of tennis" cheap or otherwise. You will never cease to regret your action if you do. Some part of the amount paid will be needed to cover gaudy poles, pins and ropes, which never cost a cent; and even if the net and balls are satisfactory the rackets never will be, being articles which each player should carefully select for himself and keep as his own especial property. Our earnest advice is, therefore, go or send to some well-known dealer and buy all the needed articles separately. Two stout sticks, four or five feet high, will serve your purpose for poles. Drive a couple of chips into the ground for pins; and use a clothes-line for rope. Then buy your net, attach it to the poles which are to be held taut by the ropes stretched to the pins, and your court is ready for play.



Net Hook.

In getting a net buy one forty-two feet long. You will then have one suitable for single and double playing. A narrow net will be most convenient, preventing you many weary steps to get intercepted balls. As the net should be six inches lower in the centre of the court than at the poles, an iron hook like that shown in the cut will be very useful. It should, of course, be three feet high, exclusive of the prongs. Any blacksmith will make it for you.

Always have two balls to play with; if possible, more. The English ball made by Ayres is the most reliable, though many made in America



Lawn Tennis Court.

are cheaper and in quality begin to be as good. In rackets, the American manufacturers lead the world.

The best advice is, "suit yourself." Be sure, however, that you obtain a symmetrical racket. Curves passed away, long ago. See that there are no knots in the woodwork of the bow, that the bat is not warped and that the stringing is tight. Good weights for men range from thirteen to fourteen and a half ounces, thirteen and a half and fourteen being good average weights. Fifteen and sixteen ounce rackets were once popular, but the tendency is toward lighter weights. For women the range is eleven and a half to thirteen; twelve is a safe weight.

As with most other amusements, any amount of money may be spent on tennis. There are plenty of trouble-saving contrivances, and expensive outfits, from elaborate court-markers to inlaid rackets, but your net should not cost much over $3 50. Balls cost $5 per dozen, and rackets $5 50 a piece. You do not need to buy much, and the estimate here is only on the best quality. These suggestions bring us to the game itself, which is best explained by the rules of the National Lawn Tennis Association.

(1) The Court is 78 feet long, and 27 feet wide. It is divided across the middle by a net, the ends of which are attached to two posts, A and B, standing three feet outside of the court on either side. The height of the net is three feet six inches at the posts, and three feet in the middle. At each end of the court, parallel with the net, and 39 feet from it, are drawn the base lines D E and F G, the ends of which are connected by the side-lines D F and E G. Half-way between the side-lines, and parallel with them, is drawn the half court-line I H, dividing the space on each side of the net into two equal parts, the right and left courts. On each side of the net, at a distance of 21 feet from it, and parallel with it, are drawn the service lines K L and M N.

2. The Balls shall not measure less than 2 15-32 inches, nor more than 2 1-2 inches in diameter; and shall not weigh less than 1 15-16 ounces, nor more than 2 ounces.

3. The choice of sides and the right to serve in the first game shall be decided by toss; provided that, if the winner of the toss choose the right to serve, the other player shall have choice of sides, and vice versa. If one player choose the court, the other may elect not to serve.

4. The players shall stand on opposite sides of the net; the player who first delivers the ball shall be called the server, and the other the striker-out.

5. At the end of the first game the striker-out shall become server, and the server shall become striker-out; and so on alternately in all the subsequent games of the set, or series of sets.

6. When serving the ball the player shall have one foot outside of the base line and the other either on or in a perpendicular line above the base line. He shall deliver the service from the right to the left courts alternately; beginning from the right.

7. The ball served must drop between the service line, half court line, and side line of the court, diagonally opposite to that from which it was served.

8. It is a Fault if the server fail to strike the ball, or if the ball served drop in the net, or beyond the service line, or out of court, or in the wrong court; or if the server do not stand as directed by law 6.

9. A ball falling on a line is regarded as falling in the court bounded by that line.

10. A fault cannot be taken.

11. After a fault the server shall serve again from the same

court from which he served that fault, unless it was a fault because he served from the wrong court.

12. A fault cannot be claimed after the next service is delivered.

13. The server shall not serve till the striker-out is ready. If the latter attempt to return the service he shall be deemed ready.

14. A service or fault delivered when the striker-out is not ready, counts for nothing.

15. The service shall not be volleyed, i. e., taken, before it has touched the ground.

16. A ball is in play on leaving the server's racket, except as provided for in law 8.

17. It is a good return, although the ball touch the net; but a service, otherwise good, which touches the net, shall count for nothing.

18. The server wins a stroke if the striker-out volley the service, or if he fail to return the service or the ball in play; or if he return the service or the ball in play so that it drops outside of his opponent's court; or if he otherwise lose a stroke, as provided by law 20.

19. The striker-out wins a stroke if the server serve two consecutive faults; or if he fail to return the ball in play; or if he return the ball in play so that it drops outside of his opponent's court; or if he otherwise lose a stroke as provided by law 20.

20. Either player loses a stroke if he return the service or the ball in play so that it touches a post of the net; or if the ball touch him or anything that he wears or carries, except his racket in the act of striking; or if he touch the ball with his racket more than once; or if he touch the net or any of its supports while the ball is in play; or if he volley the ball before it has passed the net.

21. In case any player is obstructed by any accident, the ball shall be considered a let.

22. On either player winning his first stroke, the score is called 15 for that player; on either player winning his second stroke, the score is called 30 for that player; on either player winning his third stroke, the score is called 40 for that player; and the fourth stroke won by either player is scored game for that player, except as below: If both players have won three strokes, the score is called deuce; and the next stroke won by either player is scored advantage for that player. If the same player wins the next stroke, he wins the game; if he loses the next stroke, the score returns to deuce; and so on until one player wins the two strokes immediately following the score of deuce, when game is scored for that player.

23. The player who first wins six games wins the set; except as below: If both players win five games the score

is called games all; and the next game won by either player is scored advantage game for that player. If the same player wins the next game, he wins the set; if he loses the next game, the score returns to games all; and so on until either player wins the two games immediately following the score of games all, when he wins the set. But individual clubs at their own tournaments may modify this rule at their discretion.

24. The players shall change sides at the end of every set; but the umpire, on appeal from either player, before the toss for choice, may direct the players to change sides at the end of every game of each set, if, in his opinion, either side have a distinct advantage, owing to the sun, wind, or any other accidental cause; but if the appeal be made after the toss for choice, the umpire can only direct the players to change sides at the end of every game of the odd or deciding set.

25. When a series of sets is played, the player who served in the last game of one set shall be striker-out in the first game of the next.

26. The Referee shall call the game after an interval of five minutes between sets if either player so order.

27. The above laws shall apply to the three and four handed games, except as below:

THREE AND FOUR-HANDED GAMES.

(The double court, for three or four handed games, is in length the same as the single court, but it is enlarged in width from twenty-seven to thirty-six feet, but the service courts are the same size as in the single court. The net line, in a double court, is necessarily extended to forty-two feet in length.)

29. In the three-handed game the single player shall serve in every alternate game.

30. In the four-handed game the pair who have the right to serve in the first game shall decide which partner shall do so; and the opposing pair shall decide in like manner for the second game. The partner of the player who served in the first game shall serve in the third, and the partner of the player who served in the second game shall serve in the fourth, and the same order shall be maintained in all the subsequent games of the set.

31. At the beginning of the next set either partner of the pair which struck out in the last game of the last set may serve, and the same privilege is given to their opponents in the second game of the new set.

32. The players shall take the service alternately throughout the game; a player cannot receive a service delivered to his partner; and the order of service and striking out once

established shall not be altered, nor shall the striker-out change courts to receive the service till the end of the set.

33. It is a fault if the ball served does not drop between the service line, half-court line, and service side-line of the court diagonally opposite to that from which it was served.

34. In matches the decision of the umpire shall be final. Should there be two umpires they shall divide the court between them, and the decision of each shall be final in his share of the court.

35. A Bisque is one point which can be taken by the receiver of the odds at any time in the set except as follows:

(a) A bisque cannot be taken after a service is delivered.

(b) The server may not take a bisque after a fault, but the striker-out may do so.

36. One or more bisques may be given to increase or diminish other odds.

37. Half fifteen is one stroke given at the beginning of the second, fourth, and every subsequent alternate game of the set.

38. Fifteen is one stroke given at the beginning of every game of a set.

39. Half thirty is one stroke given at the beginning of the first game, two strokes given at the beginning of the second game, and so on alternately in all the subsequent games of the set.

40. Thirty is two strokes given at the beginning of every game of a set.

41. Half forty is two strokes given at the beginning of the first game, three strokes given at the beginning of the second game, and so on alternately in all the subsequent games of the set.

42. Forty is three strokes given at the beginning of every game of a set.

43. Half Court: The players may agree into which half court, right or left, the giver of the odds shall play; and the latter loses a stroke if the ball returned by him drop outside any of the lines which bound that half court.

DECISIONS. BY JAMES DWIGHT.

The following cases and decisions relate only to points which have already been settled mainly in England. They are added at the request of a number of players, as the answers to certain questions which are continually asked. J. D.

Case I.—Can a player follow a ball over the net with his racket, provided that he hits the ball on his own side of the net?

Decision.—Yes. The only restrictions are that he shall not volley the ball until it has crossed the net, and that he shall not touch the net or any of its supports.

Case II.—A player is standing outside of the court and volleys the ball; he then claims that the ball was out.

Decision.—The ball is in play until it touches the ground outside of the court. The player's position is of no consequence whatever.

Case III.—A player standing outside of the court catches the ball, and claims that it was certainly going out. Who wins the stroke?

Decision.—His adversary. It is a very common thing for a player to stop a ball in this way and score the point, but it is by courtesy only that he is allowed to do so. He loses the stroke if his opponent claims it.

Case IV.—The service is delivered before the striker-out is ready. He tries to return it and fails. Is he entitled to have it played over?

Decision.—No. If he attempts to return the service he is deemed ready.

Case V.—A ball having been played over the net, bounces back into the court from which it came. The player reaches over the net and plays it before it falls. Has he a right to do so?

Decision.—Yes, provided he does not touch the net. He has a right to play the ball at any time from the moment it crosses the net into his court until it touches the ground a second time.

Case VI.—A ball is played into the net; the net player on the other side, thinking that the ball is coming over, strikes at it and hits the net. Who loses the stroke?

Decision.—It was simply a question of which happened first. If the player touched the net while the ball was still in play, he loses the stroke. Hitting the net after the ball is dead can make no difference.

Case VII.—A player is struck by the ball served before it has touched the ground, he being outside of the service court. How does it count?

Decision.—The player struck loses the point. The service is presumably good until it strikes in the wrong court. A player cannot take the decision upon himself by stopping the ball. If it is going to be a fault he has only to get out of the way.

Case VIII.—A by-stander gets in the way of a player; the latter attempts to return the ball and fails. Has he a right to have the hand played again?

Decision.—Not if he attempted to return the ball. But if he makes no such attempt, and in the umpire's opinion the by-stander was distinctly in the way, he shall then have a right to have the hand played over.

GENERAL HINTS.

Counting, &c.—In calling score the server's score is mentioned first, as "fifteen-thirty" means that the server (striker-out) has won "fifteen" (one point) and his opponent "thirty" (two points). "Love" means "nothing," as "forty love" signifies server forty, opponent nothing; "love thirty," server nothing, opponent thirty. In calling score by games mention your own score first, as "four-three" means you have four games to your adversary's three. An ace is a point won; if you serve a good ball and your opponent fails to return it, it is an ace for you, and similarly if he returns it and you fail to get the ball back to him, losing the point, it is an ace for him.

In ordinary playing it is the scorer's duty to call the score. "All" means the score is equal, as "fifteen all" means both sides have scored fifteen.

Serving.—In learning to play Tennis, the greatest attention should be paid to the method of service you are acquiring. Those who are proficient in the game should continually watch and improve

Overhand Service.

their service. It is the most important feature in the game. A good steady service will make an otherwise poor player a formidable adversary. A suitable method of practice is to fasten a hoop about two feet in diameter upon a stake which is backed by a wall, and from a distance of forty feet endeavor to serve through the hoop, the lower rim of which should be three feet from the ground. Remember in serving that you have a distance of sixty feet to cover, and the game is or should be in your hands.

There are three methods of serving: Overhand, underhand, and simple tossing. The writer does not believe that a service can be learned by written directions. He will therefore simply indicate that the straight swift overhand service well placed is undoubtedly the most effective: and he earnestly advises the player to devote attention to it without experimenting with impossible styles of service. For a straight swift overhand service, throw the ball as high in the air as you can reach it with the centre of your racket (grasped by the end of the handle), and deliver a hard sharp blow. Every inch higher that you reach greatly increases your chance of putting the ball in the proper court. A study of the triangle formed will tell you that. Begin to serve rather slowly. Increase the speed with proficiency. As you become more skillful you can vary your serve by adding right and left "cuts," that is, putting a twist on the ball by hitting it with the racket held obliquely instead of straight. Striking the ball with the racket turned slightly right or left gives the ball a deflection which will frequently puzzle your opponent, but remember that a cut ball is always slower than it would have been if hit straight. Cutting is fascinating, but scarcely profitable. You will find in the end that well placed straight swift balls (both in serving and returning) pay better than any cut known.

Many beginners, and even fair players, knowing they have two chances in serving, deliver one terribly swift ball almost sure to bring up in the net or a neighboring field—a sort of experiment certain to be a fault—and then follow it up with a weak little "pop-over" service with which their opponent does as he pleases. The folly of this popular error does not need comment. Cultivate a steady second service. Steadiness is the end to be obtained. No doubt there is a fascination in making points simply by the service; but remember the real object of a good service is to force your opponent to return the ball defencelessly.

It is often a good plan to have the first and second services very different. For example, have your first serve a swift straight overhand, which being a fault deliver a choppy sort of cut that will put the ball just over the net and give it a short bound. Your opponent being forced back by your swift service, may not have advanced far enough for the second. You must make sure of that before you serve.

Watch your opponent; take advantage of his position in the court. The proper place to stand in serving is about three feet from the centre line, that is near the middle of the base line; but vary this. You can obtain different effects sometimes by serving from the corners. Notice them. By sometimes wandering into the corner of your court you can deliver a service obliquely into the corner of your opponent's court that it would be hopeless for him even to try for. Don't experiment during a game; remember it is a fault if you hit at a ball and miss it. After making a fault pause and get your balance and range again. Never make two faults; there is really no excuse for it; by doing so you show yourself to be either very careless or a lamentably poor player. Always begin serving from the right hand court, whether you are playing with odds or not.

Receiving.—In receiving stand well back. It is easier to run up than back. If your opponent serves very swiftly and you can do nothing with his delivery, try getting back even of the base line. In that case watch the direction his ball is taking, so that you will be behind it. In returning, if possible drive the ball to your opponent's left hand. It is harder for him.

Methods of playing.—There are two general methods of playing, the back line game and the volley game. The former consists in playing near the back line and returning balls from the bounce. The volley game means standing near the centre of the court and returning the ball on the fly. Concerning these methods Lieutenant Piele says: "In volleying, for five balls out of six you have less ground to cover than your adversary has who plays near the back line. The only balls that make you run are those returned from the corner of the right or left court parallel with or near to either side line. To guard against a return of this sort go a little to the left of the centre of your volleying line (about one foot behind service line) when your adversary has tho ball in the corner of his right court, and vice versa a little to the right of the centre when he has the ball in his left court. Playing against a man who also volleys, your object is by placing to get the ball past him or drive him back and keep him there. The moment you have delivered your service follow it up by taking your position on your volley line. Personally I think the argument is all one-sided in favor of the volley game."

Double Game.—In playing a four-handed game both partners can play back, or one play back and one near the net, or both play from the service line, the latter method being the best as it embodies the volley game.

When you are receiving let your partner watch for faults. Always return a fault; it does no harm. If you see that a ball your partner is likely to take will go out of court, warn him; and if you are going to take a ball that rightfully belongs to him, call out "Mine." If your partner tries for a ball and does not touch it, take it yourself. Try and cover whatever part of the court he leaves exposed. The two should play as a unit.

GENERAL HINTS.

Choice of courts and serves is determined by tossing up the racket and calling "rough" or "smooth," referring to the stringing of the gut.

As you play, watch your opponent's eyes. He is sure to glance where he is going to place the ball.

"The proper moment to take a bounding ball is when its upward momentum is spent and it is about to fall." This is very important. Observe and practice it.

When playing from a bounding ball hold your racket by the end of the handle; when volleying your play will be more reliable, though a trifle less speedy, by holding the racket short. Recollect to allow for momentum in running. Deduct from your blow in hitting a ball as you run forward; add to it in retreating.

Backhand strokes, that is, hitting the ball with the back of the racket held to your left, are easily acquired. One should play as well back-handed as forehanded. To make the stroke cross the right leg in front of the left, thus turning the right side toward the net.

Many good players use the left hand, shifting the racket from hand to hand; by this play they, of course, greatly increase the area guarded. In the double game bear in mind Rule 31.

Advantage sets are optional, as the players may decide. Advantage sets have been recorded running up to nearly thirty games.

If a ball in play drops on a ball lying in the court, return it if you can. The player who is touched by a ball in play loses the stroke.

A Bisque is a form of odds. For example, a player is allowed fifteen on a game. Instead of simply assuming fifteen at the start, he takes it when it will do him the most good during the game, as, if the score is thirty-forty, in favor of the man with the bisque, he takes his bisque and wins the game.

Lieutenant Piele says: "Remember a bisque may not be taken after a service has been delivered. Do not be in a hurry to take your bisque; it is always better to win your game with it; that is, take it when you are vantage. I recommend a player to take his bisque in the seventh game, if he gets vantage. At the score of three games all it is most important to get the fourth game."

Be careful to save your strength. Lose two or three games if you can thereby tire your opponent and rest yourself.

Remember that tennis consists of guard and attack. Keep always on the alert. There is as much headwork in tennis as in any other game.

Unless lefthanded, it is safer to keep a trifle to the left of the court. Lawn tennis is too fine a game to be trifled with; go into it in earnest. Play, if possible, with better players than yourself; after serving do not stand still to see what will happen, run immediately to the receiving line and be ready for your opponent's return. Never grow careless.

If you are a beginner let cuts and dodges alone.

If a ball in play curves, it will bound the same way. Always try for a ball; the writer knows an otherwise only fair player who makes himself a formidable antagonist by never despairing of a stroke, and putting forth every effort for seemingly impossible balls.

A Tennis Court is not large and activity can do wonders. Do not work from the elbow; hit from the shoulder. Try and cultivate a long swinging stroke. Remember that placing is the art of the game; tire your adversary by see-sawing him across the court. Never give in, patience is half the game. Don't bang the ball—called "smashing." Hitting hard into the net looks helpless. Wait for a fine opportunity and then smash for all you are worth. A very effective return is to play the ball hard into your opponent's legs—provided he is some distance back. Aim for him below the knees. Remember that practice inevitably brings improvement. Have patience and good temper. The great trouble is that most average players do not analyze and study their play, but go on making the same errors and wonder why they do not improve.

A player loses point after point in returning services. He is loud in his disgust or wonder. The simple reason is he has fallen into the habit of taking the bounding ball on its decided rise or fall, instead of when its momentum ceases. Thought and common sense are thus indispensable. In playing tennis never get discouraged. The English are wonderful for doggedly pushing along without admitting defeat. However superior your opponent may be, do your best and never acknowledge the game lost until your opponent has actually won the game.

The National Lawn Tennis Association was formed in 1881. In 1886 it is composed of the following forty-seven clubs:

Albany	Knickerbocker	Pioneer	Staten Island Cricket
Belmont	Lehigh University	Plainfield	St. George's Cricket
Bergen Point	Longwood Cricket	Portland	St. Paul
Cheyenne	Merion Cricket	Powelton	23d Regiment
Country	Milwaukee	Providence	Washington
Delaware Field	Morristown	Rochester	Westchester
East Orange	Nahant	Roseville	West End
Far-and-Near	Newark	Scarsdale	Waterbury
Franklin	New-Haven	Scarlet Ribbon	Yale University
Germantown Cricket	Newport	Seabright	Young America Cricket
Harvard University	New-York	Short Hills	North Shore
Hackensack	Orange		Montclair

With the increase in popularity of the game the number of good players has also greatly increased. Tournaments are held annually at Newport under the auspices of the National Association.

These contests, as well as the introduction of tennis into this country, are largely due to Dr. James Dwight and Messrs F. and R. Sears. Dr. Dwight has been and is the moving spirit in the annual tournaments, and is still one of the finest players in the United States.

The prizes competed for at the annual meeting in Newport are a Challenge Cup, given by the National Association, to be won three years, not necessarily in succession (already won twice by Mr. R. D. Sears); a first and second prize in singles and a first and second prize in doubles, open to all comers. The champion stands out in singles, and only plays the winner of the "all comers." He can therefore win no prize except of course the Challenge.

In 1881, the first tournament, there were two prizes in singles and two in doubles, all to be won at sight. The next year, in addition to the same number given by the Association, were the Casino Cup, valued at $250, to be won two years in succession; the Association prize of '82 given by two gentlemen of Philadelphia; a placque to be won three years, and the Horsman diamond racket, valued at $500, to be won three years in succession. All of these prizes Mr. Sears now owns, having won them all.

The following is the record of the victories at the annual tournaments at Newport, beginning with 1881:

1881.—Singles—Sears beat Glynn, 6—0, 6—3, 6—2. Doubles—Clark and Taylor beat Van Rensselaer and Newbold, 6—5, 6—4, 6—5.

1882.—Singles—Sears beat C. M. Clark, 6—1, 6—4, 6—0. Doubles—Sears and Dwight beat Nightingale and Smith, 6—2, 6—4, 6—0.

1883.—Singles—Sears beat Dwight, 6—2, 6—0, 9—7. Doubles—Sears and Dwight beat Van Rensselaer and Newbold, 6—0, 6—2.

1884.—Singles—Sears beat Taylor, 6—0, 1—6, 6—0, 6—2. Doubles—Van Rensselaer and Berry beat Brinley and Stevens, 6—2, 6—2.

1885.—Singles—Brinley beat Knapp, 6—3, 6—3, 3—6, 6—4; and Sears beat Brinley, 6—3, 4—6, 6—0, 6—3. Doubles—Sears and Clark beat Knapp and Slocum, 6—3, 6—0, 6—2.

1886.—Singles—Beeckman beat Taylor, 3—6, 6—3, 6—4, 6—2; and Sears beat Beeckman, 4—6, 6—2, 6—3, 6—4. Doubles—Dwight and Sears beat Taylor and Brinley, 7—5, 5—7, 7—5, 6—4.

In The Tribune's summary of the Lawn Tennis season for 1885 the twelve leading players were ranked as follows for that year:

1, Sears; 2, Dwight; 3, Berry; 4, Brinley; 5, Clark; 6, Moffat; 7, Beeckman; 8, Taylor; 9, Mansfield; 10, Knapp; 11, Slocum; 12, Van Rensselaer.

In the fall of 1886 The Tribune suggested the following list for the season just completed:

1, Sears; 2, Dwight; 3, Beeckman; 4, Taylor; 5, Clark; 6, Slocum; 7, Brinley; 8 Mansfield; 9, Moffat; 10, Conover; 11, Ripley; 12, Glynn; 13, Chase; 14, Shaw; 15, P. S Sears. Pettitt, the professional, is inferior to the first two (in Lawn Tennis).

The following record from the same article will also give a good idea of the standing of the chief players, each figure representing a tournament:

Season of 1886.	Beeckman...	Brinley.....	Clark.......	Dwight......	Slocum......	Taylor......	Games Won..
Beeckman..........	..	1	1	0	5	1	8
Brinley..........	0	..	0	0	1	1	2
Clark..........	0	2	..	0	2	1	5
Dwight..........	0	0	0	..	0	0	0
Slocum..........	2	1	0	0	..	1	4
Taylor..........	1	2	1	1	3	..	8
Games Lost..........	3	6	2	1	11	4	27

LACROSSE.

BY H. P. MILLAR.

Lacrosse may technically be called the national game of the North American Indians. It is the chief game among them. Although its adoption by the Anglo-Saxon has taken place chiefly in the Dominion of Canada, still the game now finds many adherents in the United States. It is a game well-suited to the American taste, being short, snappy and vivacious from beginning to finish.

A lacrosse match, as usually played, occupies one hour and a half. The side making the greatest number of goals in the specified time is the winner. The goal posts are placed 125 yards from each other; they are six feet high and six feet apart. A team is constituted of twelve men. Consequently, in a match twenty-four men are playing. Of these, two are placed at goal (a player from either team at each goal). The remaining twenty-two men constitute the field; they are placed in pairs in the intervening space. The diagram given below will explain exactly the positions of the players in the field and will give the names of their stations. The players will be called A, B, C, D, etc., those of one side being in capital letters; those of the opposing team in italics.

[GOAL]

Point.	**A**	**Inside Home.**
B		***l***
Cover Point.		**Outside Home.**
C		***k***
First Defence.		**First Attack.**
D		***j***
Second Defence.		**Second Attack.**
E		***i***
Third Defence.		**Third Attack.**
F		***h***
Centre Field.		**Centre Field.**
G		***g***
Third Attack.		**Third Defence.**
H		***f***
Second Attack.		**Second Defence.**
I		***e***
First Attack.		**First defence.**
J		***d***
Outside Home.		**Cover Point.**
K		***c***
Inside Home.		**Point.**
L	***a***	***b***

[GOAL]

The players are all armed with a crosse, a long piece of wood which terminates in a crook. The lower part (about 2 1-2 feet of the crosse) is laced with catgut, beginning on the stick itself and ending at the extreme point of the crook or right angle, thus forming a pocket about a foot in width at the lower end, and terminating in a point. With this implement, the ball, a small sponge-rubber one, can readily be caught and thrown long distances by the players. It is against the rules for any player, except the goal-keeper, to touch the ball with his hand.

All being in readiness for the game to begin, the players being in position, the referee takes the ball to centre-field. The two players at this point kneel on one knee and cross their sticks on the ground, the referee placing the ball between and at the place where the sticks cross. At the word "go" the two players draw their crosses rapidly away, and the one who retains possession of the ball, if not immediately checked, sends the ball toward his opponent's goal. In a moment, every man in the whole field is alert. The attack and defence strain every nerve, the attack trying to get the ball through the enemy's posts (it must go between, not over) and the defence endeavoring to keep it out. When one of the defence players secures the ball on his stick, he throws it up the field in the twinkling of an eye, and almost before the spectator knows what has happened, the battle has been transferred to the other end of the field.

The game goes forward ardently, first at one end, and now at the other. The whole twenty-four men are constantly on the move, never idle for more than a minute. Here a man runs a race with another man; and there a man makes prodigious throw. Finally, one side secures an advantage over the other, breaks down its opponents' defence and drives the ball through the posts with a shout of exultation.

Body-checking and checking are both allowed. The former consists of running against one's opponent with such force as to throw him to the ground, or at any rate to push him out of the way. The latter, as generally understood, seems to consist of hitting your opponent over any part of the head or body with your stick in order to make him drop the ball. Properly speaking, only the opponent's crosse should be struck, and that with sufficient force to cause the ball to drop out of the crook. The game can therefore be played either roughly or otherwise, this matter resting entirely with the players. As a rule, the Western clubs play a rougher game than the Eastern teams.

No matter where the game is played, it is essential that all the players should be strong, muscular young men, and, above all, good runners. One or two really good sprinters at 100 or 200 yards are a power in themselves.

Lacrosse in the United States is governed by the United States National Amateur Lacrosse Association, which professedly has for its object the development of lacrosse, its protection from professionalism, and the encouragement of a healthy spirit of rivalry among the different clubs belonging to the organization. The clubs belonging to the association must strictly be composed of amateurs. The playing for a money challenge is absolutely prohibited under pain of suspension, while notorious and continued foul play is punished in the same way. The annual dues from each club amount to $5. Each club in good standing has the privilege of attending the annual convention held on the first Saturday in May.

Erastus Wiman, of New-York, is at present the president of the association, and J. A. Hodge, jr., formerly captain of the Princeton College team and now an active member of the New-York Lacrosse Club, is the honorary secretary.

Among the prominent clubs which are members of the association are New-York, Boston, South Boston, Independents of Boston (champions of the United States and champions of New-England), Baltimore, Brooklyn, St. Louis, Calumets of Chicago, St. Paul, Princeton, Harvard, Yale, University of New-York, and Stevens Institute. The last-named five clubs are also members of the Intercollegiate Lacrosse Association, the championship of which is at present held by Princeton.

Lacrosse has taken a strong hold among college men ; and every year a number of lacrosse players are produced at college who carry their love of the game back to their homes and help to create new clubs or strengthen those already in existence.

The National Lacrosse Association has two challenge cups. The first of these is known as the Westchester cup, a valuable though not remarkably handsome mug, and with this trophy goes the championship of the United States. For a number of years it was held in the West—Chicago, St. Louis and St. Paul each having had a turn at holding it. In July, 1886, the New-York Lacrosse Club sent a strong team out to St. Paul, and after a hard though decisive battle, the New-Yorkers proved victorious and returned East with the precious piece of metal. They did not keep it long, however, for on October 2 of the same year they were easily beaten by the Independents of Boston, and the cup and championship were consequently transferred to Massachusetts.

The second cup held by the association is known as the Oelrichs cup. This prize is played for every year in New-York City, and is open to any club in the association. New-York held it for a number of years and then lost it to Harvard; but in 1886 New-York was successful in winning it again, and is at present the holder.

Another association is the Metropolitan Junior Lacrosse Association, consisting of the New-York Juniors, the Ticonderogas of Staten Island, and the Bedfords and Nationals of Brooklyn. These clubs are all composed of boys who play for a challenge flag, at present held by the New-York Juniors.

The rules of lacrosse are as follows:

1. The crosse may be of any length, woven with catgut, or rawhide, but not with soft leather or cord. The crosse shall not be more than one foot at its widest part. A string must be brought through a hole at the side of the tip of the turn, so as to prevent the point of the stick from catching an opponent's crosse. The length strings must be woven to within two inches of their termination to prevent the ball from catching in the meshes. No metal of any kind (screws or nails) is allowed in the crosse. A player may change his crosse during the match.

2. The ball must be of sponge-rubber. The home team to furnish a new ball at each match. The ball becomes the property of the winning team.

3. The goals must not be less than 125 feet apart. The top of the poles must be six feet out of the ground, including any top ornament, and must be six feet apart. In matches, the home team must supply the poles.

4. Unless the ball has passed cover-point's position on the field, no player on the attacking side must be within six feet of the goal posts.

5. The referee shall be selected by the Captains; and in championship matches one day before the match. The Referee must appoint Umpires; and before the match begins he shall draw the players up in lines and satisfy himself that the rules applying to spiked shoes, the ball, crosses, etc., are complied with. He has the power to suspend or rule off from the field any player guilty of an infringement of the rules. When a "foul" has been called the Referee shall call "time," whereupon the game must immediately cease. The Referee must see that the ball is properly "faced" at the beginning of each game, and in all cases of appeal his decision is final. When a game is claimed and disallowed, the Referee shall have the ball faced where it is picked up, but in no case must it be closer to the goals than ten yards in any direction.

6. The umpires, neither of whom can belong to the clubs playing, shall be stationed one at each goal. The um-

pire's duty shall be to decide whether or not the ball passed between the posts when a game is claimed.

7. Each team is allowed to have a captain, who may or may not be a player, but must be a member of the club for which he acts as captain. The captain's duty is to select umpires and referee, and toss for choice of goals; and they alone shall be entitled to call "foul" during the match.

8. Twelve players, all regular members of the club they represent, shall constitute a full team. No member shall be allowed to change clubs more than once during the season, except on account of bona fide change of residence. Members of college clubs are allowed the privilege of playing on any team they choose during vacation.

9. No player must wear spiked soles or boots.

10. The ball must not be touched by the hand.

11. The goal-keeper may use his hand or any part of his body in defending the goal. Should the ball lodge in an inaccessible place, it may be taken out by the hand and the player picking it up must face his nearest opponent. A ball thrown out of "bounds" must also be "faced" at the nearest spot within the bounds.

12. Should the ball be accidentally put through a goal by one of the players defending it, it is game for the side attacking that goal.

13. Should the ball catch in the netting, the player must not remove it with his hand, but dislodge it by striking his crosse on the ground.

14. No player shall grasp an opponent's crosse with his hands, hold it with his arms, or between his legs. A player more than six feet away from the ball shall not hold his opponent's crosse with his crosse, run in front of him, or in any way keep him from the ball until another player reaches it. No player shall hold, deliberately strike or trip another, nor push with the hand nor wrestle with the legs so as to throw his opponent. Nor shall he hold the ball in his crosse with his hand or person, or lay or sit on it. No player shall charge into another after he has thrown the ball. The crosse or square chute which consists of one player charging another with both hands on the crosse so as to make the crosse strike the body of his opponent is strictly forbidden. No player shall interfere in any way with another who is in pursuit of the ball. "Shouldering" is only allowed when within six feet from the ball, and then only from the side. The Referee shall be the judge of fouls, and when he allows one the player fouled shall have the option of a free "run" or "throw," all players within ten feet of him shall move away to that distance. If a foul is allowed within twenty feet of the goal the man fouled shall move away that distance from the goal before taking the run or throw. If a throw is claimed and time called, and the foul not allowed then the accused player shall be allowed a free "run" or "throw."

No player shall throw his crosse at a player or at the ball, such action being a "foul." Any player deliberately striking another or raising his hand to strike another shall be immediately ruled off the field.

Clubs who employ a professional as lacrosse teacher may play him in all matches except championship matches, or for any prize or trophy offered by the United States National Lacrosse Association. The season shall be from May 1 to November 1 inclusive.

FOOTBALL.

A popular game in the colleges of the United States is football. Until within the last few years the game was almost exclusively played by collegians. While numerous crowds will assemble to witness a great game of football, such, for instance, as the annual match between Yale and Princeton for the championship, as a rule young men in private life have no strong desire to participate in the game. The reason is that football is a rough and fatiguing sport. Every man who indulges in the game has to be as strong as a young giant, able to do hard work on the field, and he must have fortitude enough not to be afraid of receiving a few blows. Such men as these can easily be collected at college and drafted into the football teams; but when they leave, owing to the scarcity of football clubs, beyond the walls of their institutions, they generally abandon the game. The outside clubs are, as a rule, largely composed of Englishmen; so that for football proper we must look to the colleges.

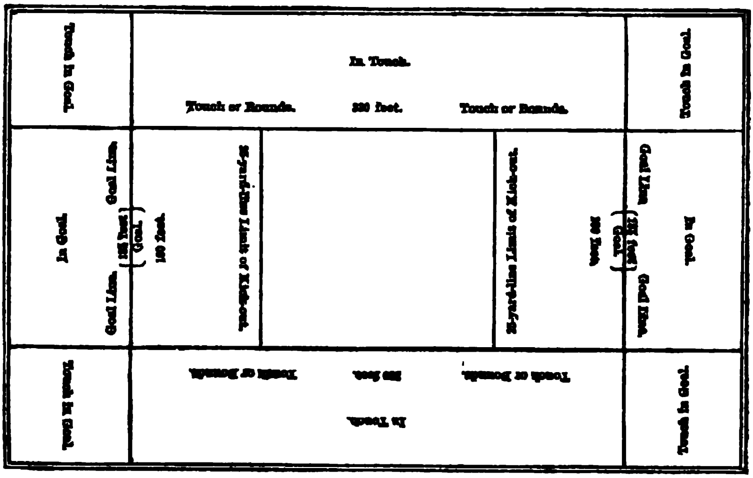
American football is governed by the American Intercollegiate Association. In this association there are five members, Harvard, Yale, Princeton, Wesleyan and the University of Pennsylvania. Delegates meet in New-York in October of every year, and arrange a series of matches for the championship. They dictate the rules, and regulate the affairs of the sport generally. Lehigh University and Stevens Institute both play football, although not members of the intercollegiate association.

The great event in football circles every year is the struggle for the championship. Unfortunately, college feeling ran so high in these contests and the rival teams competed with such deadly energy that the game awoke opposition a few years ago on the part of the college faculties. The professors arose in their might and forced the men in the teams to realize that unless the employment of unnecessary force was stopped, the game would be abolished. Such tumultuous scenes were continually witnessed on the football field that in 1885 Harvard was prohibited from playing in the intercollegiate series. This stern measure had a salutary effect; and the season of 1885 was characterized by a spirit of fairness and chivalrous action, and there were no brutal scenes that year. Football is now rapidly improving in popular estimation. The Princeton team won the championship in 1885.

In former years, this great game was played in New-York on Thanksgiving Day. In 1885 it was played at New-Haven, and Princeton then won the championship from Yale. That contest was one of the greatest on record in the annals of football; and the name of Lamar will be handed down at Princeton as one of the greatest players the college ever sent forth. Lamar practically won the game and championship by running through the entire Yale team and making a touchdown. Another famous Princeton football player is Alexander Moffat. Peters, of Yale, '86, is another of the great football players, and is considered one of the best men the college ever had.

Outside the colleges, football is most popular in and around the City of New-York. Here are the headquarters of the American Football Association and the American Football Union. In the Association are the New-York Rovers, Pilgrims, West Side Rovers, Paterson Thistles, Trenton, Kearney Rangers, Alma, Newark, and O. N. T. clubs, while those in the Union are the Brooklyn Hill, Staten Island, Crickets of Stevens Institute, Unions of Columbia College, Cutler's Academy and Spartan Harriers. Both these organizations play a milder form of football than the colleges, and are doing much to increase the popularity of the game. In most of the large cities there is one flourishing club, sometimes more.

In playing football according to the Intercollegiate rules the ground is marked off in chalk according to the following diagram:



A team is composed of eleven men, so that in a match there are twenty-two men on the field. Seven men on each side are "rushers"; one is "quarter-back"; two are "half-back," and one is "full-back." The rushers draw up in line facing each other and "toeing" a line which marks the centre of the field. The captain who has won the toss and consequently has the kick-off generally endeavors to dribble the ball backward to his quarter-back, who, if he has the chance, starts for his opponents' goal, but if hard-pressed tries to pass it to one of the rushers, and in this way it is carried toward the goal. The game is full of scrimmages and earnest striving for points.

The following are the Rules:

1. The grounds must be 330 feet long by 160 feet wide. A goal is placed in the middle of each goal line, and is composed of two posts, over 20 feet high, 18 1-2 feet apart, with a cross-bar ten feet from the ground.

2. There are eleven men on each side. A substitute can take the place of an injured man.

3. The game is limited to 90 minutes, each side playing 45 minutes from its own goal. Intermission 10 minutes. The Referee should announce to the Captains a few minutes before time is up that fact.

4. Soles of the shoes must be smooth, but may be of rubber. No spikes allowed, or any metal or gutta-percha.

5. The Captains toss up to begin; the winner has the right to select the goal and he shall at once kick off. The other side kicks off in the latter half of the game. A Referee is chosen to decide fouls, claims, and violations of the Rules.

6. The different kicks are: "Place-kick," when the ball is on the ground; "punt," when the ball, dropped from the hands, is kicked before it reaches the ground; "drop-kick," when the ball is dropped and then kicked the moment it rises in the rebound. The "kick-off" from the centre of the field cannot score a goal. Neither can the "kick-out," which is a drop-kick by the side which has touched the ball down in its own goal or into whose touch-in-goal the ball has gone.

7. A goal may be won in any way by kicking the ball (without touching the ground or any player after the kick) over the cross-bar of the goal of the defence, except by a "punt"; but not, after a fair catch or touch-down, if any of the attack are off side.

8. A "fair catch" is a catch made when the ball is in the air from either a kick or throw forward, or bat, by one of the other side, provided the catcher mark on the ground with his heel the spot where the catch is made and no one on his side has touched the ball.

9. When the ball is over the touch line, or even when a holder gets one foot over the line, the ball goes into "touch"; a player on that side must bring it to the spot where it crossed the line, and send it out at right angles to the line (1) by bounding the ball in the field of play, (2) by throwing it out, or (3) by walking out with it not more than 45 nor less than 15 feet, first announcing how far he intends to walk. He must face the field or the goal of the defence, and no one else can put his hands or feet between him and the goal of the defence. Putting the ball into play after it has crossed the touch line is a "fair."

10. A "touch-down" is gained when the ball is carried

over the goal line and touched down; also when it is carried into touch-in-goal. If in the goal of the defence, the player may bring the ball straight out to the goal line, marking the spot on the line, and shall send the ball with a "punt" (from any spot between the touch-down and the goal line) to his side, who must all be 15 feet away from the line. The defence may be anywhere on the goal line, except for a space of 10 feet extending from the player's mark toward touch. The player cannot handle the ball after his kick until some other player has footed it. Or, he may try at the goal of the defence by a "place kick." In that case, he places the ball at the proper spot on the goal line, and another of his side kicks it. The defence must remain behind the goal line until the ball is on the ground. If the touch-down is in the player's own goal, he must send the ball by a "kick-out." If any player, guarding his own goal, receives the ball from his own side either by a pass-kick or snap-back, and then touches it down, or if he carries it back himself and either touches it down or puts it into touch-in-goal, the act is a "safety," and scores against his side.

11. A "punt-on" or a "punt-out" is made by a player who has won a "fair catch" from punt out or on.

12. The ball is dead under the following circumstances: (1) When either the holder calls down (See Rule 9) or the Referee does. (2) When a goal is won. (3) When a touch-down has been made. (4) After a fair catch, see next Rule.

13. After a fair catch, the player is entitled to a drop-kick, or punt, or the placing of the ball for a place-kick. The defence may stand at the catcher's mark on the ground, and the ball must be kicked from a point behind it parallel to the touch line.

14. If, during a scrimmage, a player out of his goal gets in front of the ball, or if the ball has been last touched by his own side behind him, he is "off-side," and cannot touch the ball or block an opponent until again on his own side, or until the ball has been touched by an opponent, or some other man on his own side has run in front of him.

15. If the ball goes into touch before striking a player, it must be kicked out again. If this happens three times in succession the other side takes it. At a kick-out, the opponents must be on the 25-yard line, or nearer their own goal. The side which has a free kick must be behind the ball. At kick-off, the defence must stand 30 feet in front of the ball.

16. An intentional violation of the Rules scores a touch-down for the other side.

17. If a player having the ball be tackled, the one attacking him shall call "held,' and the other man "down." The ball is then put down for a scrimmage. Neither the snapper-back nor his opponent can take the ball out with the hand until it touches a third man, and he must have his foot as well as his hand on

the ball. If the snapper-back is "off-side," the ball must be snapped again; if this is done three times running on the same "down," the ball goes to the other party.

18. The ball cannot be carried forward by the player who receives it when it is snapped from a "touch-down," or a "fair."

19. In three consecutive "fairs" or "touch-downs," unless the ball crosses the goal line, if the ball shall not have been advanced 15 feet or taken back 30, it shall go to the other side on the fourth.

20. A side can charge at once (1) if a punter advances beyond the line; (2) the moment the ball touches the ground in a place-kick.

21. The various points score as follows: Goal obtained by a touch-down, 6. Goal by a kick from the field, 5. Touch-down, failing goal, 4. A safety by opponents, 2. The victory is decided by the largest score, made in the two halves of the game.

The brevity of this rousing game is one of its advantages.

RACKET.

Racket is not much played on account of the difficulty of finding a proper place for its practice. It is of open-air origin, and is the old and simple form of throwing a ball up against the side of the house, and trying to bat it when it comes down. In racket this exercise is brought up to the greatest possible height of improvement. Owing to the importance of a hard floor for the ball to bound upon, the game is now best played in a room in the house. The best racket-court in the United States is the one in the house of the Racket Club of New-York City.

A single racket court proper is forty feet square, but the game can be played in any space in which there is room to act. While the space travelled over by the players is not large, the action is lively; and racket has become proverbial for the great activity and profuse perspiration of its votaries. A front wall and a back wall are indispensable to the game. The side walls can be omitted.

The floor of the court is divided into four widths, by lines parallel to the walls. The players take stations in these divisions. The wall is marked by a conspicuous line of white chalk or paint 26 inches from the ground. Every ball must strike above this level. Seven and three-quarter feet above the ground there is another line, above which the ball is to be played. The ball is a small one, and if made with leather cover should weigh an ounce. Rubber balls are also used. The bat is the well-known racket, having an oval loop at the outer end, which is netted with catgut.

The game is played by either two or four men. One advantage of a closed room is that the players can remove their ordinary clothing, and dress for the sport in gymnasium costume. The exercise is sure to cause perspiration to flow profusely; so much so, that a good bath at the end of the game is desirable. The players by dressing specially will not have to wear away from the scene of their endeavors any saturated clothing. In playing, each player occupies one of the four divisions of the floor. If two play, then each one covers two divisions, the one nearest to the wall being the inhand, the other one the outhand player. Service courts are marked off near the side walls for the two men (when four play) who stand nearest the main wall. The inhand player, chosen by lot, strikes his ball against the wall. He must do it in such a manner that the ball flies back into the outhand spaces where, bounding from the pavement and picked up or hit by the racket, it is sent back to the wall again by one of the outhand players, who serves it in a way to cause it to fall back into one of the inhand spaces. Every successful instance of batting scores one. The inhand player must change places with the outhand if in serving the ball he causes it to strike the wall below the line, or to fall short in its rebound of the outhand ground, or if it touches the server or his partner before it has bounded twice. Two faults are allowed in a close court before a man's hand is out, if he has served the ball properly against the wall, but not so as to cause it to fall into his opponent's ground. When 13 points have been scored the game begins again.

The ball must be served from right and left alternately. The server must have at least one foot in his own court. No player has a right intentionally to stop the ball in any manner before it has bounded from both wall and ground. If the ball is served below the line it may be taken, and if not taken it is a "fault." A "fault" also arises from the server not being in his proper place; if the ball does not fall into the proper space; and if it touch the roof of a close court. If the ball strikes anywhere before reaching the main wall, the hand is out.

The novice in racket will be surprised both by the amount of work he can extract from this simple game, as well as by the variety and number of bounds. Various players will practise the game differently. Many will allow the ball to rebound from any of the walls of the court after it returns properly from the main wall. It is best to confine the playing to the main and rear walls.

CRICKET.

BY H. P. MILLAR.

Cricket, the national game in England, finds many votaries in the United States. It is uncertain when the game was first introduced into this country; but the game was played in a desultory fashion and principally by Englishmen for many years. Philadelphia always was, and still is, the great stronghold of cricket in America. That city has, not inaptly, been described as the "nursery of American cricket."

In 1878 it was thought advisable that there should be an organization to control the game in America. On April 17th of that year "The Cricketers' Association of the United States" was formed by the leading clubs for the "advancement of cricket." Out of nearly 150 recognized clubs in the United States, seventeen of the principal ones are now members of the Association, which practically regulates the laws of the game on this side of the Atlantic. The advantages of membership are that the clubs obtain an official standing; all matches between members are kept recorded; all disputes are decided by a regular Board, and each club has a voice in all matters of interest to cricketers.

An impetus has been given to American cricket in recent years by the frequent visits of teams, both professional and amateur, from England and the English colonies. For a number of years an annual match has been played between Canada and the United States, the Canadians generally winning. This contest, which takes place one year in Canada and the next in the United States, has served to keep alive the interest in the game

In August, 1874, what is known as the "Halifax Cup" contest was initiated. A tournament was organized by the officers of the British garrison stationed at Halifax, consisting of the 60th Royal Rifles, the 87th Royal Irish Fusileers, 7th Battery Royal Artillery, a detachment of Royal Engineers and the officers of the British men-of-war on the North American and West Indian stations. A handsome silver cup was offered, emblematic of the championship of America, the contest being open to teams in the United States and Canada. Prizes were also offered for individual averages There were three entries, viz.: (1) England, represented by Captain N. Willoughby Wallace (captain), Lieutenant Hon. Keith Turnour, Lieutenant H. L. Farmour and Lieutenant R. C. Davis, 60th Rifles; Captain W. Taylor, Lieutenant F. Carpenter, Lieutenant M. Singleton and Lieutenant Gardiner, 87th Royal Irish Fusileers; Lieutenant J. Reid, Lieutenant J. Mitchell, Lieutenant Barker and C. Stubbing. (2) All Canada, represented by Rev. T. D. Phillips, Ottawa, (captain); Messrs. Hebert and Swinyard, Hamilton; Street, London; E. Powell and Wright, Toronto; A. Powell and C. B. Brodie, Ottawa; J. Goreham, C. Bullock, Daly and Kearney of Halifax. (3) America, represented by Messrs. C. A., R. S. and D. S. Newhall (captain), Spencer Meade, J. B. Large, E. and W. F. Hopkinson, K. L. Baird, R. and G. Ashbridge, H. Magee, F. E. Brewster, R. N. Caldwell and W. Welsh, jr., all of Philadelphia. The first match, America vs. Canada, was played August 18 and 19 and was won by America by an inning and 31 runs. The score was: America, first inning, 191; Canada, first inning, 94, second inning, 66; total, 160. The second match, America vs. England, was also won by the American team by an inning and 5 runs, the Philadelphians thus winning the cup. America scored 205; England, first inning, 117, second inning, 83. In the third match, England vs. Canada, England won by three wickets. The batting prize was won by Mr. D. S. Newhall, average 49.66. The bowling prize was won by Mr. C. A. Newhall, average 6.83. The prize for the highest individual score was won by Mr. R. S. Newhall with a score of 79 in the match against Canada. Ever since this tournament the three Newhall brothers have been considered the best American born cricketers in the United States, a reputation which they still hold.

In September, 1875, a similar tournament took place in Philadelphia, in which the same teams competed. The Philadelphians again came off victors, and the cup became their absolute property.

In 1880 the Philadelphia eleven offered it as an annual award to the champion club of Philadelphia. With the exception of 1883, when the prize was held by the Belmont club, it has been successfully held ever since by the Young America Club.

The rivalry between the different clubs in Philadelphia has naturally done much to improve the game in that city.

In 1878 the Australian team came to the United States on its way home from England and played a series of matches, winning every one. In the spring of 1879 a team of English amateurs, forming part of Lord Harris's team, visited America on its return from Australia. In the autumn of the same year the Gentlemen of Ireland came over; they had things all their own way. In the same year a third team, comprising a party of English professional cricketers, visited the United States and won every match they played. In 1882 the Australians again came to America and scored a succession of victories. All these matches tended to improve American cricket vastly.

In 1884 a picked team of American cricketers went to England. The greatest curiosity was aroused among English cricketers, and they were utterly dumbfounded when they found the Americans winning matches right along. The visit of the Americans was returned in 1885 by a first-rate team of English cricketers captained by the Rev. R. T. Thornton. Their first match against Staten Island resulted in a "draw." Their three succeeding matches at Detroit, Toronto and Montreal, proved easy victories for them. On September 17, 18 and 19 the Englishmen played against the Philadelphians, and to their utter astonishment were defeated by 109 runs. This was the first occasion on which an English team had ever been beaten in the United States. The Englishmen came back again in 1886 with one of the strongest teams of amateur cricketers that could well be collected. This time they defeated the Americans overwhelmingly, winning every match by long odds. A team of English cricketers from the West Indies came to America during the same year, but they lost nearly every match they played.

There are several great drawbacks to the popularity of cricket in this country. In America everything is done with a rush. Even a man's sports are characterized with the same spirit of go. Cricket is voted slow. Apparently there is reason, because three days, with seven hours' play a day, are required in which to finish a cricket match. A game of baseball seldom lasts more than half an afternoon. Consequently cricket can be played only by men of leisure—of wealth at any rate. Among American clubs matches have been condensed into one, at the most two, days. Then also the long distances to be travelled in order to play a match are detrimental to the advancement of the game here. Last but not least of the difficulties under which cricket in America labors is the fact that cricketers have to contend with the remarkable popularity of baseball.

Among the best clubs in America are the Philadelphia, Belmont, Young America, Germantown, Merion and Oxford, of Philadelphia; the Staten Island, St. George's, Riverside and New-York, of New-York; the Manhattan of Brooklyn; and Longwood's of Boston. There are also good clubs in Newark, Baltimore, Chicago, Detroit, Milwaukee, Rochester, Syracuse, Buffalo, Pittsburgh and San Francisco, and in most of the New-England cities. Two schools—St. Paul's, Concord, N. H., and St. Austin's, Staten Island—are constantly turning out young cricketers, for at both these institutions baseball is prohibited and cricket is commended to the youthful mind. The colleges are now taking up the game, and an Intercollegiate Cricket Association, including Harvard, Yale, Princeton, Columbia, University of Pennsylvania and Haverford College, Pa., has been formed. It is safe to say that as the United States grows so will cricket, and it is quite probable that the future will show increased popularity.

In order to play cricket successfully it is necessary that a pretty good sized area of turf as level as can be had should be engaged by a club for the season. This should be well watered and rolled.

The rules of the game are as follows:

1. The Game.—A match is played between two sides of eleven players each, unless otherwise agreed to. Each side has two innings, taken alternately, except in the case provided for in Rule 53. The choice of innings shall be decided by tossing.

2. Runs.—The score shall be reckoned by runs. A run is scored: first, so often as a batsman, after a hit or at any time while the ball is in play, shall have crossed and made good his ground from end to end; second, for penalties under Rules 16, 34, 41, and allowances under 44. Any runs scored shall be duly recorded by scorers appointed for the purpose. The side which scores the greatest number of runs wins the match. No match is won unless played out or given up, except in the case provided in Rule 45.

3. Umpires.—Before the beginning of the match two umpires shall be appointed, one for each end.

4. The Ball.—The ball shall not weigh less than five ounces and a half, nor more than five ounces and three-quarters. It shall measure not less than nine inches and a quarter in circumference. At the beginning of each inning either side may demand a new ball.

5. The Bat.—The bat shall not exceed 4 1-4 inches in the widest part; it shall not be more than 38 inches in length.

6. The Wickets.—These shall be stationed opposite and parallel to each other at a distance of 22 yards. Each wicket shall be 8 inches in width, and consist of three stumps, with two bails upon the top. The stumps shall be of equal and sufficient size to prevent the ball from passing through and 28 inches out of the ground. The bails shall each be 4 inches in length, and when in position on the top of the stumps, shall not project more

than half an inch above them. The wickets shall not be changed during a match unless the ground between them becomes unfit for play, and then only by consent of both sides.

7. The Bowling Crease.—This shall be in a line with the stumps; 6 feet 8 inches in length; the stumps in the centre; with a return crease at each end at right angles behind the wicket.

8. The Popping Crease.—This shall be marked 4 feet from the wicket, parallel to it, and be deemed unlimited in length.

9. The Ground.—The ground shall not be rolled, watered, covered, mown or beaten during a match except before the beginning of each inning and of each day's play, when, unless the in-side objects, the ground shall be swept and rolled for not more than 10 minutes. This shall not prevent the batsman from beating the ground with his bat, nor the batsman or bowler from using sawdust in order to obtain a proper foothold.

10. The Bowler, No Ball.—The ball must be bowled; if thrown or jerked the umpire shall call "no ball."

11. Delivery of the Ball.—The bowler shall deliver the ball with one foot on the ground behind the bowling crease, and within the return crease, otherwise the umpire shall call "no ball."

12. Wide Ball.—If the bowler shall bowl the ball so high over or so wide of the wicket that, in the opinion of the umpire it is not within reach of the striker, the umpire shall call "wide ball."

13. The Over.—The ball shall be bowled in overs of four balls from each wicket alternately. When four balls have been delivered the ball is finally settled in the bowler's or wicket-keeper's hands. The umpire shall call "over." Neither a "no ball" nor a "wide" shall be reckoned as one of the "overs."

14. Changing Ends, and Overs.—The bowler may not change ends more than twice in the same inning, nor bowl more than two overs in succession.

15. Side of the Wicket.—The bowler may require the batsman at the wicket from which he is bowling to stand on that side of it which he may direct.

16. Scoring off No Balls and Wide Balls.—The striker may hit a "no ball," and whatever runs may result shall be added to his score; but he shall not be out from a "no ball," unless he be run out or break Rules 26, 27, 29, 30. All runs made from a "no ball," otherwise than from the bat, shall be scored "no balls"; and if no run be made, one run shall be added to that score. From a "wide ball" as many runs as are made shall be added to the score as "wide balls," and if no run be otherwise obtained one run shall be so added.

17. Bye.—If the ball, not having been called "wide" or "no ball," passes the striker without touching his bat, or person, and any runs be obtained the umpire shall call "bye"; but if the ball touch any part of the striker's person (hand excepted) and any run be obtained, the umpire shall call "leg-bye," such runs to be scored as "byes" and "leg-byes" respectively.

18. Play.—At the beginning of the match, and of each in-

ning, the umpire at the bowler's wicket shall call "play." From that time no trial ball shall be allowed to any bowler on the ground between the wickets. When one of the batsmen is out, the use of the bat shall not be allowed to any person until the next batsman shall come in.

19. Out of His Ground.—A batsman shall be held to be "out of his ground," unless his bat in hand or some other part of his person be grounded within the line of the popping crease.

20. Wicket Down.—The wicket shall be held to be "down" when either of the bails is struck off or when a stump is struck out of the ground.

21. Bowled.—The striker is out if the wicket be bowled down, even if the ball first touch the striker's bat or person.

22. Caught Out.—If the ball, from a stroke of the bat or hand, but not the wrist, be held before it touch the ground, although it be hugged to the body of the catcher, the striker is "caught" out.

23. Stumped Out.—If in playing the ball, provided it be not touched by the bat or hand, the striker be out of his ground, and the wicket be put down by the wicket-keeper with the ball or with hand or arm, with ball in the hand, then the striker is "stumped" out.

24. Leg Before Wicket.—If with any part of his person he stop the ball, which in the opinion of the umpire at the bowler's wicket shall have been pitched in a straight line from it to the striker's wicket and would have hit it, the striker is out by "leg before wicket."

25. Hit Wicket.—If in playing at the ball he hit down his wicket with his bat or any part of his person or dress, the striker is out by "hit wicket."

26. Obstructing the Field.—If under the pretence of running either of the batsmen wilfully prevents a ball from being caught, he is out by "obstructing the field."

27. Hit the Ball Twice.—If the ball be struck, or stopped by any part of the striker's person and he wilfully strikes it again, except this be done for the purpose of guarding his wicket, which he may do with his bat, or any part of his person except his hands, he is out by having "hit the ball twice."

28. Run Out.—Either batsman is out, if in running, or at any other time, while the ball is in play he is out of his ground, and his wicket be struck down with the ball after touching by any fieldsman.

29. Handled the Ball.—If he touch with his hands or take up the ball while in play unless at the request of the opposite side, the striker is out by having "handled the ball."

30. Batter Obstructing a Fieldsman.—If he wilfully obstruct any fieldsman the striker is out.

31. Running for the Wicket.—If the batsmen have crossed each other, he that runs for the wicket which is put down

is out; if they have not crossed, he that has left the wicket is out.

32. Striker Being Caught.—The striker being caught, no run shall be scored even if he has attempted a run.

33. Ball Dead.—A batsman being out the ball shall be "dead."

34. Lost Ball.—If a ball in play cannot be found or recovered, any fieldsman may call "lost ball," when the ball shall be "dead." Six runs shall be added to the score, but if more than six runs have been run before "lost ball" has been called, as many runs as have been run shall be scored.

35. Batsman Out of His Ground.—After the ball shall have been finally settled in the wicket-keeper's or bowler's hands it shall be "dead"; but when the bowler is about to deliver the ball if the batsman at his wicket is out of his ground before actual delivery, the bowler may run him out; but if the bowler throw at that wicket and any run result, it shall be scored "no ball."

36. Absence of a Batsman.—A batsman shall not retire from his wicket and return to it to complete his inning after another has been in, without the consent of the opposite side.

37. Substitute.—A substitute shall be allowed to field or run between wickets for any player incapacitated by illness or injury.

38. Approval Required.—In all cases the substitute must be approved of by the opposite side.

39. Striker and Substitute to Keep Their Ground.—In case any substitute shall be allowed to run between wickets, the striker may be run out if either he or his substitute be out of his ground.

40. Batsman Liable For His Substitute.—A batsman is liable to be out for any infringement of the Rules by his substitute.

41. Fielding.—The fieldsman may stop the ball with any part of his person, but if he wilfully stop it otherwise 5 runs shall be added to the score and the ball be dead.

42. Wicket-keeper.—The wicket-keeper shall stand behind the wicket. If he shall take the ball for the purpose of stumping, before it has passed the wicket or if he shall incommode the striker by any noise, or motion, or if any part of his person be over or before the wicket, the striker shall not be out, except under Rules 26, 27, 28, 29 and 30.

43. Umpires.—The umpires are the sole judges of fair or unfair play, of the fitness of the ground, the weather, and the light for play; all disputes shall be determined by them, and if they disagree the actual state of things shall continue.

44. Umpires shall pitch fair wickets, arrange boundaries where necessary, and the allowances to be made for them, and change ends after each side has had one inning.

45. They shall allow two minutes for each striker to come in, and ten minutes between each inning. When they shall call "play," the side refusing to play shall lose the match.

46. They shall not order a batsman out unless appealed to by the other side.

47. The umpire at the bowler's wicket shall be appealed to before the other umpire in all cases, except in those of stumping, hit wicket, run out at the striker's wicket, or arising out of Law 42, but in any case in which an umpire is unable to give a decision, he shall appeal to the other umpire whose decision shall be final.

48. If the umpire at the bowler's end be not satisfied of the absolute fairness of the delivery of any ball, he shall call "no ball." The umpire shall take especial care to call "no ball" instantly upon delivery; "wide ball" as soon as it shall have passed the striker.

49. If either batsman run a short run, the umpire shall call "one short," and the run shall not be scored.

50. After the umpire has called "over," the ball is "dead," but an appeal can be made as to whether either batsman is out, if made at once.

51. No umpire shall be allowed to bet.

52. No umpire shall be changed during a match, unless with the consent of both sides except in case of violation of Law 51; then either side may dismiss him.

53. Following Inning.—The side which goes in second shall follow their inning, if they have scored 80 runs less than the opposite side.

ONE-DAY MATCHES.

1. The side which goes in second shall follow their inning, if they have scored 60 runs less than the opposite side.

2. The match, unless played out, shall be decided by the first inning. Prior to the beginning of a match, it may be agreed that the over consist of five or six balls.

SINGLE WICKET.

The Laws are, where they apply, the same as the above, with the following alterations and additions

1. One wicket shall be pitched as in Law 6; with a bowling stump opposite to it at a distance of 22 yards. The bowling crease shall be in a line with the bowling stump; and drawn according to Law 7.

2. When there shall be less than five players on a side, bounds shall be placed 22 yards each in a line from the off and leg stump.

3. The ball must be hit before the bounds to entitle the striker to a run, which run cannot be obtained unless he touch the bowling stump or crease in a line with his bat, or some part of his person or go beyond them, and return to the popping crease.

4. When the striker shall hit the ball, one of his feet must be on the ground behind the popping crease, otherwise the umpire shall call "no hit," and no run shall be scored.

5. When there shall be less than five players on a side,

neither byes, leg-byes, nor overthrows shall be allowed, nor shall the striker be caught out behind the wicket, nor stumped.

6. The fieldsman must return the ball so that it shall cross the ground between the wicket and the bowling stump or between the bowling stump and the bounds; the striker may run until the ball be so returned.

7. After the striker shall have made one run, if he start again he must touch the bowling stump or crease, and turn before the ball cross the ground to entitle him to another.

8. The striker shall be entitled to three runs for lost ball, and the same number for ball wilfully stopped by a fieldsman, otherwise than with any part of his person.

9. When there shall be more than four players on a side there shall be no bounds. All hits, byes, leg-byes and overthrows shall then be allowed.

10. There shall be no restriction as to the ball being bowled in overs, but no more than one minute shall be allowed between each ball.

The cricket bat is 38 inches in length, with a straight blade, about 5 inches wide, 25 inches long. The handle thus occupies 13 inches of the total length. It is grasped with both hands. Cricketers are fastidious with regard to the weight and hang of their bats. Novices are apt to use too heavy a stick governed by the wish to secure driving power. Weight tends to make their play slow. A light stick which they can wield with quickness and accuracy is the best.

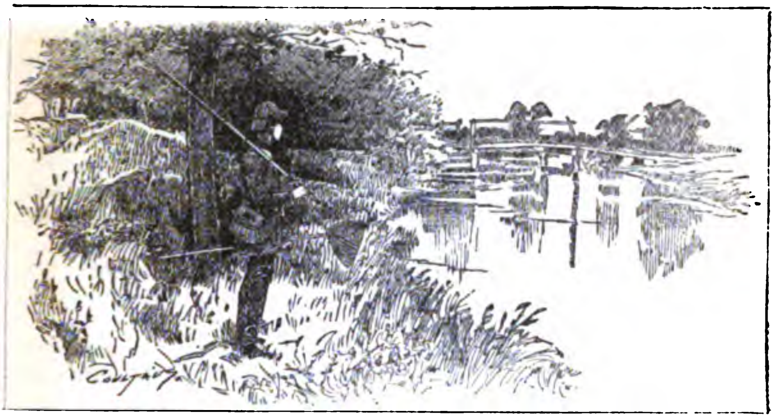
The batsman stands with left foot at right angle to the wickets, the other parallel to them. The safest guard is about four inches from the popping crease, a fact which will soon be learned through the player's own experience. The batsman is advised to play low, not to be in a hurry until he understands the bowling, to watch the wicket toward which he is running in order not to run down the other man, not to run away from the ball and, in cutting, to wait until the ball is nearly over the wicket, and then bat it with the face of the bat almost toward the ground. Balls that come about five inches above the bails should generally be allowed to pass.

The batsmen have to learn the tricks of the bowlers and meet them properly. Batting in the cricket field changes from time to time, owing to changes in the style of delivery of the ball.

In bowling, the underhand and round arm are the popular styles. Changes of pace, pitch, and twist confuse the batsman, and the best bowler is the man who, having perfect command of the ball, is able to astonish the batsman the most times by the changes in his strategy.

Fielding is of great consequence in cricket. Slovenly work in the field should never be tolerated for a moment.

The wicket-keeper has, of course, a difficult position to fill. He is obliged to wear pads and gloves for protection of his legs and hands.



FISHING.

BY YALE BEACH, NEW-YORK.

Philosophers say that angling for fish tends to develop the moral and intellectual faculties of man. Possibly this is true. Anglers will welcome the statement with pleasure as well as some surprise. Without dwelling upon the point, it can certainly be said that angling does possess a charm which attracts the best, most eminent and wisest of men as well as the careless and unthinking. Governors, Senators, Generals and Presidents are passionately fond of the sport. On the other hand, angling also tends to make man a philosopher. Success calls for patience and perseverance, and a knowledge of the haunts and the nature of the game, while disappointment calls for a rational mind and a capacity to be contented with the pleasure of pursuit without the concrete reward of good fish.

There are various ways in which to fish. The supreme object with many is to secure the holiday, basking lazily in the sun on a river bank or in a comfortable place on a bridge, or floating upon the surface of a lake in a great safe tub of a skiff, and, in that position, to enjoy the aromatic fragrance of the woods, the beauty of the scenery, and the drowsy influences of the summer's day. This may be enjoyment, a resting of the tired mind and body, but it is not fishing. The real fisherman is a man of action as well as a philosopher. He studies the nature of fish, their habits and favorite haunts; he explores and experiments; he trains his arm and hand to delicacy and skill in the management of rod and line; and he is not satisfied with himself on any occasion until he has employed every resource that in him lies first to entice the wary game to bite at his hook, and secondly, to land the captured beauty. The real fisherman is fully awake to the charming influences of nature, but he does not go to sleep over his work, and he always brings back a string of fish if the conditions are at all favorable to their capture.

Young anglers are apt to follow the sport regardless of the proper methods and the proper equipments for the catching of fish. How often will they row out upon the lake and angle half the day in some spot, delightful for its pictorial beauty when there is not a fish within half a mile of them. Young anglers would frequently succeed where now they fail, and when succeeding would double their catch oftentimes, as well as add to the sport in taking the fish, if they would inquire from the nearest fishermen about the habits of the fish, and the proper tackle for taking them. It is a good rule not to seek game blindly. Find out where the fish live and do not be afraid of the small outlay required to secure proper rods and lines. Then, if the "old fisherman" of the village should not care to show you where all his best fishing grounds are, use your eyes and wits and find out for yourself. If you are at the seaside, watch "Captain Dan" when he goes off in his dory for a few black fish or bass. Notice the tides and the time of day. If you row off and anchor near him and discover that he takes large fish rapidly while your hook is unnoticed, it is fair to conclude that "Captain Dan" is anchored over a rock or wreck around which the fish congregate. It may be, too, that the "Captain" makes this spot a feeding ground for fish, that come there every day for rations. By getting the ranges of the Captain's dory; that is, by bringing the boat within range of certain landmarks such as the white church steeple, and the red barn beyond it, or any prominent object on shore, you can row right up to the favorite resort of the black fish at any time. However, fishermen are as a rule good natured if you approach them properly, and they seldom hesitate to give the amateur good fishing ranges. No matter where the amateur fishes, be it in salt water or fresh, the lake or the running stream, a little preliminary information about the best fishing grounds will be of great service to him. If no one will tell him, he must explore for himself.

The elementary ideas in angling are, first, that a fish is governed by a voracious appetite, which he is constantly seeking to appease. He spends most of his time scouting for food, which consists of small fish, frogs, flies, insects, etc. Though more active at certain hours of the day than at others, he is as a rule always hungry, and he seizes upon his favorite food the moment it is presented to his view. Of this fact the angler takes advantage. The second principle is that the fish is timid and must not be alarmed. Everything must be concealed which will make him suspicious of the bait. The sight is the fish's one sense which is well developed, and an angler must govern himself accordingly. The hook must be concealed beneath the bait, as far as possible. The lure must be attached to the line by a foot or two of fine catgut, which is nearly invisible in the water; and the line itself must be as small as possible in order not to attract too much attention. Furthermore, when fishing in shallow water like running brooks, the angler is obliged to conceal his own form from view behind the bushes of the bank. A strange moving object on shore will alarm the alert little creatures in the stream, and they will rush pell-mell into deeper water, or into their retreats among the boulders, and will refuse to venture out until the cause of the alarm disappears, or becomes so motionless as to seem to have become one of the fixed objects of the bank. The skill of the angler therefore shows itself, first, in selecting for bait the favorite food of the fish, and, secondly, in presenting the bait to his notice in a manner which does not alarm him.

In ordinary still fishing, in lakes and rivers, the angler uses a slender fish pole, silk or cotton line, lead sinker to cause the hook to seek the depths of the water and a little float or bob, which, resting on the surface of the water, betrays by its motions the moment the fish is nibbling at the bait. The deep sea fishermen use strong hand lines, dispensing with poles as a rule. A few varieties of large fish must be caught by trolling, that is to say by trailing at a suitable distance behind a moving boat a spoon hook or other similar lure, the flash of which in the water resembles the motion of a small fish swimming rapidly near the surface. Still another method is fly fishing. The hook is covered with an arrangement of fine feathers and silk, and this line, being skilfully launched through the air and allowed to drop neatly on the surface of the water causes the fish below to imagine that a tempting butterfly or insect is floating above him. Fly fishing is the favorite method. Anglers are saved the trouble of digging for bait in the back yard or of spending half a day in the preliminary pursuit of minnows with scoop nets. Flies are made of every hue and pattern that can be devised. A well filled fly book is a beautiful sight. And the variety of bait which the fly book places at the command of the angler enables him to change from one kind of lure to another if the fish are not tempted by those he tries at first.

There is a great deal of discussion among anglers from time to time concerning the "most killing" fly for trout, black bass, etc. The outcome of the comparison of experiences seems to be, invariably, that the best lures for any waters are those which resemble the natural flies and insects living in the vicinity of the streams or lakes in question. The angler is recommended, therefore, to study the colors and shapes of the ephemeridæ which frequent the locality in which he is fishing. Oftentimes his luck will change for the better in consequence of his acting upon a hint thus obtained.

To the inland fisherman a knowledge of fly-casting is essential at the beginning of his career. He will do well to master the intricacies of the art at the earliest opportunity. The line will be found unmanageable at first. The angler will spend many a long day in trying experiences before his arm and hand acquire the requisite skill. But let him remember that a boy of fifteen cast a trout fly at a recent tournament a distance of 68 feet with a 9 1-2 ounce rod, 11 1-2 feet long; and that perseverance will crown his efforts with success. Practice is the fly caster's school. Book suggestions, however, will be of some assistance. Experts say that to cast, the rod should be held nearly perpendicular and be brought forward with a quick stroke. In retrieving the line, or taking it from the water, do so with a quick jerk. Let the line straighten out behind you. Then repeat the quick jerk forward to cast the fly on to the water. When the fly touches the water the line should be nearly straight. Bad casts are made by bringing the outer end of the rod over too near the ground behind the caster. This causes the line, when cast forward, to lie crookedly on the water and gives the striking fish a chance to get away before the slack line is taken up. Observe the points of not throwing the rod too far back when casting, and allow time for the line to straighten behind you before attempting to cast. Successful fly casting depends upon these movements. The "rolling cast," "water cast," "hoop-snake" cast and "switch cast," as the English term it, are fancy ways of handling the fly. The common style as indicated will answer the purpose of the beginner. Successful fly casting depends upon the close observance of the movements mentioned. Individualities assert themselves in throwing a fly. Some anglers move their rods forward when casting in a perpendicular plane. Others cast with a sweep to the left or right. The nature of the angler's surroundings has something to do with the manner of casting his fly in any particular instance.

The records of practiced fly casters will show what the angler may accomplish by practice.

AMATEUR SINGLE-HANDED FLY CASTING.

Name.	Length of Rod.	Wght. of Rod, Ounces.	Distance cast, feet and in.
R. C. Leonard	11.6	10	85.
H. W. Hawes	11.6	9¾	81.
Thomas Prichard	10.	4½	80.3
H. C. Thorne	11.6	8½	80.
C. A. Rauch	11.6	10	80.
W. E. Hendrix	11.5	10	78.
W. H. Goodwin	11.	8½	76.
Ed. Eggert	11.6	7½	75.
Samuel Polhamus	11.6	9	74.6
Ira Wood	11.6	9½	71.
Wallace Blackford	11.6	9½	68.

EXPERT SINGLE-HANDED FLY CASTING.

Name.	Length of Rod.	Wght of Rod. Ounces.	Distance cast, feet and in.
R. C. Leonard	11.	9	92.
Harry Prichard	10.4½	8	91.
Thomas Prichard	11.6	9	90.
Thomas B. Mills	11.6	10¾	85.
George Laudman	11.6	10	83.
Martin Culhane	11.6	9½	83.
W. E. Hendrix	10.6	7¾	81.
C. G. Levison	11.6	10¾	80.
Ed. Eggert	11.6	10	78.
W. H. Goodwin	11.6	9	65.

SALMON CASTING.

Name.	Length of Rod.	Wght. of Rod, Ounces.	Dis. cast, feet and in.
R. C. Leonard	18.	37	125.
Ed. Eggert	18.	27	109.
Ira Wood	18.	33	100.

RODS, LINES, AND FLIES.

RODS.—Split bamboo is the toughest material for fly rods either for single and double handed casting. The single handed rod is in more general use. Double handed rods are heavier, longer and adapted for salmon fishing in wide and rough banked streams. A single handed rod weighs from four to twelve ounces and is from eight to twelve and one-half feet long. Rods may be made of lancewood, ash, greenheart and hickory. Double handed rods weigh from sixteen to thirty-five or forty ounces, the usual length being eighteen feet, sometimes twenty-one feet. Old anglers say there is only one rod in the world that is suited to each man and with which that man can do his best work. Experts are fastidious in selecting rods, some giving years to the trial of different rods and spending much money in experiments.

A good single handed rod costs at least ten dollars. For twenty dollars handsome rods by the best makers can be obtained. A fifty dollar rod is a great prize. Cheaper rods, costing from several dollars upward, are in the market. These cheap rods are not to be depended upon; and the angler is advised to try nothing cheaper than the ten dollar article, which is usually a machine affair.

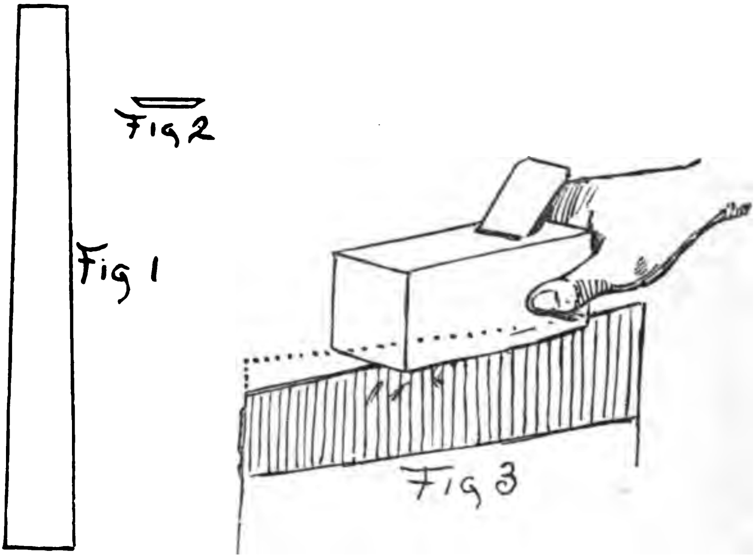
It is difficult to direct how to select a rod for any particular person. Each man must judge for himself. The rod should be well balanced. That is, a perfect taper should exist from the butt to the end of the tip. This insures strength in the rod and enables the angler to make better casts. A poorly balanced rod should be disposed of; it will be found awkward and weak.

Rods for sea fishing are from nine to ten feet long. They are made in two or three joints, the first and second joints being of ash and the third of lancewood.

What a thrill of delight courses through the nerves of the young angler when he arrives at the split bamboo fly rod period, and begins for the first time to take fish with a delicate five to eight ounce tapering rod, as limber as a coach whip yet stout as an ox-goad. The very handling of one of these well-made rods fills the eager angler with enthusiasm. He longs to start right out and whip a trout stream at once.

With care and patience any angler can make his own rod. The writer is indebted to Officer William H. Ahern, of our Metropolitan Police, one of the best amateur rod-makers in this country, for facts about rod-making. The rod-maker needs a fore-plane, several fine wood files, a sharp jackknife, several sheets of very fine sand-paper, a glue pot, varnish brush, small hammer, small iron vise, pair of calipers and a carpenter's screw-bench. The first thing is to select a piece of Calcutta bamboo, that is, variegated bamboo, not the yellow variety. It is sold at fishing tackle stores. The large round bamboo is tough and desirable; the question of the length of the wood in selection is immaterial. Observe that the bamboo is not filled with worm holes, and is as free as can be from knots.

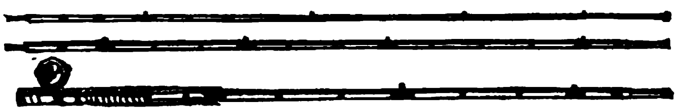
Suppose we want to make an eight-ounce rod nine feet long. It will be of three joints, each thirty-six inches long. The first joint will comprise the butt and first joint proper, and is the starting point of the rod. The joint part is constructed and made of such a diameter as to fit into the natural hole in the piece of bamboo selected for the butt, which serves as the "grasp" and the foundation for the reel plate. In making this joint part six strips of bamboo are needed



Making the strips for a bamboo fishing rod.

for gluing together to form the hexagonal shaft. It is in the preparation of these strips that the greatest care is required. For a nine-foot rod the joint part (for insertion in a butt twelve inches long to a depth of five inches to give the combination stability) must be twenty-nine inches long. The six strips must each be wider at one end than at the other, so that when glued together the joint tapers evenly from the dowel to the ferrule. The longitudinal edges of these strips must be bevelled so nicely that when fitted together a hair cannot pass between them. The least imperfection in the edges of the strips permits water to enter when the rod is in use, thereby loosening and weakening the entire length. The shape of each one of the six strips needed is indicated in figure I. At the widest end, each strip for rod described should be one-quarter of an inch at point of entrance into the butt, tapering to three-sixteenths inch at small end. Bevel the lengthwise edge of each strip as shown in figure II. The outside edge should be perfectly straight. Perfect edges are obtained by careful filing. To cut a tapered strip of the fine bamboo, a rectangular piece is glued on to a thin, soft pine board, and board and bamboo strip are planed off together as indicated in figure III.

When one side of the strip is tapered take the bamboo from the board and glue it on again with the other edge of the strip in position for planing. When both edges are prepared bevel them with a file as in figure II, without displacing so much as a single fibre of the wood from the finished edge. When the six strips fit together exactly glue them together. Fit the twenty-nine inch joint into the piece of bamboo selected for the butt to the depth of five inches (see figure). The part of the joint introduced into the butt should be wound with fish-line and thoroughly glued into position in the butt; then taper down projecting corners of the butt to the diameter of the joint part of the first joint. Lash the joint with silk for an inch and a half above the point where it enters the butt; also, wind the butt for the same distance from its tapered end. At the small end of the joint add a metal ferrule which encases the wood for two and a half inches and



extends beyond the end of the bamboo for two inches, as a receptacle for the dowel of the second joint. In adjusting the ferrule the inside of it should be coated with white lead or gum shellac to make it adhere firmly to the bamboo, and the end of the joint is previously heated. Before the ferrule is put on the end of the joint is hollowed out for about two inches in order to encase the dowel of the second joint, which ought to fit into the bamboo end perfectly, otherwise the rod will be crooked at this point. Lash the joint with silk for an eighth of an inch, say every three inches, along its entire length. Every twelve inches fasten on a small brass guide ring for the line. The silk is lashed over the thin brass plate holding the ring. Continue this lashing a quarter of an inch each way from the ring. All silk lashing is coated over with shellac.

The six strips for the second joint should be thirty-six inches long, a fraction less than three-sixteenths of an inch wide at the broad end and one-eighth inch at the narrow end. Prepare them in the same way as the strips for the first joint. The dowels, or metal ends fitting into the ferrules of the preceding joints, are coated with white lead on the pointed ends and driven into the broad ends of the second and third joints. Before driving in the dowel, the bamboo should be ferruled to prevent the dowel from splitting it. This ferrule is retained on the joint. The second joint is lashed with silk and furnished with guide rings the same as the first joint.

The six strips for the third joint are prepared in the same manner as the strips of the other joints, the width of each strip at the broad end being a shaving less than one-eighth inch, tapering at the narrow end to three-thirty-seconds of an inch. Ferrule this tip at the dowel end and place the dowel. At the narrow end lash on a wire ring which is made expressly for tips. Lash the tip with silk at the several joints along its surface.

Then varnish all the joints. Wind the "grasp" of the butt with fish-line or rattan string. By sending the diameter of the ends of the joints to a fishing tackle store, and the diameter of the taper end of the butt, proper dowels, ferrules, and reel-plate will be furnished. The reel-plate is fastened to the butt below the "grasp," as seen in the cut. The end of the butt is finished with a metal cap.

In rod-making the principal object of care must be the preparation of the strips forming the joints. The correct taper of the entire rod depends upon the taper given these separate strips. The six strips forming one joint must have exactly the same slope or taper. If they are in the least irregular the joint will not taper evenly. Too much care cannot be exercised in preserving the edges of the strips from the slightest irregularity. Discard any imperfect strip even though hours have been spent preparing it. A good bamboo rod permits of no slovenly work. Each edge, each lashing and the fittings of the metal parts must be precise.

REELS.—For trout, use a click reel of bell metal with handle set in the barrel. Bait anglers prefer a multiplier. In salmon fishing, have two click reels each holding 160 yards of salmon line. For salt-water bass and sea fish use a reel carrying 200 or 300 yards of fine linen line. This reel should be a triple multiplier without a check or drag, the bearings being finely constructed and mounted on jewels.

In single-handed rods the reel is fastened below though sometimes above the "grasp." A reel set below the "grasp" is usually preferred. When the click reel is used, its handle is set into the barrel without a projecting arm; an arm is continually catching the line.

Buy American reels. They are better than the English. American rods, reels and lines are now exported to England. They suit the English anglers much better than those of their native make.

LINES.—Thirty yards of fine silk waterproof line, with a nine to twelve-foot casting line of gut nearest the flies, will answer for trout. Salmon fishing requires 150 or 160 yards of silk or of silk and hair braided line, with a gut casting line of twelve feet. An upper casting line of seventy-five to one hundred feet is sometimes added to a salmon tackle. For striped bass and sea fish, linen or hemp hawser-laid lines, or a braided silk line are used. Lines should be several hundred yards long.

FLOATS.—A common cork taken from a large bottle will answer when there is nothing better at command. It should be dropped very gently into the water so as not to alarm the fish. The best floats are made tapering at each end and consist of quills or a short piece of reed, with a cap at top and bottom. They are buoyant, drop lightly into the water, and dip below the surface with the faintest pull at the bait. Cheap and serviceable floats are found in every store which purveys for anglers. In the Western States catfish are frequently angled for with jugs as floats. The jug is tightly corked and the line is attached to the handle. Half a dozen are set afloat at once. When the bait is taken the antics of the jug betray the fact at once.

FLIES.—Artificial fly-making furnishes pleasant occupation for a rainy day when out-of-door sports are suspended. The young angler will do well to learn how to tie his own flies. By observation, after experience, he may devise some new colored fly of his own, thereby winning success in the field and fame in the world of anglers. The beginner of fly-tying should provide himself with a big pocket-book or other similar book or a box with compartments to hold feathers, fur, pig-hair, mohair, hackles, wing feathers, silk, tinsel, scissors, pliers,

Trout Flies.

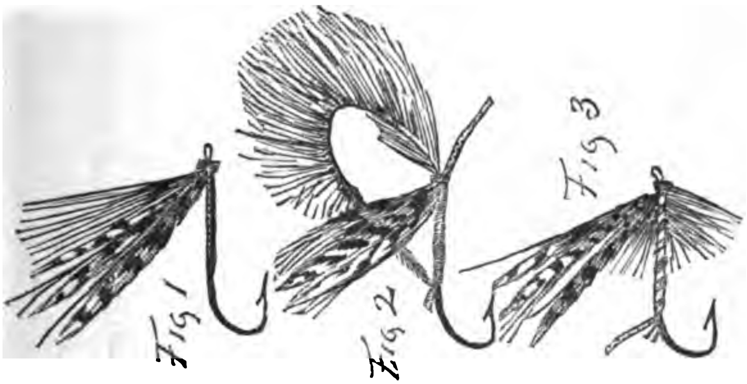
knife, wax, hooks, gut and other articles. If possible, first visit a professional fly-maker and watch and talk with him.

In trying your own hand at fly-making, take a strand of fine silk, pin one end on your knee, taking the other end between the left forefinger and thumb. Rub a well-tempered piece of shoemakers' wax over the tightly drawn string of silk with your right hand. Rub the end about to be tied on the hook thoroughly. Wax all the silk well before tying any part of the fly. Silk can be purchased in various colors on spools. Several strands of silk can be waxed in one operation by drawing them between the waxed surfaces of a piece of folded leather. Next, take the hook by the bend between the thumb and left forefinger; give two or three turns of the silk around the shank (see figure I); flatten the end of the gut a little, which gut should be on the inside of the shank, keeping it from pulling out; and tie underneath about half-way down the hook firmly. Then lay on a little varnish with pencil. Take a piece of finer silk to make the fly body with, fastening it near the end of the shank. Do not bring the silk to the extreme end of the shank, because room must be left there for tying on the wings. Strip off two pieces of woodcock or other wing and lay them together evenly at their points, so that the wings may be double when tied on (see shape in figure II). The wings should not be too long. A little longer than the hook bend is long enough. Press them tightly with your nails against the hook at point of tying. The wings are tied on the reverse way at the end of the shank (see figure II again). With two or three turns of the silk give a running knot over it, and clip off the refuse ends or roots of the feather. Before forming the body, or tying on the hackle, turn the wings up in their place (see figure III) with the thumb nail of the right hand, dividing them in equal parts with a needle, drawing the silk in and out between them to keep the wings firmly in place, fastening with a running knot behind them next your left.

Then tie on the hackle or long feather (to suit the size of the fly) by the root, picking off the soft flue previously and placing it close to the wings on the back of the fly (see figure III); and make a knot over it. Take the hackle by the point in your pliers and roll it over the shank close under the wings two or three times on its side, keeping the outside of it next to the wings; then draw the hackle right through them, letting the pliers hang with the point of the hackle in them at the head (see figure IV); take two turns of the tying silk over it, fastening on to the end of the shank which was left a little bare. Make another knot to secure it, and cut off the silk and hackle: Lay on a little varnish at the head. Now tie on a piece of fine tying silk, opposite the barb, on the shank; take two fibres of a mallard feather and tie them on about three-eighths of an inch long, for a tail, to extend over the head of the hook, and with one knot tie on a piece of fine floss silk about three inches long to rib the fly (see figure V). Mix a little hare fur with yellow mohair and draw a small portion out of the lump with the right hand, taking the hook by the bend with your left. Lay the silk and hair over the end of the third finger, twist the silk and hair together and roll it finely to the shoulder; make a running knot or two with the silk close to the hackle (see figure VI), taking care to have a little more of the fur next to the shoulder to make the body nicely tapered. You may continue to make the body from where you rolled it on the hackle first, and fasten at the tail, and roll the hackle over it, if the fly is to be a long one. Tail the fly and tip it with tinsel, and with two running knots finish opposite the barb. At this point before finishing wax the silk well and touch with varnish pencil.

If there are any fibres of the hackle or wing standing in the wrong direction, clip them with scissors, and the fly is completed. Floss silk or peacock's marl may be used instead of mohair; and the fly may be finished at the tail or the shoulder as desired.

To make a salmon fly, tie a salmon hook to a length of twisted gut or loop (see figure I) with well waxed strong marking silk and lay on a little varnish. Take two pieces of turkey feather of equal size, tying them on the reverse way (see figure II), but a little longer than the bend of the hook. These feathers are tied on the same as trout fly wings, and when turned up appear like the wings in figure I. This figure shows everything necessary in making a plain salmon fly, such as is readily taken in rivers far up-stream from the sea. Next, hold the hook by the bend and tie in the hackle by the root end at the head of the fly, tying in tinsel to rib it in like manner (see figure II); about the place where the hackle is fastened on tie three or four hairs of the peacock's tail, twist them round the tying silk and roll it down to the tail, fastening with a running knot. The tying silk is now left hanging at the tail, where may be seen a small portion of the harl left cut, to show where it was fastened; roll the tinsel over the body to the same place and tie; three turns of the tinsel are sufficient; then take the hackle by the end in the right hand and roll it sideways in rotation with the tinsel, twisting it between finger and thumb as you turn it over to keep it slanting from the head; tie it in at the tail with a running knot, and clip off the ends of the hackle. A short tail may be added at this place. Wax the



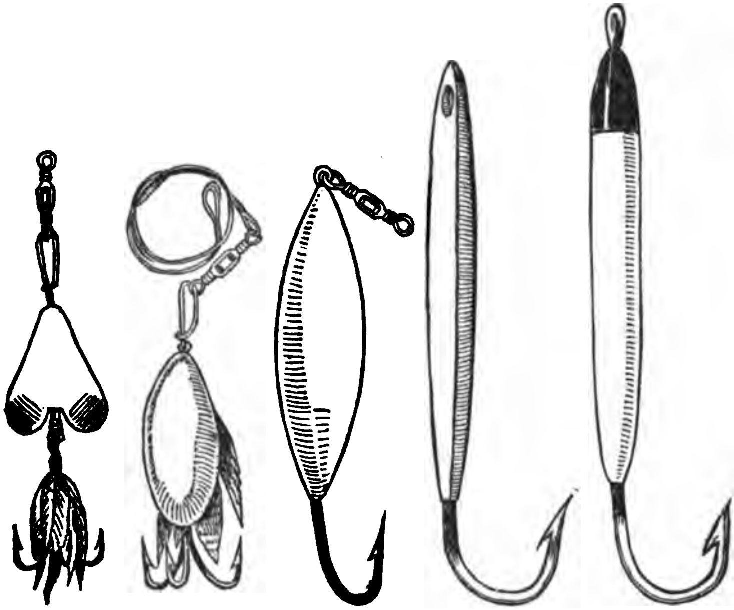
Salmon Flies.

silk. Finish with several running knots; and you have a fly as represented in figure III.

Information as to the colors of various flies and the material needed is readily obtained from professional fly-tyers or at the leading tackle stores. Plates of flies correctly colored are published by prominent fly-makers.

In using the artificial flies the color chosen for use depends upon whether the day is bright or overcast. Bright colored flies are used on a cloudy, dark day. On a bright sunny day the dark colored flies are the best. If the angler will study the colors of the flies about a trout stream or lake he will be enabled to match them closely from among the many flies in his fly books. It is true that artificial flies are not exact patterns of natural flies. Sometimes trout rise to almost any particle falling on the surface of the water. When fish are not in the humor to rise readily, then is the time for judgment in selecting a tempting fly. If the trout should refuse one fly, try another, although it must be said that it is not well to change flies too often. Anglers have been known to cast for several hours without securing the notice of a fish. Suddenly the humor of the trout has changed, and the very flies which were refused before have been snapped at eagerly.

Anglers usually have their special favorites among the hundreds of artificial flies. A discovery of new combinations of colors results from the experience of observing sportsmen. For instance, the popular Red Ibis trout fly was suggested by a red float to which trout were seen constantly to rise during still fishing. This gay fly is now found in nearly every angler's outfit. When trout refuse artificial lures, natural bait can be tried. A tempting cricket, grasshopper, white grub worm or common angle worm will be taken by a hungry trout.



Heart-shaped spoon hook. | Pickerel spoon hook. | Common spoon hook. | Bluefish squid. | Eelskin squid.

As artificial flies are preyed upon by moths the angler should place camphor or some other moth preventative with the flies.

Before using a fly always examine the silkworm gut attached to it and see that it is clear and sound. Frayed gut should be discarded. It may part at a critical moment, causing the loss of a fine fish and deep disappointment to the angler. The hook should be of good metal without flaws. Cheap tackle invariably gives dissatisfaction. Buy the best outfit you can afford and at least buy first-class lines, gut leaders and hooks.

SQUIDS, SPOONS, SPEARS, NETS.

Very little need be said about hooks. They should be adapted to the size of the fish and be covered by the bait, whenever bait is used. See that they are perfect, well barbed and sharp.

The bluefish squid is a strong hook, the shank of which is covered with bright metal. The flash of the metal as the squid is rapidly drawn through the water resembles the twinkling of a small shining fish. When trolling with this hook no bait is required. When the surface of the metal becomes dull it is brightened by scraping with a knife.

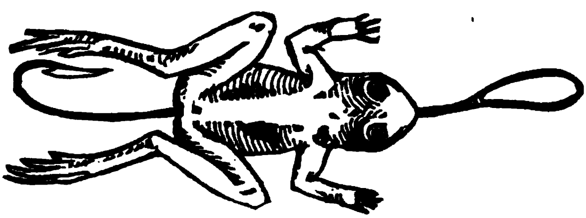
Sometimes the squid is encased in eel skin, so as to expose the silvery lining to the notice of the game.

The spoon hook is employed when fishing for lake trout or other fresh or salt water fish which are caught by trolling. The white and polished oval of metal is formed like the bowl of a teaspoon. The hook is soldered to one end and a swivel is attached to the other, so that the spoon may rotate without twisting the line.

The pickerel spoon is armed with several hooks and a fly. Pickerel, muscalonge and bass are taken with this implement.

Another form of spoon is shown in the illustration herewith. The metal is heart-shaped. A triple hook with fly is hung below it. This is an inviting line for spoon-biting fresh water fish.

A good lure for bass and some other varieties of fish which are caught by hand lines from a boat, is the frog hook, shown in the illus-



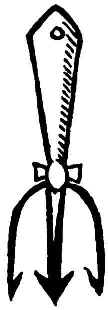
tration. It is made of some light substance like artificial India rubber, and is painted to represent the natural frog as accurately as pos sible.

Spearing is a method of capturing fish which the true angler frowns upon. Laws prohibit the spearing of many varieties of fish, especially at spawning time. Eels, like trout and many other fish, are taken by spearing. The heads of an eel spear and fish spear are shown in the illustrations.

Pickerel, perch and lake fish are often speared in the winter through holes in the ice. A rough board shanty is erected with a hole in the floor. All chinks or cracks in the structure are carefully covered to prevent a ray of light from entering the structure from above. This shanty is placed over a hole in the ice at a shallow part of the lake or pond. The fisherman enters the little house, closes the door and drops into the water an artificial minnow at the end of a short line. He manœuvres the lure a few feet below the surface of the water to attract the attention of the hungry fish. As the fish approaches the lure the fisherman discovers the fact from the darkened surroundings. When a fish is sighted, the spear is thrust down carefully within a foot or so of the game, and at the proper moment a quick thrust secures the game upon the barbs of the spear.

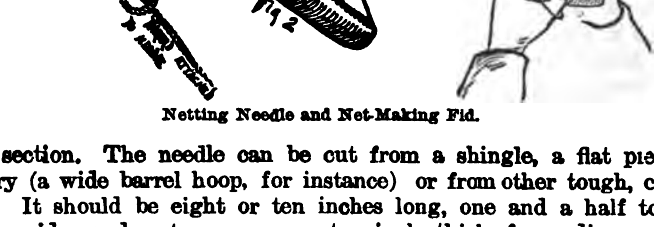
Although the amateur angler will seldom resort to the use of a net,

Eel spear.



Fish spear.

he will be glad to know how to make one in case of need. Net making is an easy and agreeable occupation. All the paraphernalia required for the manufacture are a proper quantity of seine twine; a needle to carry the thread, and a fid to govern the size of the mesh. The fid is merely a piece of hard wood about six inches long, sometimes round like a piece of broom handle, but frequently having an oval shaped

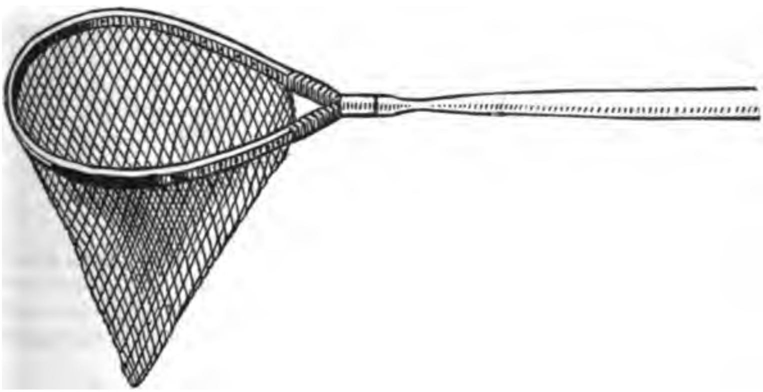


Netting Needle and Net-Making Fid.

cross section. The needle can be cut from a shingle, a flat piece of hickory (a wide barrel hoop, for instance) or from other tough, elastic wood. It should be eight or ten inches long, one and a half to two inches wide, and not over a quarter inch thick for ordinary seine netting. Finer nets require finer needles of the same shape. Iron netting needles are sold at the twine stores, but with a pocket knife the amateur can cut out an excellent needle in a very few minutes. A whittled needle should be thoroughly sandpapered so that all rough shreds or woody fibres will be removed.

To start the net, tie one end of the needle twine to a loop of other twine, which is cast over a door knob or a convenient hook. The needle is made ready by winding the twine upon it shuttle fashion. Hold the fid in the left hand between the thumb and the index finger. For the first stitch cast the line around the fid, knotting it securely. Repeat the operation until the number of stitches needed for the width of the net are cast. Then turn the work about and repeat the stitching, casting the second row of meshes through the loops of the first row. Row after row of meshes is added by continuing the operation until the desired depth of net is obtained.

Seine twine is obtained at almost any twine store. The size of the mesh is governed by the size of the fish for which the net is intended; and also to some extent by the size of the net. Landing nets may be attached to an oval hoop of iron or of elastic wood, which



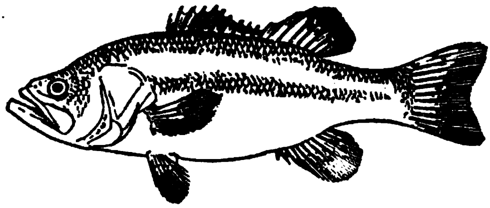
in turn is fastened to a handle like that of a rake. Scoop nets on round hoops are also used.

A seine net is roped at the edge to give it strength. Cork floats are bound to the edge which is intended to come uppermost and sinkers of lead are bound to the sunken edge. Fyke or trap nets, consisting of a series of net pockets with funnel shaped entrances, are stretched on hoops and tied to stakes near the bottom in rapid running waters. Fish enter the first pocket easily and are unable to find their way out through the narrow funnel opening.

METHODS OF CAPTURE.

The object of this paper is purely practical; and the remainder of the space will be devoted to an enumeration of the principal varieties of the game fish of America and the methods of capture by amateur anglers in each case. The methods employed by professional fishermen, who capture the staple varieties by the ton for the market, will not always be referred to.

Black Bass.—This fish is caught in western and northern lakes and streams. Early in June and July it frequents rocky shoals. Later in the season bass retire to deeper water, visiting the shoals night and morning for food. It is then that anglers capture them with flies. Some sportsmen prefer the early morning for fly fishing; others say that one hour before sunset is the proper time, because the bass are less likely to see the shadow of the rod. If the fish sees the shadow, he will not bite. In the fall season bass frequent odd places off shores and shoals and sand points, though also found in deep water. During September and October the fish are in prime condition, and the small-mouthed variety make splendid sport for the angler. For fly fishing use a ten or eleven foot eight ounce rod with a little more "backbone" or stiffness in it than in a trout rod. An enamelled plaited silk fly line tapered, either F or G size, and a six-foot single silk worm gut leader free from all flaws, and two lines are required. Among the good flies are, Red Ibis, Lord Baltimore, white and Ibis.



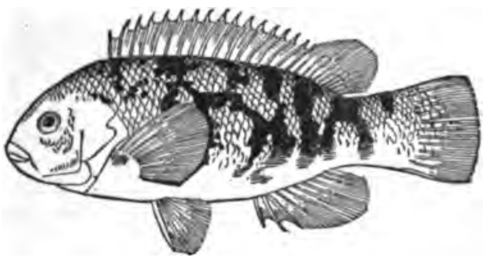
Black Bass.

King of the Waters, Professor, Oriole, Grizzly King, Coachman, Henshall, Oconomowoc and Polka. The Abbey is sometimes substituted for King of the Waters. Different kinds of tackles are employed. Large sized trout flies on No. 2 to No. 5 sproat or O'Shaughnessy hooks should be used.

In bait fishing bass bite at minnows, small frogs, crickets and grasshoppers.

Mr. W. W. Byington, secretary of the Anglers' Association of the St. Lawrence River, says of the bass found thereabouts: "They are found in both varieties, both large and small mouth; but the latter largely predominate, especially in the St. Lawrence River, and are considered the most gamy and the hardest fighters. They are taken by skilful anglers with a five to eight-ounce rod. No bait is used, but an artificial fly is cast upon the surface of the water at distances ranging from thirty to seventy-five feet, and allowed to settle below the surface and is then drawn toward the starting point. The fish is captured by noticing the swirl in the water as it rushes for the fly, rather than by the feeling of the bite or strike. The more usual way of catching the black bass is with bait, and for this purpose the live minnow is almost universally used; but the worm will also be taken. Any kind of ordinary-sized hook, line and rod will answer for this purpose. The skiff is anchored near the shore at some point where there is a shoal.

and the baited hook is thrown overboard, generally with a small sinker. Those who know best will avoid making any noise like thumping in the bottom or on the sides of the boat; but conversation, whistling or even the firing of a gun does no harm. The only danger of alarming the fish is in jarring the water. The trolling spoon used is about an inch long and is attached to the end of a double leader of six feet and run out fifty to one hundred feet behind the skiff, the distance depending on the depth of the water. The oarsman propels the skiff at a three mile an hour speed. The fly rod can be used in trolling. Instead of a spoon hook a single snell hook, baited with worms or live minnow, is used. Late in the season a good bait is had by cutting out the full under portion of a six-inch perch, using the fleshy part and all of the bottom fins. This is attached to a small gang of hooks, punching the hooks through the bait. This bait is trolled like a spoon."

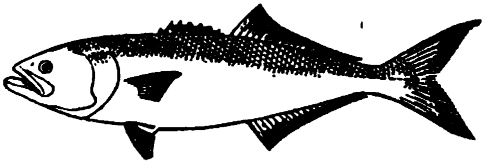


Blackfish.

Blackfish.—From Martha's Vineyard to lower New-Jersey blackfish or tautog bite at shrimp, shedder crab, lobster, fidler, winkle or clam bait. The best fishing season is in April. The fish are taken with sixty to seventy feet of flax line, a tracing sinker, usually two blackfish hooks fastened to the end of the line below the sinker, several feet apart. Hand lines are used; but more sport is had with a stiff ten or twelve foot rod of tough wood or bamboo. The fish feed close to the base of rocks, bite earnestly and are gamy. The time of taking is at the flood tide.

Black Sunfish.—Southerners call it "war-mouth perch." It has teeth on its tongue. Black bass blood courses in its veins. Bass tackle and bait are used in capturing it in Southern fresh waters during the spring and warm months.

Bluefish.—Bluefish alias "horse mackerel," "skip-jack," "greenfish," "snappers," "blue snappers" and "skip mackerel," are abundant from Cape Florida to Penobscot Bay, when the temperature of the water is above 40 degrees and when their favorite food, the menhaden, is plentiful. August and September are good fishing months along the Eastern coast. Bluefish are usually taken by trolling with a metal or bone squid and a large hook. An eel skin turned inside out and drawn over the squid is also employed. A cotton, hawser-laid line fifty yards long is tied to the stern of a sail boat which cruises over the shoals; or it is held in the hand. The position of gulls searching for prey over a school of bluefish is a good game indicator. In striking, the fish hooks itself, the angler simply taking care to keep the line taut as he pulls it in, thereby preventing the fish from dislodging the hook. The angler must scrupulously avoid slackening the



Bluefish.

line at any moment until the fish is landed in the boat. When half a dozen lines extend from one boat, outriggers to hold the lines apart are a convenience. Little bluefish run along the southern New-England coast in the early autumn close to the shore. They are caught with a light rod, small hooks and a fine line. The bait used consists of minnows, salted lobster or bits of fish. Use a float. These little fellows are very greedy and bite readily.

Blue Sunfish.—This variety, known also as "blue bream" and "copper-nosed bream," is a wary, gamy fish. He is taken in Southern fresh waters with a five-ounce rod, ordinary trout line and gay-patterned flies such as Grizzly King, White and Ibis, Red Ibis and Professor, fastened to a No. 8 or 10 sproat hook. Use darker flies if the day is too bright for the gay bait.

Bonita.—During the summer this fish swims in shoals between Cape May and Cape Sable At times it is found off Cape Hatteras, Chesapeake Bay, and in the Gulf of Mexico. Block Island fishermen take a good many. Its habits are similar to those of the bluefish. It is taken with the same kind of bait and tackle. Shedder crab bait may be used with a heavy rod, line and hook.

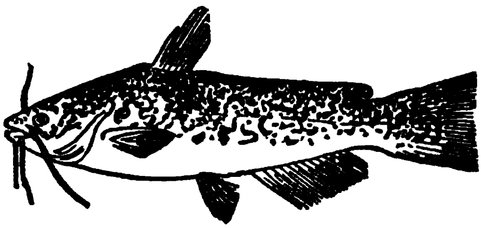
Bream.—The bream of Southern fresh water ponds and streams are taken with a delicate tackle and bait of gentles, angle worms, bleached moss, grasshoppers, or brown bread and honey paste. Horsehair or silk line with a quill float is used. The fish lie near the bottom. Adult fish frequent deep water; the young swim near the shore

Buffalo Carp.—Anglers in the Ohio, Mississippi and Missouri rivers take this fish with a No. 1 or No. 2 salmon hook on a flax or hemp line, with a heavy sinker. Soft cheese bait mixed with cotton batting or raw cotton, is fastened on the hook. Corn meal mush mixed with cotton, and the crawfish are good baits.

Calico Bass.—In the waters of the Great Lakes, the Upper Missouri River and in Georgia and the Carolinas east of the mountains, anglers find this fish under the name of "strawberry bass," "grass bass," "bitter head," "lamplighter," "bar-fish," "goggle-eye," and "goggled-eyed perch." It frequents clear waters with grass bottoms, and is fished for with trolling spoons. This bass has the voracious nature of the black bass.

Catfish.—Catfish abound in all fresh waters east of the Rocky Mountains. The common channel cat or blue cat, lives in all the larger

Western and Southern streams. Channel cat of the Potomac or white catfish are found in the Chesapeake Bay and tributary waters and in the Susquehanna and Potomac rivers. The great Mississippi cat grows up to one hundred and fifty pounds in weight. Great lake catfish swim in the lakes and in the large Southern and Western streams. "Horned pout," "bull-heads" or "minister," probably the hardiest of all the fresh water fish, thrive in Northern and Eastern States; they seldom exceed four pounds in weight. "Mud cats," "yellow cat," "goujon" or "bashaw" of Southern and Western rivers weigh as high as fifty pounds. "Gaff-topsail catfish" range from Cape Cod to Florida in brackish water. They are known as the "sea cat." The catfish caught in the Gulf of Mexico are not a good food fish.



Catfish.

The channel cat are among the gamy fish of the West, and are fished for with heavy bass tackle, minnow bait and tracing sinker. Bull heads are caught with worm bait on medium hooks. They bite well at night and are found on muddy bottoms about piling or sunken stumps. A hand line or line with almost any kind of a rod is used. Catfish are caught during the warm weather.

Cavallo.—This fish lives along the Southern Atlantic coast, abounding in tidal rivers of Florida and biting at a trolling squid of either red cloth, metal or bone. With a reel and a bass rod the angler finds much sport taking this fish.

Carp.—This fish frequents the stagnant fresh waters of the East, or waters where the current is not swift. It is also found in company with dace and perch, and bites at flies, angle worms and insects. At times it is found in rapid running water. The carp has been introduced into California and Oregon, where it thrives.

Chub.—The chub or "Southern trout" is one of the best of Southern fresh water fish. It seldom bites at worms, preferring feathered squids, minnows or flies. It is taken readily in the spring and fall. Angle for them with regulation black bass tackle.

Chub Robin.—This is a gamy pond fish running in some of the Southern and Southwestern lakes and rivers. It will take a fly or a worm. When hooked this fish becomes infuriated and fights vigorously until exhausted. Sometimes it bites at small minnows and is especially fond of white grub worms. Delicate tackle is used in its capture.

Cisco.—The cisco is fished for in the great lakes. Use a fifteen foot perch rod or single handed trout rod. Cisco flies and eel flies make good bait. Artificial flies may be used on a heavy trout line.

Codfish.—Along the New-England coast and the Newfoundland Banks dwell the codfish in countless numbers. For sport good grounds are found about Block Island. Parties often charter a big schooner or sloop and go off from the mainland for a week's fishing excursion. The depth of water over the banks regulates the length of line. A four hundred or six hundred foot heavy cotton line is used by tho regular fishing fleet with a heavy, say twelve ounce sinker and large hooks baited with fish or clams. Caplin, a small fish, is good bait for cod. Professional fishermen set trawls, or a great number of hooks on one line and catch dory loads of tho fish at one haul.

Crabs.—The edible crab caught along the ocean coast is commonly called the "blue crab." It is captured by scooping, and by bait and a scoopnet combined. In scooping, the crabs are sometimes sought along the piles of the wharves about two feet below the surface where they cling to the wood. In shallow water crabs are seen on the bottom and readily scooped up. In bait crabbing a piece of meat is tied to a line or string and thrown overboard in moderately deep water When the crab begins to feed on the meat, the angler pulls it gently to the surface. The feeding crab forgets, in the midst of his repast, whither he is drifting, until the fatal scoop-net encircles him. Midsummer is the best time for crabbing; and harbor and tidal estuaries are the best places.

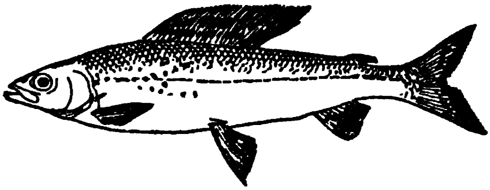
Crocus.—Near the shore from Virginia to Florida this four to eight-ounce fish is taken with delicate tackle and clam or shrimp bait. The line should have a light adjustable sinker.

Dace.—In ponds and rivers of the New-England and Middle States this lively fish bites at artificial flies or worm bait. It fights vigorously when hooked. Weight about eight ounces. Use a light perch-rod, trout hooks, sinker and quill float. Liver is used for bait also.

Eels.—The eels found in the salt and fresh water in this country bite at worms, clams, meats and almost any real bait. Eels bite freely at night over muddy ground. They are then caught by "bobbing," that is by stringing red angle worms on stout thread and attaching a bunch of them to the end of an ordinary fish line. The eels bite at the threaded bunch and entangle their teeth in the threads. They are then drawn ashore. In cold weather eels bury themselves in the mud of shallows. Fishermen pole boats over these shoals and with a four or five-pronged spear strike into the mud here and there, piercing any unfortunate sleeper within range. To obtain red angle worms readily, search a grass plat after dark with a lantern. Dozens of worms can then be picked up as they then come out of the ground. They retire at or soon after daylight.

Flounder.—In the fall and the early spring this fish bites the best. It is taken along the Atlantic coast with hand-lines, set-nets and fyke-nets. In rod fishing use a light tackle. The flat fish and other varieties of flounder have habits similar to the common flounder, and are taken with small hooks, light tackle and clam or lobster bait held near the bottom.

Grayling.—This is a beautiful and a very gamy fish. It lives in the Ausable, Manistee, Muskegon, Boardman, Au Gray, Rifle, Yellowstone and Cheboygan rivers. Its favorite resort is fast-running clear water. In the United States graylings are seldom taken larger than two pounds in weight. They are fished in the same manner as trout, biting readily at dark-colored flies. Anglers consider the upper edge of a pool below



Grayling.

the rapids a choice spot to cast a fly for grayling. The fish bites at caddis-worms and other larvæ.

Grouper.—This is a South American fish found in the Gulf of Mexico and about Florida. It weighs from fifteen to seventy-five pounds, and is taken in nets and by trolling with a large squid and a heavy line.

Haddock.—This fish is something like a codfish, of similar habits and is taken in the same manner.

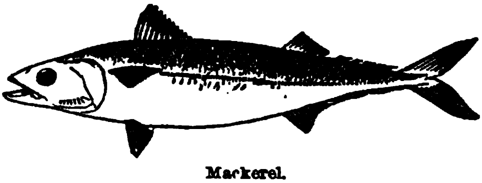
Hake.—Blackfish tackle is used for hake, with clam or crab bait. The game is found along the New-England coast and in New-York Bay.

Hogfish.—The hogfish weighs from five to fifteen pounds. It is taken along the Southern coast with large bass shank-headed hooks; shedder crab or soft shell crab answers for bait in still fishing. The tackle should be heavy.

Lafayette.—On the coast of Virginia and the Carolinas lafayette are taken weighing four to twenty-four ounces. Fish for them with a light bass tackle, trout hooks, fine linen line; clams, shedder crabs or the white part of fish are favorite baits. The season is from June to October. Occasionally lafayette are taken in New-York Harbor.

Lamprey.—This is an eel swimming near the bottom in fresh waters. It is taken in nets. Epicures regard it as a choice table fish.

Ling.—The ling is taken in company with codfish and in the same manner. It ranges from Nantucket to Georgian Bay.



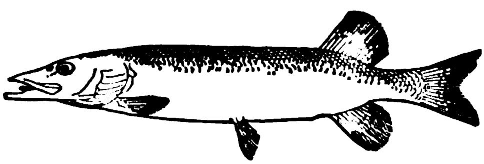
Mackerel.

Mackerel.—The Spanish mackerel are numerous, running in large shoals along the Atlantic coast during the bluefish season. They are taken with trolling squids in the same way as the bluefish, but the sail-boat should be a light craft in order not to frighten the fish. Mackerel squids are finer than those used for bluefish. The squid is made of britannia, block tin or German silver highly polished. Feathers may be added to extend beyond the bend of the hook as a tail.

Muscalonge.—This fish ranges in the large lakes along the northern boundary of the United States and in some of the large rivers. It is taken by trolling, with a spoon usually two and a half to three inches long, trolled from a heavy linen line extending 100 to 200 feet behind the boat. The haunts of the fish are generally learned from practice, and they are sought for in places where they have been captured before.

Capture of the Muscalonge.

In biting they take a spoon hook well into the mouth. The angler's skill is displayed, not in keeping his strong tackle unbroken, but in endeavoring to keep from tearing the hook out of the mouth of the fish. He must give the fish the line when he must and keep the line taut when it slackens. A muscalonge sometimes jumps from the water shaking his head vigorously in the effort to throw out the hook



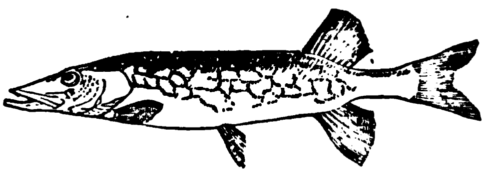
Muscalonge.

With skilful handling the fish is generally captured within thirty minutes, being brought into the boat on a gaff hook. The fish weigh as much as fifty pounds. Mr. James T. Story, of Albany, caught one weighing forty-six pounds in the summer of 1886 in the St. Lawrence River. The waters about the Thousand Islands are full of muscalonge. Faithful, patient work is needed for the capture of this great fish. At times whole days pass without a strike. One angler estimates that in several years of muscalonge fishing he has travelled 150 miles in his skiff on an average for each muscalonge taken.

Mullet.—"The golden mullet" is taken on the Carolina coast with light bass or perch tackle, small hooks, single leader and fine linen line. It bites at shrimp bait and sometimes takes soft clams or mussels. "The mountain mullet" lives in rapid streams of the South. Is fished with light tackle. "Silver or gray mullet" range along the coast from Maryland to the Carolinas. They are fished with small fly hooks and light tackle with clam or fish bait. "Black mullet" are caught in the same way.

Perch.—Perch of several varieties are found in nearly all fresh waters. The average weight is eight ounces. Some weigh three pounds. They bite at bass or muscalonge bait. The Red Ibis fly is a favorite with perch. This fish bites at worms, fish, or any other bait which comes along. Use small hooks, fine linen and a light rod.

Pickerel.—Anglers find this shark-like fish in nearly all the American lakes and rivers. It is taken with a trolling spoon. For still fishing use minnows or parts of bright fish on a large hook and stout line. Pickerel are fished for through the ice in the winter with short lines, good-sized hooks and minnow bait; the lines are attached to small bushes or tip-ups. Twenty or thirty lines may be set at one time. Bites are indicated by the vibration of the bush or tip-up. Almost anything



Pickerel.

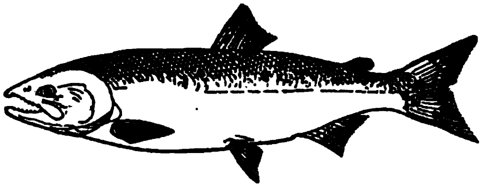
will do for a tip-up which will lie flat on the ice before the bait is taken, and will assume a perpendicular position the moment the pickerel pulls. Of course the tip-up must be so made that it will not go through the hole in the ice. Otherwise fish, line and tip-up would vanish like a flash. A good tip-up can be made with a light narrow board, like a railway signal, working on a round stick (which is placed across over the hole). The line is tied to the short end of the lever. A three or four-pronged piece of a sapling makes a good one also. A genuine Yankee can make a tip-up out of almost any stuff. In skittering, use a long rod, long line and large hook. A piece of fish or a spoon hook answers for bait. Pull the bait over the shoal water where there are lily pads, by giving the rod continuous short jerks in a semicircle and recasting the bait as often as necessary. Whenever the pickerel bites let him chew the bait awhile before striking.

Pike.—The pike is sometimes mistaken for pickerel. It is found in the same waters and is taken almost entirely with a trolling spoon or with baited hook on a small rod. Pike is the most plentiful fish in the St. Lawrence River. The wall-eyed pike, a large yellow fish weighing three to seven pounds, is caught in lakes and rivers of the Middle and Northern States. It is sometimes called "glass-eyed pike," and is taken with a trolling spoon or a baited hook, in about the same way as the black bass. These pike are handsome fish. They are rarely caught. They live almost entirely at the bottom of deep or swift rivers. Another name for this fish is "pike-perch." The sauger or "Jack," "sand-pike," "rattlesnake pike" and "gray pike" are closely related to the wall-eyed pike. They rise to flies at sundown and bite well on moonlight nights. Use sproat hooks No. 1 to 3.

Porgees.—The porgee is caught in tidal waters from Maine to Florida with an eleven-foot rod, fine linen or silk line, small hooks, single gut leader, clam or shrimp bait. Use a swivel sinker and a cork float. Porgees are found with striped bass, blackfish and other common seacoast denizens.

Red Drum.—Along the coast of Florida and Virginia, and sometimes as far north as New-York, this fish takes the hook. It eats mussels, clams, oysters, soft shell and shedder crabs. In February the drumfish are found in the Indian River of Florida, and in March in the St. Augustine and Matanzas inlets. April finds them in South Carolina they are at Cape May a month and a half later. They are captured with a bass rod and reel on the bottom. Although a bottom fish, the drum are game when struck. They weigh as high as eighty pounds.

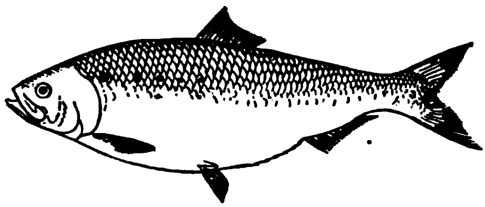
Red Snapper.—Snappers are caught on the Florida coast and in the Gulf of Mexico by trolling with silver or pearl squids, or with a rod, a stout line and hook baited with porgee or mullet. This fish makes sport when taken with a rod and reel. Big fish weigh over a hundred pounds.



Salmon.

Salmon.—Pliny christened the salmon eighteen hundred years ago. There are eighteen accepted species of the salmon tribe. In the East the fish are found in the North Atlantic Ocean and its affluents, ranging along Labrador shores and in the Great Lakes, and the rivers of Nova Scotia, New-Brunswick, Canada and Maine. There are a few salmon rivers in New-Hampshire, Massachusetts and Connecticut. Latitude forty-one is about the southern limit of salmon. Half of the time they live in the sea; in the spring or early summer they ascend the rivers to lay their eggs. Some live in fresh water all the time, being found in Eastern waters under the name of "winninish," "grayling," "schoodic trout," Sebago trout" and "dwarf salmon." The rivers and sounds of California, Oregon, Washington Territory and the British possessions furnish the best salmon fishing. Pacific salmon, known as the "steel head," range from Monterey to Kamschatka close to the coast; and are found in abundance in the Columbia and Frazer rivers in the spring and in Puget Sound at the time of the salmon run. Their average weight is sixteen pounds. The California salmon is a gamy fish and its young are in demand for the stocking of Eastern streams. In salmon fishing use a twenty-ounce rod, eighteen to twenty-one feet long, according to the waters fished; 100 yards of braided silk waterproof line, a stout single gut leader and one or two large flies. A good rod costs from $25 to $50. The casting line should be of clear, round, transparent strands of silk worm gut, tapered by attaching the heaviest end to the reel line. Double or twisted leaders are unnecessary. As salmon are shy the tackle should be as fine as possible to avoid alarming them. Use a salmon click reel. Salmon flies are the Prince William of Orange, Jack Scott, Butcher, Curtis, Silver Doctor, Fairy, Silver Gray. The angler should keep dozens of other varieties in his fly-book with which to tempt the fish's palate.

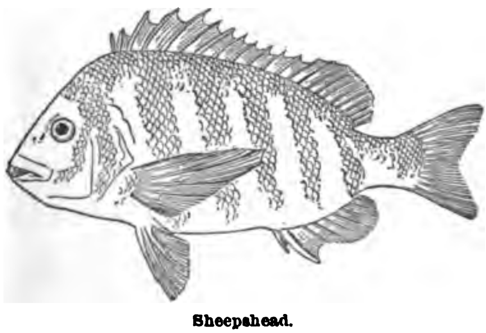
Sea Bass.—This fish takes clam bait, shrimp and shedder crab bait. Bites best between the turn of the tides. Affords the angler but little sport, and is the tamest fish to catch along the coast. Use blackfish tackle.



Shad.

Shad.—This is a commercial fish and is caught exclusively with nets from Florida to the New-England States along the coast and in tidal waters.

Sheepshead.—From June until September this fish bites freely along the New-Jersey and Long Island coast. It is fished with a hand-line



Sheepshead.

or with a heavy rod and reel accommodating from 400 to 600 feet of line. Use a tracing sinker, a large sproat bent hook or a shank-headed hook of the Virginia bend. Two hooks may be used, one baited with a soft-shell clam by forcing the hook between the shells, and one baited with a whole clam without the shell. The fish is full of game and pluck.

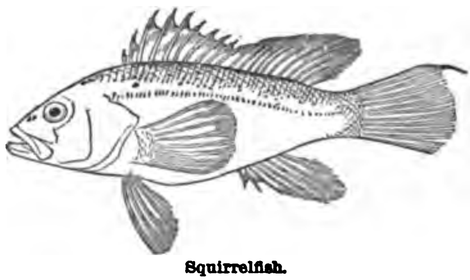
Sharks.—These voracious monsters are taken almost everywhere within two miles from shore on every ocean coast. Shark lines are stout as a clothes line. At the end a six-foot chain and a hook eight inches long are attached. The hook is baited with a bunch of small fish (perch will do) or a large piece of meat. In catching the common shark, which is from five to eight feet long and weighs from 200 to 500 pounds, the hook is lowered to a point near the bottom. The shark bites lightly, and will often take most of the bait without being hooked. When by a strong pull he is secured, two or three men are required to haul him to the surface, where he lies thrashing the water and struggling, his big mouth wide open and his deadly teeth displayed. He is killed by the blow of a heavy club upon the nose. The man-eating shark swims nearer to the surface.

Shiner.—This little bright fish is good for bass and pickerel bait. It is taken with a small hook, worm bait on light tackle; also in nets in shallow streams.

Siscowet.—Siscowet are found in Lake Superior. It bites at a fly or feathered squid. Use trout tackle. This lake trout appears to live in only one lake.

Smelt.—From the Raritan River to the Gulf of St. Lawrence, smelt are taken in large seines. They are plentiful in the Raritan and the Passaic rivers. A few land-locked smelt are found in Maine lakes and in the Provinces. On the Pacific coast "California," "Alaska" and "surf" smelt are taken.

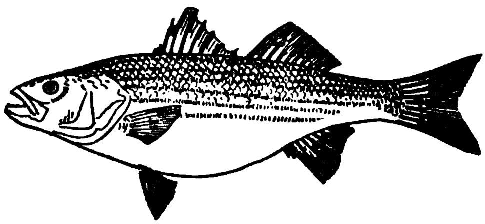
Squeteague.—See Weakfish.



Squirrelfish.

Squirrelfish.—From May until September this fish is caught on blackfish grounds of the Southern Atlantic coast with blackfish tackle and bait.

Striped Bass.—There is genuine sport in taking this excellent fish. Every inch of him is game. He is caught along the Atlantic coast and in the estuaries and tidal waters from Maine to Virginia. In fishing for striped bass use a bamboo rod not over nine feet long, made of two or three joints. A single piece of bamboo makes a good rod, but is inconvenient to carry. The reel should be a multiplier running noiselessly and with absolute accuracy. Use a flax line of twelve to fifteen threads; No. 3 hook is usually large enough. With crab bait, a larger hook is needed. The skilful way to capture striped bass is to cast the hook, baited with menhaden, into the surf. Seventy-five yards is a good casting distance. Casts of over one hundred yards are exceptional. To cast, wind up the line on the reel until the bait is within several feet of the tip of the rod. The rod should be extended behind the caster and the cast made with a steady, strong swing, the reel being governed by the pressure of the thumb in order that the line shall not unreel faster than the flying bait requires it. Upon the government of the reel depends the success of the cast. The reel must not be checked too much, or allowed to run too freely, else the bait will be retarded or the line will unreel faster than it is needed



Striped Bass.

and get into a snarl. An eel skin turned inside out and drawn over two hooks answers for a casting bait. Shrimp, soft crabs and lobster are used in still fishing. This soft bait should be tied to the hooks by strings. Crab is the best summer bait for striped bass. Use a double gut leader in still fishing, about thirty inches long.

Sturgeon.—The sturgeon will not take a hook as a general rule. Occasionally, however, one is hooked in the St. Lawrence River. An expert angler in that river recently struck a hook attached to a light bass tackle into a seventy-eight pound sturgeon, and after a long fight he landed the fish with a seven-ounce split bamboo rod. The sturgeon is found in the Great Lakes and in salt and fresh waters along the

Sturgeon.

ocean coast. In the South the sturgeon is captured with a gang of three hooks about fourteen inches long, fastened to a clothes-line leader and held near the bottom of a fast flowing tidal river. In passing above the hook the fish oftentimes hits the line. The angler feels the touch and gives the hooks, which are keenly pointed, a sudden jerk, sticking them into the body of the fish.

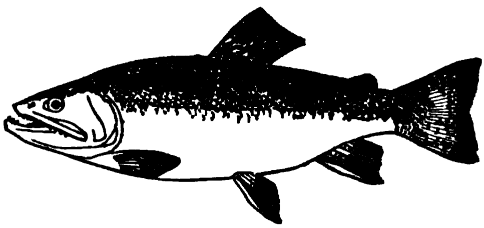
Sucker.—This is a low grade fish. It sucks in a bait of angle worms or shad roe. Trout tackle can be employed in taking suckers. Various colored suckers are found in the muddy bottoms of fresh waters throughout the country. They are sometimes snared. A slip-noose of fine wire is attached to the end of a long rod and passed over the body of the fish as it reposes in shallow water. A jerk of the rod tightens the noose and the fish is lifted bodily from the water. Suckers may be speared in the same manner as eels. They are often speared in pools at the base of a fall at the proper time of year.

Sunfish.—This is a small fish found in lakes, rivers and ponds of the United States. "Roach" is another name. Small hooks and perch tackle are used in taking it. The Western sunfish, the "Buffalo," reaches five pounds in weight and is sometimes mistaken for spotted bass.

Swordfish.—This pugnacious fish is found off the ocean coasts. Many are taken off Block Island. They are speared from small sailing craft. One of the crew sits aloft in the rigging of the cruising craft and watches for the fish as it naps near the surface. When a fish is sighted the boat runs down toward it and a man in the bowsprit, with a long pole attached to a detachable brass barbed spear-head, strikes the fish as the boat approaches. The spear-head remains in the fish and the line fastened thereto insures a speedy capture. The sport is most exciting.

Togue.—One of the lake trout found in New-England and the adjacent Eastern Provinces. Togue are not common and are taken with a heavy trout tackle.

Trout.—Speckled trout are found from Maine to Florida in the



Speckled Trout.

lakes and streams of the Atlantic watershed; in a few rivers flowing into the Gulf of Mexico; in rivers of the Great Lakes; in the Gulf of St. Lawrence and in the streams of the Rocky Mountains and California as far south as the San Luis Rey River. They are known as "brook," "rainbow," "mountain" and "golden" trout, and seldom exceed three pounds in weight. The largest trout are found in Maine. Twelve pounders have been taken in the Rangely lakes. Heavy fish come from Mooselucmaguntic Lake; and it is said that Nepigon River has yielded a seventeen pounder. April, May and June are good months for trout fishing.

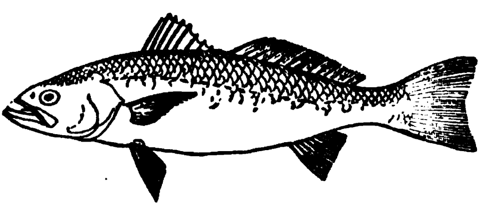
Anglers for trout use a single-handed fly rod, weighing between five and twelve ounces, from eight to twelve and one-half feet long. The line is a water-proof silk tapered with a delicate gut leader ten or eleven feet long. To this are attached three small artificial flies · the stretcher or end fly; the first drop, or the fly nearest the stretcher fly; and the second drop, or the fly nearest the angler's hand. The snell for the first drop should be three inches long and attached to the leader about twenty inches from the stretcher fly. The second drop is attached to the leader with a five-inch snell at a point say eight inches above the first drop. The drops are attached by graded snells so that all the flies may alight on the surface of the water together as nearly as possible. Trout can be taken with worm or insect bait on small hooks

Trout live in water whose temperature runs from 36 degrees to 68 degrees. Beyond these limits the fish suffer and die. Southern and Western rivers are not generally inhabitable for these fish owing to the roily water. In April, May and June trout take Hackles, Professor, Ibis and all medium sized artificial flies. In July and August the fish seek the headwaters of streams. It is then that midge bait only will tempt them. When trout are in the humor for rising, feathers taken from a chicken and tied roughly to a hook will serve as a fly bait.

The silver or sea trout is found in tidal waters of Canadian, Nova Scotian and Newfoundland streams; also in river estuaries of Maine, Massachusetts and Long Island. It is taken in the same season and the same manner as speckled trout, save with a little heavier tackle.

A handsome fish of the trout family is the large variety which swims in the inland lakes throughout the United States and British America. These fish are different in color in different lakes. From this circumstance anglers have believed them to be different in family. But investigation proves that the black and brown trout, the crimson spotted and the pickerel marked are all of one race. The Indian name was "fresh water cod." Anglers sometimes give them the name of "lake salmon" and "salmon trout." These excellent fish live in the deep water of the various lakes, especially where there is an abundance of smaller fish upon which to feed. They can be caught with flies and heavy tackle, but a good way is to troll for them with a spoon hook at the feeding hours. Lake trout are taken in quantity for the markets with gill nets. The white trout of the Maine lakes is fished for with an eight-ounce rod and single fly. Lake trout have almost disappeared from some of the smaller lakes which have been stocked with pickerel.

Virginia Hogfish.—This fish is found on the Southern Atlantic coast. It weighs from eight to forty ounces and is taken with a bait of bright fish, shedder crab or clam on a light bass tackle with medium hooks.



Weakfish.

Weakfish.—This game is known as squeteague and under various other local names. The best season for taking weakfish is between June and October. The game is found along the Atlantic coast and in tidal waters from Maryland to Massachusetts. Fish for them on the first of the flood tide with clam bait. Sometimes a white fly fastened above the clam bait will be taken. As weakfish are a mid-water fish with large mouths and soft jaws, it is well to use a large Carlyle hook of fine steel with a round bend, a float and a sinker connected to the hooks with fine gut leader. Shedder crab is good bait. A nine-foot bass rod with reel and one hundred yards of line are used as tackle.

West India Kingfish.—Sportsmen find this fish in Florida bays. It bites at a hook baited with bright colored cloth or at a squid. The angler uses a stout rod and reel. The hooks should be attached to a jimp snell.

White Bass.—This is one of the game fish of the Great Lakes and the upper Mississippi River. It usually takes an artificial fly. Use a five or six-ounce rod with light tackle. The fish weighs between one and three pounds.

Whitefish.—The Great Lakes contain millions of this excellent fish. They seldom take a hook, but are caught in pound nets usually. Lake herring and cisco are allied to whitefish. A pound net is simply a big seine stretched on poles which are arranged in a line, for five hundred or a thousand feet. The line of net ends in a circular pocket. When a fish runs against the net it noses along the seine seeking an outlet until it swims into the pocket. The fish is usually unable to find its way out of this pocket. Every day the fishermen draw up the pocket and ladle out the catch in scoop nets into sharpies or other flat-bottomed boats.

White Perch.—This perch frequents fresh and salt waters, from Massachusetts to Forida. It bites early in the fall, and makes good sport for youngsters, biting at clams, crabs and worms. Use a light bass tackle.

Yellow Tail.—Anglers along the New-Jersey coast call this excellent pond-fish "silver perch." It is a valued food fish in the South. It is most plentiful from May to November and is found on grassy shoals in bays. It bites at a bait of fish or shrimp. Use light tackle.

TRAPPING.

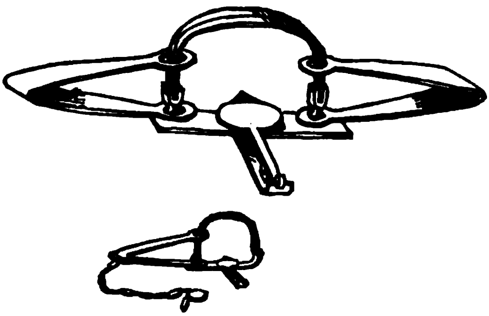
BY YALE BEACH.

A trap is a mechanical contrivance, worked either by a weight or a spring, which closes suddenly when interfered with, used for catching wild fowl and game. The animal is lured within the scope of the trap by placing in plain sight some morsels of its favorite food, and a trigger is arranged under the bait, which, upon being touched gently, will release the weight or spring and catch the game.

A great deal of amusement can be gained by boys, both on the farm and in town, in catching wild birds and small game alive with traps of their own construction. It is a pleasure to make the traps, and great sport to catch the game. Very often, too, the boys can do a real service by catching and slaying with a trap some wild animal that prowls around slyly at night or when the premises are unguarded, and destroys the garden plants or robs the chicken roosts. It would be tiresome, and is not always practicable, for some one to sit up all night several times in succession watching for a fox, or to spend a whole day hidden in the garden, gun in hand, waiting for the wild rabbit that is eating up the cabbages. To set a trap for the wily depredator saves time and trouble.

In the regular hunting of the standard varieties of wild game, which abound in the forests and in or on the waters of the country, it is not considered honorable and sportsmanlike to resort to the use of traps, except in special instances. To stop depredations, a trap is always allowable. To catch good wild fowl and palatable quadrupeds with traps is the device of poachers, law-breakers and mercenary market men. No true sportsman would be guilty of it, except in case of actual need. The animals which it is proper to trap regularly are (besides the depredators) ferocious game like bears and wolves, and fur-bearing animals like otter, mink and beaver.

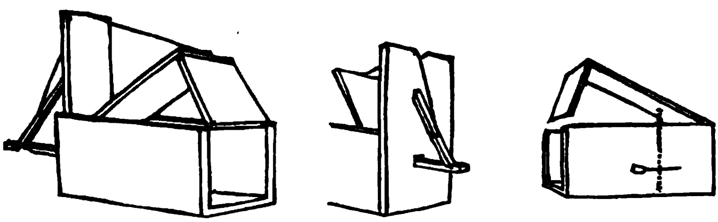
For continued use the manufactured steel trap is better than any home-made contrivance, because it is so durable, effective and cheap There are eight sizes of these excellent traps. The smallest is used for rat and woodchuck catching; the largest, weighing forty pounds for bears.



Steel Traps.

For occasional special use the amateur trapper will derive more pleasure from his work if he makes his own trap. In the selection of the proper apparatus for any special occasion, the amateur must be governed by the habits of his game. He must learn its favorite foods, its run-ways, and hours of prowling, and adapt his strategy to the facts thus ascertained. If he is at a loss to know what to do, let him consult some old settler whose experience will generally suggest the proper style of trap.

A number of the best and handiest traps will now be described.



Trap for Catching Them Alive.

Catch Them Alive Trap.—This is a good trap for rabbits or squirrels. The box is about twenty-four inches long and eight to ten inches wide, with a movable top and end, as indicated in the figure. The movable end should be made to fit snugly when the lid is closed. A figure-of-four trap trigger is arranged through a hole in the back of the trap, the lever being attached to a stout cord which connects with the upraised cover. When the bait end of the trigger is disturbed, the lever flies out of the trigger notch, releasing the cord suspending the uplifted box cover, and the game is bagegd.

A modification of this trap is made as follows: Instead of extending a trigger through the box, place a short trigger on an upright inside the box, and another upright resting on the upper side of the trigger to support the upraised lid. The least disturbance of this trigger causes the box to fall. See figure 3.

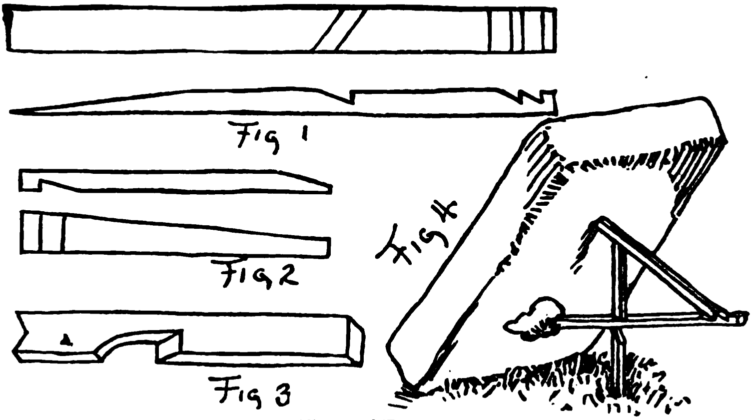
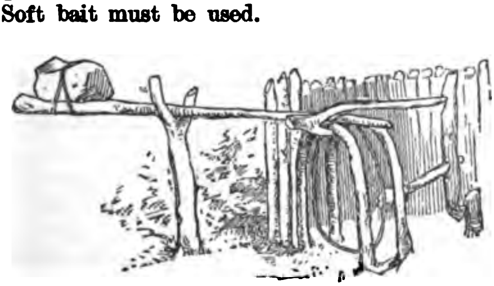


Figure of Four Trap.

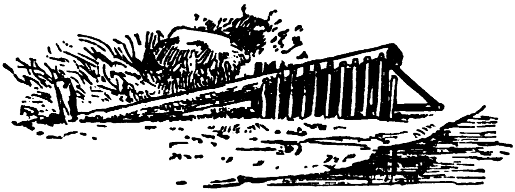
Figure of Four Trap.—One of the simplest, oldest and best of the "dead-fall" order of traps is a heavy stone or beam, supported by three sticks. These sticks must be prepared and notched as represented in the cuts herewith. The stick which forms the trigger is about twelve inches long, with notches a sixteenth of an inch deep; see figure I for two views of the trigger. The pointed end holds the bait. The lever is shown in profile and front view in figure II. Figure III is the perpendicular post. Animals caught in this trap are crushed to death instantly. Soft bait must be used.



Choker Trap.

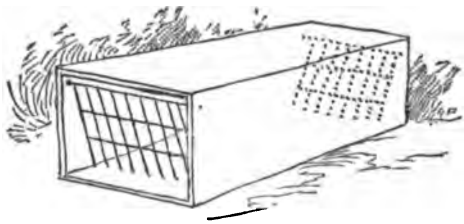
Choker Trap.—With a pocket knife and a piece of cord or wire this effective trap for birds or small animals may be readily constructed

The inclosure about the bait may be, say twelve inches in diameter, and the stakes eighteen inches high. The illustration will guide the trapper in the construction of his apparatus.



Dead Fall.

Dead Fall.—This is another crushing trap and a modification of the figure-of-four combination. Simply drive two parallel lines of stakes which are all of the desired height; the lines should be about a foot apart. At the end intended for the opening, into which the game enters, a figure-of-four trap is set, elevating a log which fits between the lines of stakes and is backed by a stake or stump at the opposite end. The figure-of-four releases the log which falls upon the game meddling with the bait.



Cell Trap.

Cell Trap.—Simplicity and effectiveness are the distinguishing features. A box or tin case is used, open at both ends with swinging wire doors. A muskrat, mink, squirrel or weasel will readily push up the yielding doors of the trap in quest for food. The doors open only one way (inward) and the fine wire is mistaken by the eager game as only a passing straw.

Hedge Snare.—Partridge and other game birds in walking through the woods will seldom fly over an obstruction, if there is an opening through which to pass. This preference enables a hunter to arrange a series of snares in a clump of woods abounding with game, and to capture a large number of quail and partridge by means of them, with sometimes a rabbit or a squirrel. A long line or fencing of bushes is planted, a foot or eighteen inches high, having a number of gateways in which the snares are placed. Copper wire or horsehair answers for a snare, and there is a cross trigger working both ways, set as seen in the cut. No bait is used. The snare is sprung by the bird pushing through the opening in the hedge. For illustration of a hedge snare see the picture at the beginning of this article.

The wholesale trapping of good game birds is not regarded as the act of a good sportsman. The writer in common with other hunters has destroyed hundreds of these hedge snares in the woods. If the hunter lacks the time for hunting, and he wishes for his table one or two of the good game birds which he knows frequents the woods down back of the farm, it will not be regarded as improper if he should catch just what he wants with a snare. But wholesale destruction is wanton murder and unsportsmanlike.

The horse-hair or silken snare is used to capture a great many singing birds. It is merely a running noose, so placed that, while feeding, the birds' feet will become entangled in the noose.

Among the Western Indians, birds are caught for the larder by an ingenious snare affixed to the top of a long pole. The pole is a reed the end of which is whittled off in exactly the same manner as willow whistle. The horse-hair noose is hung loosely over a twig placed crosswise over the top of the reed. The horse-hair back of the noose is tied to a short, slender trigger which is kept in position by one end resting on the twig referred to and the other resting on the side of the hollow reed. The end of the horse-hair passes down the hollow of the reed, out through a hole in the side of it, and down toward the ground, where it is fastened to a cord and weighted with a stone. The reed is planted in the earth, or thrust into an ant-hill, and is made to lean sidwise, so that the apparatus at its top will remain on the slope of the whittled-away end. The bird alights unsuspectingly on the perch and liberates the trigger instantly. The weight of the stone closes the noose around the bird's feet, and he is caught.

Wild Turkey Trap.—This is simplicity itself. A four-square pen is built up with sticks of wood, in corn-cob house fashion, and the top covered over with branches weighted down. There is a low opening left in one side, into which the turkey can just enter by crowding. Then kernels of corn are strewed along the path leading to the opening in the trap, and a few more are strewn inside. The unsuspecting turkey comes along picking up the corn and crowds into the rustic coop. Once in he never can find the way out, for the moment the corn disappears he lifts his head, and turkey instinct prompts him to try to get out through the cracks at the top of the coop. He never dreams of crawling out through a little opening near the floor. This trap, as will be seen, is different from all others in being simply a pen, and not a self-acting machine.

MODES OF CAPTURE IN SPECIAL CASES.

By common consent, it is proper to employ any means, the gun, the snare or the trap, to destroy animals which are dangerous to human life, or which prey upon the flocks and herds of the farm, or which are valuable for their fur.

The steel trap is generally employed for the capture of these varieties of game. It is strong and effective. Its construction is simple and continual use does not impair its value. And it can be more readily concealed from the game. Different sizes of traps are needed for the different animals. A short explanation of the baits which are used and the manner of placing the traps will be of interest to the amateur.

Bears.—A No. 5 Newhouse steel trap will hold the average bear. Use a heavy clog to weight the trap, that is, a chain attached to a solid piece of wood. Bait with some small animal or a bit of venison, setting the trap in a shallow hole in the ground. Cover the trap with leaves. Conceal the clog and chain entirely. Suspend the bait over the trap, scattering bits of meat upon the ground as a lure.

Badger.—Use a No. 3 trap, setting it at the entrance of the burrow, or within the entrance if practicable Fasten the trap to a long stake driven well into the ground to prevent the game from digging it up.

Beaver.—A No. 3 trap is large enough. After finding a beaver's resort, set the trap a few inches under water, burying it in the mud, leaving the pan free or covered simply with light dirt or leaves. Attach the trap to a chain long enough to permit the beaver to reach deep water. This chain may be fastened to a pole planted in deep water, down which it slides as the beaver seeks the bottom of the pool. This chain may be attached to a rope running to the surface. The beaver is unable to ascend to the surface, and he drowns.

Fox.—In open places, set a No. 3 trap so that the jaws will be even with the ground, placing roasted meat beneath and about the trap, and covering the jaws and spring with feathers or wood ashes The clog to which the trap is fastened is buried slightly in the ground. In the States where the fox is hunted with hounds, trapping is opposed by sportsmen.

Wolf.—The prairie wolf is taken in the same way as the fox. The big wolves in the Northern Territories are seldom trapped.

Woodchuck.—By covering a No. 2 trap with loose earth, grass and leaves and placing it near the mouth of a burrow, this pest of the farmer is easily taken. Their hides are useful and the flesh is often eaten.

Raccoon.—A No. 2 trap set along a stream in a coon country, with a frog, plucked fowl or fish hung over it, will capture a coon. The trap must be hidden from sight with a light covering of some kind and must be fastened by a chain to a stake or tree.

Otter.—Trout and similar fish make a favorite bait for the otter. Set a No. 3 trap in an otter trail in water. The securing chain must be arranged so that it will slide down a pole into deep water as in trapping the beaver. The otter must be drowned. If given the opportunity it will amputate its imprisoned leg in order to escape.

Mink.—This piratical animal is taken in a No. 1 trap with a fish, bird or some small animal hung over it in shallow water. The trap chain is arranged as in the case of a beaver to insure the drowning of the mink. This shrewd animal will amputate its own leg to escape.

Muskrat.—The cell trap, figure-of-four trap or No. 1 Newhouse trap will hold a muskrat. The steel trap is set under water at the regular landing-place, which every rat has, several inches below the surface, with a piece of fruit or vegetable fastened to a twig above it as a guide to the game. A cell trap may be set under water near the mouth of a muskrat hole.

Hawks.—The hen hawk can be taken with a small steel trap placed in some tree of scant foliage and baited with a bird or a chicken. Fish hawks will descend to a fish bait, and may also be caught with a steel trap. The trap should be obscured by leaves or grass.

Owls.—In setting a steel trap in a tree for owls, place the bait, consisting of a bird or mouse, six or eight inches above the trap. Owls usually perch below the bait in order to survey and investigate before eating.

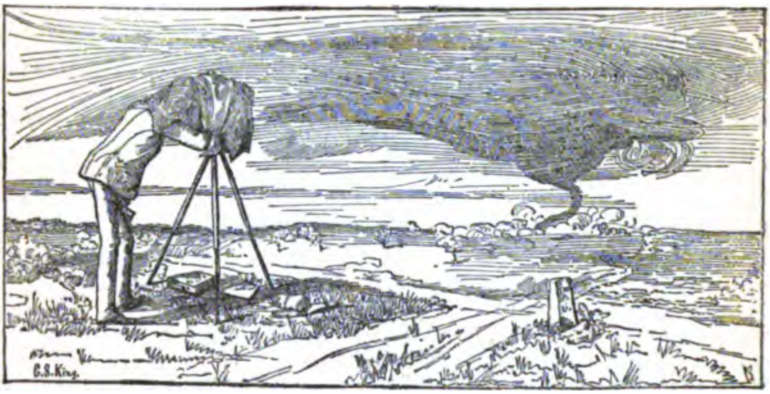
TREATING PELTS.

The professional trapper takes his game in cold weather and does not need a preservative in drying the skins. It is customary to draw the pelts over a stretcher, tacking them in position with the flesh side out

In removing the hide from the smaller class of fur-bearing game, the skin is opened first upon the inside of the hind legs from the ankle to the tail. This will permit the skin to be pulled over th animal's head without further incision or mutilation. In removing the tail, place the fleshy part between the jaws of a split stick and pull. The tail comes off nicely. The hide of the tail should be started at the base with a knife, when removed in this way.

Do not wash a fresh pelt in water, nor use salt, alum or saltpetre in curing it. The water causes decomposition and the salt and alum undue shrinkage. Let the pelt dry naturally, not in the hot sun, but in a moderately dry place.

The skins of bears, panthers, wolves and other large game are removed by incisions down the middle of the belly and the inside of the legs The pelt is stretched on a flat surface. Hides of deer, moose, buffalo and large game are stretched on the ground. Pegs driven through the edges hold them in position.



AMATEUR PHOTOGRAPHY.

BY JAMES HALL, NEW-YORK.

Aamteur photography has come into popularity since about 1880.

This amusement exercises a unique fascination upon its devotees. It has a charm peculiarly its own. It does not demand violent exertion, and it is adapted to men, women and even invalids, whose tastes run in the direction of ingenious amusements calling for skill and artistic taste. It promotes health, however, by enticing into fresh air and sunshine, and leading into pleasant tramps with a burden just sufficient to promote delicious fatigue. And it does far more. It draws its votary into the fairest spots of earth. It opens his eyes to the beauties of Nature as they never were opened before. It exalts the mind and cultivates the taste. Its chemistry educates him in delicacy, and suggests some beautiful and wonderful ideas to his imagination. It has as many adventures, comicalities and mysteries as a fishing jaunt or a hunt after the hounds, and it yields lasting souvenirs of summer rambles. The vine-flung cottage, the splendid villa, the sea-washed cliff, the pebbly beach, the yacht, the pine-pillared forest avenue, the mountain gorge and the countless other features of vacation haunts, which we like to remember and wish to describe afterward, are thus copied for us with ease and perfect fidelity. An infrequent visit to one's ancestral home, a long tour in other parts of the world not likely to be soon repeated, some unique trip, as in a balloon, can be improved to rare advantage by one who has a little skill in photography.

Men and women turn it to account also in business. Tourists illustrate the articles which they expect to contribute to magazines. Artists bring back from Nature no end of details and effects which can be worked into their canvasses in city studios. Geologists, physicians, lawyers, detectives and other people without number secure views of phenomena for future use and study, of inestimable value in professional labor.

The art of photography is one in the development of which men spend a lifetime, and still find something new to learn. Yet the elements of it are so simple that a child of ten can master them; and, indeed, it is surprising how expert the youngsters become in this sport. As for the more mature amateurs, some of them have produced results upon which professional artists look with envy. Recent improvements in processes and apparatus have simplified the work of taking a picture the most important step in this direction being the perfecting of the "dry plate," which is in many ways more convenient than the old "wet process." Cameras and the laboratory furniture are much cheaper and more portable now than formerly. One of the Vanderbilts has gone into this fascinating pursuit with such enthusiasm that he has spent thousands of dollars on his various instruments and appliances.

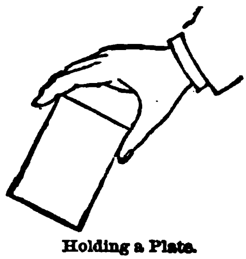
One wealthy New-York amateur is said to have laid out $10,000 in the last ten years on photographic apparatus; one-half of it in lenses alone. No doubt there are other instances of this kind. On the other hand, pictures have been taken with $2 toy cameras, although nothing cheaper than a $10 instrument is to be recommended, even for children. To this outlay it will be necessary to add $10 or $12 for other articles in the outfit. For between $25 and $40 one can get substantial and serviceable cameras, taking pictures measuring 5x8 inches with all the necessary utensils and chemicals for completing the picture. Many tourists prefer what is known as the detective camera, which costs from $50 upward, aside from the supplementary supplies It was a Scovill detective camera that the well-known author, William Hamilton Gibson, took with him during a South American tour, to secure illustrations for articles in *Harper's Monthly*.

Whoever meditates investing in photographic apparatus should learn as much as possible about the use and value of different parts of a camera, and decide whether or not he can afford this or that particular attachment. The cost of a camera does not depend so much upon the size of a plate it will hold, as upon its being fitted with various improvements. If the dealer can be seen personally (or if not, if he can be consulted by letter), a distinct understanding should be had in advance about these points. The buyer should also be careful to ascertain whether materials and appliances for developing and printing are included in any given outfit named in his price-list.

The following practical hints are designed for the novice (not the expert), to make the beginnings of his work easy, even if they do not lead him into those deeper mysteries which at first would confuse rather than help him. If scrupulously followed they will enable him to get good results. In the preparation of this article I am indebted for assistance to so competent an authority as Dr. Charles Ehrmann, associate editor of *The Photographic Times.*

It is hardly necessary to suggest that the beginner should carefully examine, beforehand, and in a good light, the mechanism of his apparatus. He will also find it convenient to prepare most of the chemical solutions several hours or days in advance and keep them in stock. This saves time when they are needed. Formulas for these come with the outfit. But there is one thing which neither the artist nor any of his curious friends should attempt to examine except in a red light; and that is the "dry plate."

The whole art of photography turns upon the exquisite sensitiveness to light, imparted by certain chemicals to a gelatine film on one side of a glass plate. The utmost precaution must be taken to protect that film from the least ray that is not first robbed of its actinic quality by filtering it through red glass or paper, until at the right moment a sunbeam enters the camera and paints a picture. Hence arises the necessity for a "dark room." Windows and transoms must be avoided; if they exist they must be blanketed. By waiting until night for putting plates into holders, or developing, one can sometimes



Holding a Plate.

operate in a room not available by day. Even then, artificial light, not properly strained, is to be excluded jealously.

An item in the photographer's outfit is the "ruby lantern," for use in the dark room. The maker uses glass not only of the right color but also of a special quality—what is known as "copper-flashed"; and although in emergency a safe light may be obtained in other ways, it is better to stick to the ruby lantern. Several thicknesses of deep-red tissue paper or two of "post-office" paper may be wrought into a hood to go over an ordinary lamp or gas-globe in such a way as to keep the white light from falling on the ceiling or other surfaces and being reflected thence on to the plate. But even experts are deceived sometimes about the quality of the paper, and the thus obtained light proves ruinous. Even with the right kind of ruby light, however, the operator should learn to use as little of it as possible. With a little experience he can put plates in the holders in absolute darkness.

At this and all subsequent stages of the work, the plate should be held by the edges, and the surface should be touched only when absolutely necessary, and when both it and the fingers are dry and clean.

The plate should be carefully dusted when put in the holder, and fixed in place film side upward. The eye quickly learns to distinguish between the lustreless, dead white emulsion on one side, and the bare glass on the other; but the difference can be told in the dark by the touch.

The holder is usually made to receive two plates. When one of these has been "exposed," it becomes difficult, without special precautions, to tell which plate has, and which has not, been so used. In some holders, therefore, the covering slides have one color on one side and another on the other. Or the opposite sides have other distinguishing marks. Then when a plate is first put in, the slide is inserted one side up. After exposure it is put back with the other side outward.

The amateur usually confines his earlier work to landscapes. He does wisely in this; for outdoor work is easier in many respects for the beginner.

Having filled his holders with plates, he finally takes his carrying case and folded tripod in hand and proceeds to the field of operations. There he unpacks and sets up the camera.

It is of the utmost importance now that the light should fall upon the scene or object to be photographed from some point behind or to one side of the operator. Better effects of shadow can be secured by having the light come slantingly from the observer's rear. It should never come from in front, nor have a chance to shine into the lens.

When practicable it is well to make preliminary surveys of a field of operations, and fix in the mind the precise view which it is desirable to obtain, and the exact spot from which to obtain it. This sometimes saves time at an hour when every moment counts. To secure a desirable point of view is by no means always an easy matter.

For instance, one of my earliest efforts in photography was in the copper mining regions of northern Michigan. In approaching Hancock by steamer, I noticed on the slope along Portage Lake a picturesque old ore mill that seemed to be all roof and dormer windows on one side. Next morning, apparatus in hand, I started from my hotel to get a picture of it. I tramped two miles, mostly through sandy or stony paths, across lots here and over fences there. Reaching the point I was seeking, I found that the sun would not shine advantageously on the building until afternoon. Had I studied the points of the compass carefully in advance, I might have saved myself the time and discomfort of that jaunt. Practically the forenoon had been wasted. After a midday dinner I returned to the scene. I now kept to the westward of the quaint old structure. The lights and shadows fell just right. But here a new difficulty arose. Between me and the mill there loomed up a huge heap of refuse stone. To get this unsightly obstruction out of my view I wandered down the sloping hillside to my left, lugging camera and tripod, and picking my way cautiously over the uneven ground. This would not do. I could not

---

*The illustrations in this article are furnished by the Scovill Manufacturing Company, New-York City.

see the mill; at least enough of it. Then I climbed the rugged ascent to the right, and tried again. But still that pyramid remained. I next considered how to make it obscure the least important part of the scene, seeing I could not get rid of it altogether. I set up the camera a dozen times, shifting it a little this way and then a little that, with a melting heat pouring down upon me from the heavens above, and my afternoon rapidly slipping away. At last I thought I had the exactly right point of view. But suddenly I discovered a clothes-line, hanging full of underwear which flapped gayly in the light breeze, right in the corner of my picture. It became necessary now to move again. Simply to turn the camera where I stood would not answer. I prowled like the Wandering Jew for another half hour, and once more thought I was satisfied. But still another difficulty presented itself. I had lost from the view a fine clump of pines, which were one of the most attractive accessories of the outlook. To accomplish all the objects I wished to at once seemed almost impossible. Meantime, from a neighboring house, a colony of children came out and sat on the stone wall; and while with startling frankness they discussed my mysterious performances, the head of the family appeared under the shadow of a tree and became an equally interested, even if more reticent, observer. I have often wondered whether he thought I was crazy when he saw me take out a stout jackknife and begin mowing a path into a dense clump of tall weeds, from the heart of which to make one more observation. The task consumed nearly half an hour. From this point ultimately, just as the sun went down, I obtained a frantic sort of picture; and when I had done so it took at least thirty minutes more to remove from my clothing several hundred small burrs which I had acquired in this final effort. So far away were the other objects which I wished to photograph in that vicinity, that it was now too late to reach them.

The first step in taking a picture is to see that the camera is perfectly level. This can be obtained by shifting the legs of the tripod properly.

The lens is now uncapped, and the operator looks at the ground glass plate on the back of the camera, covering his head and the instrument with the "focussing cloth," to exclude the light. A blurred image appears on that plate. By sliding the movable front forward and backward, this will grow more or less distinct. Do not be surprised at seeing the picture upside down. This is as it should be. When the view has become tolerably clear, shift the apparatus about until the picture indicates just what you want. Do not try to crowd too much into it. Get the one or two salient features of the view first, and then the right accessories. Now resume your efforts to secure the utmost possible distinctness by regulating the distance between lens and ground glass. In this process look for minute details like the slats in a shutter, filagree work, separate leaves of a tree or vine, corrugations in the bark, blades of grass or other trifles.

It will pay to have each side of every plate-holder carefully marked with a number: "one" and "two" on opposite sides of the first; "three" and "four" on opposite sides of the second; and so on. Then expose plate number One first, number Two next, and observe that system always.

Cap the lens; remove the ground glass; substitute a plate-holder; see that it fits up snugly, leaving no crack to admit light; keep the rear of the instrument carefully hooded with the focussing cloth; and, as a final preliminary to exposure, draw the slide and lay it on top of the camera. Guard well with drapery the crack left by this removal.

Now make your exposure by deftly uncapping the lens, counting the seconds carefully, and then restoring the cap. The slide must be put back into the holder without uncovering the crack. Do it by the sense of feeling alone. If there is any difference in the sides of your slide, put it back so as to turn the other surface out now. Its color, or some other distinguishing mark, will then warn you not to expose that plate again.

At this point you pause and jot down in a notebook or elsewhere, the number of the slide just used, the view taken, the length of exposure, time of day, state of sky, the "stop" used, and other facts that you may want for future reference. Some slides have a blackboard surface for this use. Then you may remove the holder, put

The Plate-holder Slide.

on the ground glass and focus the camera for some other view. When you use that holder again be sure to apply the other side of it to the instrument, so as to expose the other plate.

In buying plates the beginner should ascertain from the dealer how "quick" they are, letting him know first with what sort of camera and lens they are to be used. It is well at first to use a plate requiring five or ten seconds in a good light, out-of-doors. There are dozens of dry plate makers, and each maker has several grades of sensitiveness. The beginner, having once used one style, should not change without knowing the difference in time required for exposure. Information obtained from the dealer on this point must be supplemented by a little experience.

The photographer soon learns to discriminate between different qualities of light. A plate requiring only five seconds at noon may need seven or eight seconds at 8 a. m. or 5 p. m. In winter the light is weaker and a longer exposure required than in summer. Again, two or three times as long an exposure is needed on a cloudy day as on a bright one. There are countless gradations of intensity to light, and exposure must be regulated accordingly. A sunny sky is preferable to a gloomy one, as it gives better lights and shadows. Many amateurs, at the outset, make two exposures of different lengths for the same view, and note the contrast when the plates are developed. It is a good plan to do this always if in doubt about the right length of time, and if the view cannot be easily duplicated later.

A point worth remembering, too, is that distant objects, like mountains, require less time than those close at hand.

Sometimes, in architectural views, the operator will discover in his finished picture, if not on the focussing plate, that a structure will seem narrower at the top than at the bottom, or two houses will appear to lean toward each other. This is because the rays from the upper part of the scene have to travel further than those from the lower part to enter the camera. If the artist were on the house-top, taking a picture of buildings across the street, this trouble would be reversed. To guard against such embarrassments the backs of some cameras are pivoted so as to swing a little; and by changing the angle of the "swing-back" the perspective is corrected.

A similar difficulty, occasionally met with, is the curvature or distortion of straight lines, especially perpendiculars, near the edge of a picture. This is incident to a single achromatic lens. Until a "rectilinear" lens, which is a combination of lenses, and costs much more, is used, the amateur would do well to select subjects in which there are few conspicuous straight lines. Still, not only good landscape work but some excellent views of houses may be obtained with a single achromatic lens.

The sliding front with which some instruments are provided is designed to raise or lower the lens when the picture falls either too high up or too low down on the plate.

Occasionally a subject is high and narrow, instead of broad and low. To meet this exigency the camera is sometimes made to turn over on its side; or else the back part revolves. At times this "reversible" provision is a great convenience.

Pictures can be taken by moonlight; but in this case hours are required for the exposure where seconds would suffice by day. There is an instance where one evening a man set up his camera, took aim and uncapped, went to a theatre, attended a supper after the play, returned at 2 o'clock in the morning, capped, shoved in the slide, and developed next day; and found he had a very fair view.

Electric light and calcium light may also be used; but when these are used only a professional artist or an experienced amateur can expect good results.

A streak of lightning has been photographed by aiming the camera at that part of the horizon where the storm seemed to be raging, focussing as well as possible on distant objects, and then exposing to the invisible scene. After the thunderbolt has fallen the lens is capped and the plate treated as usual.

Interiors of houses are more difficult to photograph than landscapes. It is not always practicable to make the light fall just where you want it, and it is difficult to blanket certain obtrusive windows that will be almost in front of your camera. Moreover, no two rooms in the world, probably, are equally lighted; and it is difficult for any one but an expert to say how long an exposure is necessary in a given apartment. It may range from ten seconds to ten hours. An amateur has been known to darken his parlor, expose a plate right after breakfast, lock the door, go to business, come back at night, cap the lens, eat his supper, and then develop the plate, with good results. This was the result of special advice adapted to his case, however.

For portrait work one needs much skill in handling lights, as well as the assistance of a good lens. For this and other reasons the amateur should not undertake this branch of the art until after proficiency in out-of-door views.

In order to photograph moving objects, like a cannon ball, a rolling wave, a trotting horse, or a tornado; to get a good view of stationary scenes from a moving railway train, steamboat or balloon; or to capture a fleeting expression of countenance, a very sensitive plate and an exposure of less than a second is necessary. To accomplish this, an "instantaneous shutter" is fitted to some lenses. This device is operated by a spring, the swiftness of its motion being regulated by a simple adjustment. While focussing, the shutter is fastened open, and then

Instantaneous Shutter.

Stops.

closed and set, like cocking a pistol, to go off at the touch of a trigger. Instantaneous work cannot be done with a cheap lens. The shutter is therefore fitted only to the more costly cameras.

In time, in doing very fine work, the photographer learns not only to regulate the length of exposure but also the quantity of light entering the lens. This he does by using diaphrams or "stops," having aperatures of different sizes in the lens-tube. With the cheaper cameras one medium or "universal" stop is employed; and the amateur does not have to give it any thought. A set of stops (as well as an instantaneous shutter) goes with a superior lens. A small stop makes the plate work slower than a large one, and is desirable for distant views and a strong light. The larger one is preferable for a weak light, for near objects, interiors and instantaneous work.

Paper instead of glass is now coming into use for plates; the great advantage being that a continuous roll of sensitive surface, long enough to take twenty-four pictures in succession, can be put into the camera and be manipulated with a thumb-screw without once removing the holder. This does the work of twelve double plate-holders, saves space and weight and time, and is a great convenience. Moreover, the paper negative cannot be broken by a fall or rude shock, like glass. A special roll-holder is necessary, which costs more than the old kind. For experiment these paper films can be used in an ordinary holder, first being mounted in a "film-carrier" to keep them flat and stiff. Previous experience with glass plates, however, is desirable before trying paper.

Cameras have been made so small as to be concealed in one's hat or waistcoat, from which retreat they can be successfully operated unknown to the observer. A much better arrangement for secret photography is the detective camera. This dispenses with a tripod (although it may be mounted on one if occasion require); is provided with a quick lens and instantaneous shutter, is small and compact, and is disguised to look like a morocco case, such as a physician might carry. One can take it on the cars, through the street or elsewhere in public, ready to take a picture at a moment's notice, without exciting suspicion. It is not always available inside of buildings, for instance in the court room or near the rostrum. The light may not be strong enough there for rapid work. But in the open air, orators, processions, criminals, fugitives, a person in some ridiculous attitude, and other objects and scenes can thus be photographed without the knowledg or consent of any one. A man does not always want to excite comment or curiosity by advertising that he means to take a picture, even when his motive is proper. On account of its great convenience the detective camera is used by many artists, literary and business men, and scientists.

President Cleveland, who had avoided the photographers, was successfully taken by a college boy during a summer visit to the Adirondacks with one of these little cameras. He held it in his hand, standing in the door of the boat house, as the President approached. The President was curious, looked at the box, and was taken in a flash.

An opening is disclosed in the box into which the operator glances; and a mirror and small lens are so arranged that they will show him when the apparatus is pointed in the right direction. This device, called a "finder," obviates the necessity for holding the box up near the face, or of crouching down behind it, thereby attracting attention. A plate-holder is hidden in the box, and the slide is drawn unobserved. Pressure on a button works the shutter like a flash, and the game is bagged. The holder can be changed without attracting attention in a moment or two, and the machine is ready for another shot. The finder, in a slightly different form, may be put on any camera, and is useful in telling at what moment to spring an instantaneous shutter for a "shot" at some passing object.

The picture which the sun has painted upon the milk white gelatine film remains invisible until it is "developed," and this delicate and critical process can sometimes be deferred for weeks.

The amateur now comes to an important and fascinating stage of his work. The hidden image is to be brought out, by chemical treatment, and "fixed" so as to be safe from any further influence from light. These two operations are conducted at one session in the "dark room." That apartment must always be provided with running water. If a regular tap like that in the pantry and bedrooms of a city house be lacking, the amateur can improvise one by inserting a small faucet into a big pail and arranging it over a sink or another pail. The various "stock solutions" have previously been prepared and the bottles carefully labelled. When, in order to save space, these liquids are made of double or quadruple strength, this fact should be carefully noted on the label, so that they may be properly diluted when used. Most of these solutions, already prepared, can be obtained from dealers. All the operator's utensils are conveniently arranged before shutting out the white light and resorting to the faint glow of a ruby lantern.

A plate is now taken from the holder and laid in the developing tray, and the developer is poured in upon it. Pains must be taken to have the film side upward and to submerge the whole plate at once, so as to effect the surface evenly. Do not use more developer than necessary; you may want to dilute it or throw it away before treating the next plate; although, usually, it is best to keep some old developer on hand in a separate bottle. If any air bubbles adhere to the film, touch them gently with a soft, fine camel's hair pencil. Avoid, however, as far as possible, touching the surface. While awaiting results it is well to keep the tray covered with pasteboard, especially if the plates be rapid (very

Developing the Negative.

Drying Rack.

sensitive). Or the ruby lantern may be placed so as not to shine too strongly on the plate, except at intervals, when inspections are made.

Errors in the length of exposure can, within certain limits, be corrected in development. An under-exposed plate will need prolonged treatment, and will stand "forcing" or "accelerating." An over-exposed plate is in danger of developing too quickly and should be given weaker treatment. Vogel says that in development errors of over-exposure can be more readily controlled than those of under-exposure; but both are to be avoided as far as possible.

Development requires anywhere from five to thirty minutes. In exceptional cases the minutes lengthen to hours. If the outlines come out with much distinctness in less than forty-five seconds, progress should be checked. If that period elapse without any change at all in the film, then matters may be hastened. Suppose the amateur is using the pyro-carbonate developer. For the trouble first named he uses a little more of the pyro solution; in the latter case, more of the carbonate of soda. With developers of other kinds the method differs in detail, but is the same in character. With the ferrous-oxalate one puts in a few drops of a weak solution of bromide of potassium to restrain, and a little more of the iron solution to accelerate. With the pyro-ammonia, one adds a few drops of ammonia to force matters; to restrain, he shifts to another bath containing less ammonia, or old, weak developer. In every case of addition to the mixture, the liquid should first be poured from the pan to a graduate and there "doctored"; not in the tray. Cautious photographers often begin development with old developer, or the new made purposely weak. This takes more time, but yields better results. Patience pays in this work. In the pauses between peeps at the plate, keep the tray gently rocking.

As on the ground glass focussing plate, so now on the film, your picture is reversed. This is all right. In the evolution of the image, "high lights"—the sky, sunny faces of white objects and bits of blue, will begin to show first, turning dark. The other features of the scene, foliage, shadows, black clothing and other sombre colors, will remain white. Direct your attention mainly to the latter, after the first few minutes. Look for details there, like twigs and sprays in the depths of a leafy mass, seams in the bark of an almost hidden tree, joints in masonry, a shaded lattice, or carvings. Wait for distinctness here, if it takes a quarter or half an hour. One has to be guided entirely by the eye in development. No prescribed time can be given. When the shadows show plenty of detail; when the film ceases to be white, but is of gray tints; when the picture, after showing quite distinctly on the surface begins to grow dim; and when, holding the plate between you and the red light, with the under side toward you, the picture still shows good "detail," then you may wash the plate and put it into the fixing bath.

A word here about developers. There are many kinds. Each has its merits. Some of them entail risks, and should be used only after experience. That made of sulphide of sodium, pyrogallic acid and carbonate of soda is one of the safest for beginners. Directions for mixing go with the supplies.

The "fixer" is a solution of hyposulphite of soda. Some photographers think when a plate is put into this liquid it is safe to let in the white light. Nevertheless, it is safer not to. The usual direction for fixing is to leave the plate in the bath until every bit of the white cloud has disappeared from the under side of the film. But it is well to prolong the process several minutes thereafter. It cannot be overdone, and may be underdone.

After fixing, the plate generally goes into a bath of alum water, in a third tray, for ten minutes, before being washed and dried. Some amateurs omit this "tanning" process; and also neglect, after the plate is dry, to varnish it. These precautions are not absolutely indispensable; but they are both desirable, as they harden and protect the film from moisture and wear in the subsequent work of printing and handling.

When fixed, the plate may be exposed to white light, if desirable for scrutiny.

The negative must now be washed thoroughly, being handled with great care. This operation is necessary to remove not only the liquids on the surface but also chemical salts embedded in the gelatine. Some films are harder and hence require longer soaking than others. Holding and turning them under a faucet for half an hour or more keeps the operator so long from other duties that he will find it convenient to obtain a special box in which he can place several negatives at once and leave them under a running stream as long as he likes; over night, if necessary.

In all these processes, carrying a drop of one liquid into another must be avoided. To this end fingers should be washed when transferred from one tray to the other; and pans and graduates should be similarly treated before pouring in any solution. Hyposulphite of soda, particularly, is a notorious mischief-maker outside of its own realm. Hence the necessity for cleaning all dishes thoroughly when one is through developing. For safety, some photographers mark the under side of each tray so as to use the same one always for any specific purpose, like fixing.

Negatives, after washing, are left in a rack to dry, and sometimes varnished. While drying they must be kept from dust.

Paper negatives are handled much like glass ones. Before being put into the developer, however, they are made limp by wetting in clear water to make them lie flat. If wholly submerged, one may be placed on another. The development, with a paper negative, should be continued a little longer than would suffice with glass. After fixing and washing lay it face downward, like a plaster, on a smooth surface—a special hard rubber plate is used for this purpose—and with the fingers or a "squeegee" press out all superfluous water. Leave it to dry. Next day remove it, lay it face downward, and rub the back with castor oil or "translucine" to make the paper transparent. In this case varnish is unnecessary. It is, however, employed sometimes when the film is "stripped" from the paper. Paper would better be left until the art of making a glass negative is mastered.

The novice should, if possible, compare some of his first negatives with two or three made by an expert photographer, in order to know just the look of a good negative. This knowledge is essential in developing. If the beginner can get some of his poorer efforts criticised and interpreted by a more experienced friend, especially by a professional artist, so much the better. Some amateurs get a regular photographer to develop their first plates, and stand over them to watch the process.

Weak "high lights" and clear glass for shadows may be due to insufficient development. If development is continued so that the lights come up good and strong, and still there is no detail in shadows, there has been under-exposure.

Marked contrasts between lights and shades, if there is plenty of detail, are desirable; but if the difference is very decided, and there is no detail, the development was probably too rapid and the solutions too strong.

If the plate looks weak and thin all over, yet with detail enough, and especially if there be a faint gray fog over it all, it has been over-exposed.

A patch of fog, especially if thick, shows that white light has been allowed to fall on the plate carelessly, or has strayed into the lens from some reflecting object. Fog is sure to result from exposing with the camera fronting the light. If the whole plate looks thick, it may either be badly fogged or over-developed.

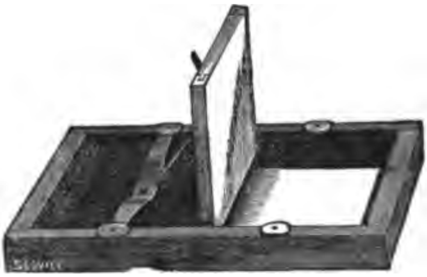
Blurred outlines may indicate that the camera was jarred or the object moved during exposure.

Pinholes usually mean that particles of dust adhered when the plate was exposed, or bubbles in the developer.

When the negative is not a reverse of the view, as it should be, it was not put into the holder film side up.

Streaks of sugary powder across the plate are usually due to imperfect washing after fixing.

The final stage in the completion of the picture is "printing." By this process any number of copies desired are obtained from one plate. In the negative lights and shades are reversed; so, too, are the right and left of the whole picture. In the print, all comes right.



Printing Frame.

Paper whose surface has been made sensitive by certain chemicals is placed under the negative, and exposed to the sunlight. That agency works slower now than it did with the gelatine film, but the length of time given it needs to be regulated by its strength, and also by the "density" of the negative. Pains must be taken to place the film side of the plate in immediate contact with the paper; or the print will be blurred, and the view, like the negative, will be reversed. The light strikes through the transparent portions of the image and darkens the paper; the opaque parts protect the paper and leave it untouched, or nearly so. If the printing frame is large enough to hold two plates at once, side by side, negatives of equal density should be selected. It is well to keep each negative in a separate envelope, and, after printing, to jot thereon the number of minutes required and the quality of light used, for future guidance.

The ordinary brown photograph is made on "nitrate of silver" paper. This has the advantage of being susceptible of examination occasionally during the printing process, to discover whether the image is strong enough.

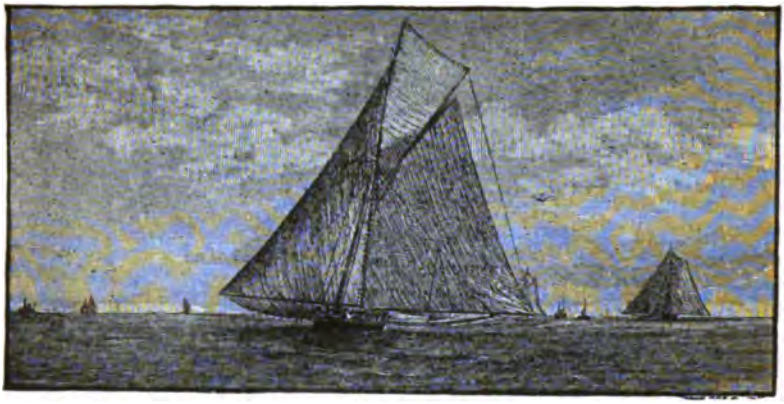
The print should at first be made darker than is desired, to allow for bleaching later. Then the paper is wet to make it limp, and is put through the toning and fixing baths. Directions for use accompany the toning preparation. It is a solution of chloride of gold. The fixing liquid is the same as that used in fixing a plate, but should be mixed fresh for prints.

Toning and fixing are unnecessary with ferro-prussiate paper, which gives a blue print. This needs only to be washed ten or fifteen minutes, and dried between two sheets of blotting paper.

For printing at night "bromide paper" is used. This is exceedingly sensitive. Exposure within fifteen inches of an ordinary gas jet, for one or two seconds, does the work. It is necessary, therefore, to handle this paper during the preliminaries only in a faint ruby light. This print does not show, any more than the image on a gelatine film, until developed. The oxalate-iron developer is preferable for this.

Transparencies and magic lantern slides are obtained by printing with negatives upon ordinary dry plates, instead of upon paper. The print is then developed and fixed. The "potash" developer is among the best for this purpose.

Amateurs, from inexperience or lack of time, sometimes have a professional artist make and mount their prints; but when one has secured success in this branch of the work himself, he takes greater pride in his artistic labors.



YACHTING.

BY HENRY HALL.*

SAILING, purely for recreation, was formerly the amusement of kings, nobles and rich civilians. The sport originated in the mild climate and on the smooth waters of the Mediterranean Sea. The rowing galleys of Egypt, Greece and Rome led the way.

It was in England, two or three hundred years ago, that yachting first took a distinct form as an organized amusement. The name came from the Netherlands. The old Dutch "jagt" was, as its name implies, a swift vessel for the chase of pirates and smugglers; and although the round-bottomed, bluff-bowed, single-masted vessel of those times would be slow now, the jagt was fast in comparison with other vessels. The Dutch were the masters of the sea in that distant age, and not only covered the North Sea with their fishing boats, but traded to every part of the known world and explored the parts unknown. From the Dutch, the English gentlemen bought yachts and used them for pleasure sailing. In 1660 the Dutch presented to the English King, Charles II., one of their fine yachts; and the first race on record is that between Charles and his brother, the Duke of York, on the Thames, in 1661. The King was fond of the pastime. From 1666

* Much of the material in this article was collected by the writer while engaged in compiling for the United States Census of 1880 the report on the Shipbuilding Industry of the United States, a work which took him to all the shipbuilding coasts of the country. Several experts have contributed special papers to this article, relative to branches of yachting, with which they are particularly identified.

to 1683, no less than fourteen yachts were constructed for his own use. They were of the Dutch pattern, and England thus began with the "skimming dish" type of yacht, which now she urgently descries.

The first organized club was formed by a number of men at Cork, Ireland, in 1720, under the title of "The Cork Harbor Water Club." In 1810 the English formed a similar club at Cowes.

The Royal Yacht Club originated in 1815, when forty-two men in London organized "The Yacht Club," with this condition of membership, that the owner should have a vessel not smaller than ten tons in measurement. The headquarters were at Cowes. The organization became popular and grew in membership. It was joined by many noblemen. In 1818, naval officers became eligible to be chosen honorary members. This made a national affair of the club. In 1820 George IV. became its patron and the name was changed to "The Royal Yacht Club." In 1828 there were 117 regular members and 334 honorary, and 96 yachts aggregating 6,721 tons. William IV became the patron in 1830; and at his command the title became "The Royal Yacht Squadron." The object from the start was to obtain the highest degree of excellence in the construction, rig and model of these vessels of which they were capable. Soon after Victoria ascended the throne of England she became the patroness of the club, and she has continued the plate of one hundred guineas for the annual regatta at Cowes to the present day, excepting only one year, when the Prince Consort died. The rig of the different yachts was greatly varied, as will be shown by the list in 1850, which included one brig, forty-three schooners, thirty-nine cutters, seven yawls, two luggers, a total of ninety-two vessels measuring 9,412 tons by the rules then in vogue. The annual regatta has always taken place in August or September at Cowes.

It is frankly admitted by English historians that the first improvements in the forms of vessels came from America. The old forms of English pleasure craft were similar to those of the merchant vessels. The boats were broad in beam, round on the floor, bluff in the bow, and shallow in draft; and the greatest beam was 10 per cent forward of the middle of length. They had the "cod's head and mackerel tail" form of model upon which so much admiration was once lavished. The dimensions of a few of them will be interesting. Dixon Kemp gives the following measurements of the yachts of Charles II.:

Name.	Length, in feet and in.	Beam, feet.	Draft, feet.	Tonnage.
Isle of Wight	31	12½	6	25
Queenborough	31.6	13.4	5.9	29
Jamaie	31	12.6	3.6	25
Navy	48	17.6	7.1	74
Monmouth	52	19.6	7.4	109
Cleaveland	53.4	19.4	7.6	107
Merlin	53	19.6	7.4	109
Katherine	56	21.4	7.9	135
Kitchen	56	21.4	7.9	135
Isabella	60	18.11	7.9	114
Charlotte	61	21	7.10	143
Fuffs	63	21	7.10	148
Henrietta	65	21.8	8	162
Mary	66.6	21.6	7.6	166

Fincham cites the following measurements of a few English yachts in 1850:

Name.	Length, in ft. and in.	Beam, feet.	Draft, for'd & aft	Displacement.	Greatest beam for'd of middle of L. of w. l.
Breeze	56.8	15.45	6.1— 8.3	56	2.75
Emerald	57.8	18.8	6.4—10.9	92	4.24
Tern	59	15.5	6 — 8.2	62	3.76
Nautilus	63	19.2	6.6— 9.4	95	5.88
Pearl	65.3	19.54	6.10—11.4	127	6.25
Novice	65.6	16.8	6.4— 8.9	83	4.60
Fair Rosamond	75.5	19	7.2— 9.9	117	7.2
Coquette	76.2	21	10.4—10.10	185	....
Lotus	88.4	21.58	8.6—11.6	201	10.4
Xarifa	90	21.9	9 —11	235	*0.56
Erminia	92	22.6	9 —12	228	8
Falcon	102.8	27.4	12.9—13	434	10.86

* In Xarifa the greatest beam was aft of the middle of length.

For various reasons the Americans of the period after the Dutch had relinquished New-York, were not content with the round-bowed, full-bottomed models of their ancient craft. They needed fast boats to carry fish to distant markets and to trade to and from the West Indies, a traffic in which they were apt to be chased by European privateers. Before 1800, the Americans had already adopted the fashion of long, deep and comparatively narrow craft. The exploits of their vessels reacted on the English models, as can be seen by the differences between the yachts of 1666 and 1850 which are named above. It is singular that the English have gone right on narrowing and deepening their yachts, while the Americans have, for good and sufficient reasons, returned in their pleasure yachts to the wide and shallow type.

The tendency in England toward narrow beams has been due to the operation of two causes: First, their rules of tonnage measurement have taxed beam. In order to evade the rules the builders have narrowed the width and increased the depth, thus retaining the actual cubical bulk of hull while putting the vessel into such a shape that it would measure less than the actual size. In races the large vessels have always been obliged to grant a certain amount of time to the smaller ones, in order that they can all sail against each other on pretty nearly equal terms. The rules of measurement chiefly have led finally to the extraordinary narrowness of beam and the great rake of stern post seen in English yachts of the present day. A second cause has been the discovery that deep vessels are better for open ocean cruising than the shallow ones. The cruising ground most popular with Englishmen is the Mediterranean Sea; and in order to reach that body of water they must first face a long stretch of the open Atlantic Ocean. So they must have yachts that can make an ocean voyage. Both causes combined have produced finally the deep and narrow English keel yachts, with ballast stowed low down, as much as possible of it in a solid casting of lead or iron in the keel.

Improvement in the form of vessels began in America with sharpening the floor, deepening the vessel in the water, lengthening the hull and building on a longer bow. These changes resulted in the production of a fleet of long, low, fleet brigs and schooners, which could distance the fastest men-of-war afloat. Finally, the broadest beam was moved back from its ancient place at two-fifths the vessel's length from the bow, first to the middle of length and then to a point aft of the middle. This enabled the Americans to introduce the long, sharp, wedge-like bow, with slightly hollow entrance, which experience has since proved to be essential to great speed. In substance, by successive changes, which began before the war of the Revolution and continued for a hundred years, the Americans finally turned the old model clear around. They pointed the "mackerel's tail" forward, and the "cod's head" aft. The old style of hull would have sailed faster backward than forward. The truth of this was well proved once by a large American ship which was taken aback at sea; the crew being disabled were unable to bring the ship around; and the vessel was successfully and rapidly backed to a port nearly 200 miles away. The new style of vessel sailed faster in a forward direction. About 1840 the new ideas as to model were introduced into the pilot boats and yachts of New-York City, with the result of producing a number of boats which afterward became famous for their speed and beauty.

The period from 1840 to 1850 and for a few years afterward was one of great distinction for the maritime interests of America. The shipping of the United States had been fostered by an admirable system of protective legislation, and this country ranked as the second maritime power in the world. She seemed close upon becoming the first. Her sailing clippers were the largest, finest and fastest of the world's merchantmen, and in order to compete with America on even terms the English owners were compelled for many years to have their clippers built on this side of the ocean. This was the golden age of American shipping. It was during this period that the fast American pilot boats and yachts came into existence, and that organized yachting began at New-York.

In 1850 some of the yachting men in New-York conceived the idea of sending to the World's Fair in London in 1851 a specimen American yacht, which should show to the world the progress this country had made in shipbuilding. George Steers was employed to model the boat, and she was paid for by J. C. Stevens, then Commodore of the New-York Yacht Club, Edwin A. Stevens, Hamilton Wilkes J. Beekman Finley and George A. Schuyler. The contract was tha the new boat should beat any yacht afloat, the builder to receive $30,000 if the stipulations were fulfilled. W. H. Brown, of New-York, was the builder. This boat was the famous America.

The America was a keel schooner, with raking stem, rounded away at the forefoot, plumb stern post and straight keel, the draft being about six feet forward and eleven feet aft. Her length over all was 94 feet; on the water line 87 1-4 feet. Beam 22 1-2 feet. Depth at deepest point to top of keel, 8 1-6 feet. Displacement, 146.6 tons ballast, 45 long tons. Mainmast, 81 feet long, raking 2 7-8 inches to the foot; maintopmast, about 30 feet. Foremast, 79 1-2 feet, with the same rake; no foretopmast. Bowsprit, hollow, 32 feet long, seventeen feet of it being outboard. The foresail had no boom, but was about

35 feet long at the foot; gaff, 24 feet. Mainboom, 58 feet; gaff, 28 feet. She carried one large jib, and the area of the three lower sails was 5,263 square feet. Her sails set very flat, more so than those of any English yacht of that day. She was oak-built, but contained some hackmatack, pine and cedar. The America was in every respect a beautiful and satisfactory boat. It is true that before she sailed for Europe she was beaten in several trials by the large sloop Maria; but no schooner could approach her. She was bought in for $20,000 and was then sent to Cowes, where she arrived July 31, 1851. The very look of this vessel, joined to the stories that had preceded her, caused consternation at Cowes. The famous race for the silver cup took place August 22, 1851. The America was matched by fifteen English yachts, eight of them cutters, the other seven being schooners. They were all completely eclipsed; and only one of them, the cutter Aurora, sailed over the whole course, she coming in twenty minutes after the America. This overwhelming defeat ended in England the reign of bluff bows and bellying sails, which in this country had gone out of fashion many years before.

The victory of the America was the beginning of great interest in yachting both in England and the United States. But it had even greater influence than that. Joined to the exploits of our clipper ships, which were making from 420 to 437 miles a day and were sailing to Liverpool in fourteen to sixteen days, and to the achievements of the Collins line of American steamers, which were regularly beating their rivals, the English Cunarders, in their trips across the ocean, the success of the America fostered the belief that the United States was soon to vanquish all rivals upon the sea. It undoubtedly helped to strengthen the resolution of England to crush American shipping by the sheer weight of the enormous subsidies she was paying to her steamer lines, and she did employ her subsidies with energy. Those subsidies did in time have the effect desired. America refused to contest the matter with her, and abandoned to her the dominion of the sea.

The America's Cup was the private property of the owners of the victorious yacht. On July 8, 1857, the cup was presented by them to the New-York Yacht Club to be a perpetual international challenge cup for supremacy in yachting. The donors of the cup made these terms, that any foreign yacht should be entitled to sail for it by giving six months' notice in writing and sending a yacht of not less than thirty tons nor more than three hundred tons measurement to compete for it. There have been six contests for the cup since, as follows:

1. August 8, 1870. Keel schooner Cambria, belonging to James Ashbury, of England, sailed in a regatta against fourteen American schooners, and was beaten by the centre-board Magic, by 11 min. 8.9 sec. and by eight other schooners. The Cambria was tenth in the list. The schooners that beat the Cambria were the centre-boards Magic, Idler, Silvie, Madgie, Phantom, Alice and Halcyon, and the keel schooners America and Dauntless.

2. October, 1871. The Livonia keel schooner, belonging to James Ashbury, of England, was raced five times, against a

single American schooner each time. She was beaten by the centre-board Columbia twice, in 25 min. 28 sec., and 4 min. 35 sec., respectively., and by the keel schooner Sappho twice, in 30 min. 21 sec., and 25 min. 27 sec., respectively, and she beat the Columbia once in 15 min. 10 sec.

3. August, 1876. The Countess of Dufferin, a Canadian centre-board schooner, challenged and sailed twice against the New-York centre-board schooner Madeleine, and was beaten both times in 10 min. 59 sec. and 27 min. 14 sec. respectively. In the second race the old keel schooner America went out also, and also beat the Countess of Dufferin over the course in 19 min. 9 sec.

4. November, 1881. The Canadian centre-board sloop Atalanta challenged and came to New-York. The iron centre-board sloop Mischief raced and beat her twice in 28 min. 30 1-4 sec. and 38 min. 54 sec. respectively.

5. September, 1885. The British cutter Genesta challenged and was raced at New-York by the Boston centre-board sloop Puritan. Two races were sailed, and both won by the Puritan in 16 min. 47 sec. and 2 min. 9 sec. respectively.

6. September, 1886. The British cutter Galatea came to New-York and was matched by the Boston centre-board sloop Mayflower. The sloop won both races. Time, respectively, 12 min. 40 sec. and 29 min. All the above were 40 mile races.

The figures given above represent the actual elapsed time. A small time allowance was made in every race, but not enough to diminish appreciably the substantial nature of the victories of the American yachts. The New-York Yacht Club has now spent over $75,000 in defending the America's Cup.

The first regular yacht club in the United States was formed at New-York in 1844 under the following circumstances. One day in July in that year the following yachts happened to be anchored off the Battery: The Gimcrack, belonging to J. C. Stevens; the Spray, owned by Hamilton Wilkes; La Coquille, John C. Jay; the Dream, George L. Schuyler; the Mist, Louis L. Depau; the Petrel, George B. Rollins; the Minna, James M. Waterbury; the Ida, James Rogers, and the Cygnet, owned by William Edgar. The owners of these vessels met on Mr. Stevens's yacht and they there formed the club which now owns the famous America's Cup, the envy of the British yachtsmen. Mr. Stevens, the owner of Castle Point, was elected the first Commodore. The Gimcrack was the smallest of the fleet, being 25 tons, while the Cygnet, the largest, measured 45 tons. The first flag of the club was a large star, containing thirteen smaller stars, but it was only used two or three years. The present flag is a blue one with a red cross, containing a white, five-pointed star in the centre of the cross. This flag has been around the world many times, and the ill-fated Jeannette, of Arctic fame, carried one with her when she was abandoned by De Long and his party. On June 17, 1845, the club held the first regatta ever given in America, the course stretching from the club-house at the Elysian Fields, Hoboken, to the Sandy Hook Lightship and return.

In 1866 the club moved to Staten Island, where it remained until 1871. In 1871 it came up into the city and occupied rooms at the southwest corner of Madison-ave. and Twenty-seventh-st. In 1884 another change was made to a house at No. 67 Madison-ave. Some of the most celebrated yacht races ever sailed have been won by yachts belonging to this club.

The New-York Club has frequently entertained distinguished guests, both Americans and foreigners. It is now a powerful organization with 600 members and 166 yachts, sloops, yawls, cutters and schooners. It is free from debt and has a good balance in the treasury.

A constant topic of discussion in America since the formation of the New-York Yacht Club has been the system of measuring yachts for time allowances, whereby the smaller boats can compete on even terms with the large ones. Many efforts have been made to reach a satisfactory solution. The object kept steadily in view from the beginning has been to perfect a system which would not in any way limit the perfect liberty of designer and builder to adopt the model and rig that would secure the greatest speed and stability. The New-York Club has not been entirely successful in this; but it can, at any rate, be safely asserted that the Americans have been more successful than the English.

The English rule, long known as the Royal Thames Yacht Club rule, has been as follows: The length of the vessel is measured from the fore part of the stem to the after part of the stern post. The depth is considered as being, not the real depth, but 1-2 the beam. So that the rule is: From the length, subtract the beam; multiply by the beam and by the depth (that is, 1-2 the beam); and divide by 94. This rule, varied in a few details, has remained in force until the present time. The result has been that English builders have narrowed the beam and increased the depth and have even moved the stern post bodily forward, leaving the stern overhanging and giving some bearing on the water. The effect has been to cheat the rule and gain a large vessel which should measure small.

The first thought of the young yacht club at New-York was to rate vessels according to their actual displacement of water. In 1845 an effort was made to measure the models of the yachts, belonging to the club, and to calculate the displacement of each in tons. The plan was soon given up as too difficult, and the first regatta was sailed under Custom House measurement, the rule for which then was as follows: Multiply the length from fore edge of the stem to the after side of stern post, less 3-5 of the beam, by the greatest beam measured from outside to outside of planking, and by the depth of hold. The product was divided by 95 cubic feet, and the result was the cubical tons of capacity of the vessel The large vessels made allowance to the small ones at the rate of 45 seconds per ton.

In 1846 the regatta committee of the New-York Club again tried "to ascertain the tonnage by actual displacement of each model." Regatta day came, and the committee announced, "There are no entries according to the rules." A meeting was held in the afternoon, and the rules were changed to read "by Custom House measurement instead of displacement." A brave effort was made the next winter to arrive at the actual displacement of the yachts. In 1847 the scale for time allowance was made 45 seconds per ton displacement. The next year this was changed to 35 seconds for boats over 50 tons, the rate remaining 45 seconds for vessels under that size by Custom House measurement.

In 1856 measurement by tonnage was temporarily abandoned. In its place, measurement by sail area was adopted. The rule was: The area of lower, top and head sails having been found, boats carrying 3,300 square feet of sail allowed 1 second per square foot of difference to small boats; those carrying 2,300 to 3,300 square feet allowed 1 1-4 seconds per square foot; those carrying less than 2,300 allowed 1 1-2 seconds. Allowances were made for reefed sails, and there were so many petty calculations that the work of a regatta committee would be prolonged several days after the actual measurements had been made. This rule taxed sail area and tended to reduce the canvas of the yachts, and it too was abandoned. As a make-shift the club tried the rule by which the large yachts in each class made allowance to the smaller ones as follows: 1 3-4 seconds per foot in the first class; in the second class, 2 1-4 seconds per foot; in the third class, 2 3-4 seconds.

In 1865 a rule was tried which made a sliding scale of allowances based on a race of forty miles.

Then a basis of displacement in cubic feet was experimented with, in accordance with the old plan.

In 1872 the cubical contents system was adopted, which allowed unlimited ballast and unlimited canvas. For more than ten years this rule held sway. It was as follows: The water line was divided into four equal parts, and the area of each cross section of the hull from the level of the lowest point in the plank sheer to the rabbet of the keel was calculated. The cubical volume of the hull was then obtained by Chapman's rule. (See Principles of Designing.) The volume of the overhang was also added. To find the time allowance of a yacht whose measurement came between even hundreds in the tables, the plan was to deduct from the allowance for the even hundreds next below such proportion of the difference between that allowance and the one next above it as the excess of her measurement over the lower hundred bore to 100. This rule worked very well, but is considered to have aided in the development of the beamy, light draft American yacht, by causing the designers to seek for stability by extending the untaxed beam, and reducing as far as possible the heavily taxed displacement.

In 1882 and '83 a change was made to the new "sail area and length" rule, which is now in force. This rule is as follows: Find the sail area by measuring a triangle whose base is the distance from the jibstay on the bowsprit or flying jibstay on the jibboom to the end of the main boom, with 1-4 the length of gaff added, and whose perpendicular is the distance from the deck to the sheave of the topmast. Find the actual length of water line from the fore edge of stem to the proper point on the counter. To the square root of the sail area add twice the length of water line and divide by 3. The result is the sailing length of the yacht. Time allowance is found by the following table:

TIME ALLOWANCE IN SECONDS AND DECIMALS FOR ONE MILE COURSE

Measurement...	Allowance....	Measurement...	Allowance....	Measurement...	Allowance....	Measurement...	Allowance....	Measurement...	Allowance....	Measurement...	Allowance....	Measurement...	Allowance....
130	.00	115	7.98	100	17.70	85	29.89	71	44.61	57	64.45	43	93.31
129	.49	114	8.57	99	18.43	84	30.82	70	45.83	56	66.14	42	95.91
128	.98	113	9.17	98	19.17	83	31.76	69	47.07	55	67.88	41	98.60
127	1.48	112	9.77	97	19.91	82	32.73	68	48.34	54	69.67	40	101.40
126	1.99	111	10.38	96	20.67	81	33.71	67	49.64	53	71.51	39	104.30
125	2.50	110	11.00	95	21.44	80	34.71	66	50.97	52	73.41	38	107.31
124	3.02	109	11.63	94	22.23	79	35.73	65	52.32	51	75.35	37	110.45
123	3.54	108	12.27	93	23.02	78	36.76	64	53.71	50	77.36	36	113.71
122	4.08	107	12.91	92	23.83	77	37.82	63	55.14	49	79.43	35	117.12
121	4.61	106	13.57	91	24.66	76	38.89	62	56.59	48	81.56	34	121.67
120	5.16	105	14.23	90	25.49	75	39.99	61	58.09	47	83.76	33	124.39
119	5.71	104	14.91	89	26.34	74	41.11	60	59.62	46	86.03	32	129.27
118	6.27	103	15.59	88	27.21	73	42.25	59	61.19	45	88.38	31	132.35
117	6.83	102	16.28	87	28.09	72	43.42	58	62.80	44	90.80	30	136.62
116	7.40	101	16.99	86	28.98								

NOTE.—Yachts over 120 feet shall be classed as 120 feet.

Yachts are divided into classes as follows:

SCHOONERS.—Class 1—To comprise all those whose measurement for time allowance length is 100 feet and over. Class 2—All those of less than 100 feet and not under 80 feet Class 3—All those of less than 80 feet.

SLOOPS.—Class 1—All of 55 feet and over. Class 2—All those less than 55 feet and not under 45 feet. Class 3—All under 45 feet.

To find the time allowance for fractions of a foot, as for instance, what a 50-foot yacht must allow a 45 1-2 foot yacht:

Add to the seconds and decimals opposite 45 feet one-half the difference between 45 and 46 feet, namely: 88.38—86.03=2.35, which divided by 2=1,175. Add to time for 46 feet: 86.03-|-1,175=87.205. Now subtract the time for 50 feet · 87.205—77.36=9.845. Multiply that figure by the length of the course in miles, say 40, and the product (39.38) is the number of seconds which the large yacht allows the smaller one.

For the change to the present rule the Seawanhaka Yacht Club of New-York deserves a great deal of the credit.

Racing upon a basis of comparison by length has also been tried in America. The New-England Yacht Racing Association, formed in 1884 by all the clubs in that part of the country, adopted this rule. The length of each yacht is obtained by adding to the water line length one-fifth of the overhang of the stern. Corrected time in a yacht race is found by means of an elaborate table of time allowances for every inch of length from 12 feet up to 116 feet. A yacht finds in the table a certain number of minutes to the mile set opposite to its racing length. It multiplies the given minutes by the length of the course in miles, and subtracts the product from its actual time. The following is the table, excluding fractions of a foot:

Length in feet.	Allowance in minutes and seconds.	Length in feet.	Allowance in minutes and seconds.	Length in feet.	Allowance inminutes and seconds.	Length in feet.	Allowance in minutes and seconds.
12	5.29.0	26	3. 6.0	40	2. 1.0	60	1. 7.8
13	5.12.4	27	3. 0.0	41	1.57.6	65	0.58.1
14	4.57.5	28	2.54.2	42	1.54.2	70	0.49.4
15	4.43.9	29	2.48.6	43	1.51.0	75	0.41.5
16	4.31.5	30	2.43.4	44	1.47.9	80	0.34.2
17	4.20.0	31	2.38.4	45	1.44.9	85	0.27.5
18	4. 9.5	32	2.33.5	46	1.41.9	90	0.21.3
19	3.59.6	33	2.28.9	47	1.39.0	95	0.15.6
20	3.50.5	34	2.24.5	48	1.36.2	100	0.10.2
21	3.41.9	35	2.20.2	49	1.33.5	105	0. 5.2
22	3.33.9	36	2.16.1	50	1.30.9	110	0. 0.6
23	3.26 3	37	2.12.1	52	1.25.8	116	0. 0.0
24	3.19.2	38	2. 8.3	55	1.18.6		
25	3.12.4	39	2. 4.6	58	1.12.0		

Yachting became a popular pastime in America after 1865. The war with its long years of gloom and oppressive horror was at last over. Great prosperity prevailed at the North; and there was a new spirit of adventure amongst the young men of the country, which had been engendered by the excitement of the war, and which now sought an outlet in sports as well as in business enterprise. Yachting felt the influence of the new state of things, and the lakes, rivers, and harbors of the populous parts of the country soon swarmed with a great multitude of pleasure craft of all descriptions. It was a natural result of the great increase in the number of pleasure boats, that new clubs for organized yachting and racing were soon formed in all localities where pleasure boats abounded. The moment the national pride was aroused by the English challenges for the America's Cup and by the victories of the American defenders of that great trophy, yachting became a popular passion in all the sea ports, large and small. Club after club was organized in various parts of the country; private yachting increased outside of the clubs; and by 1880 this sport had taken its place, as was fitting, among the most important of the open air amusements of a nation having the longest navigable ocean, river and lake coast in the world. Many a bluff fishing boat was lengthened, sharpened, and fitted up as a yacht during that period; and the production of new boats for pleasure sailing only was enormous. These new boats, the small ones at any rate, were at first all modelled after the practical working craft of their various localities. A yacht is not a type of vessel different from all others, a class apart by itself. A yacht can be made out of the heavy cat-rigged oyster boat of New-Jersey, the narrow sharpy of Long Island Sound, the tuck-up of the Delaware, the canoe of the Chesapeake, the fruit lugger of Louisiana, the pound boat of the Lakes or the lateen-rigged double-ender of San Francisco Bay; or, to mention larger craft, the coasting sloop and the fishing schooner. The yacht differs from the practical working boat merely in being fitted up in dainty style, and having finer lines. A few new rigs have latterly been introduced, but the yachts of America still remain merely very elegant specimens of our fishing and working craft. In 1886 the American Yachting List comprises 75 clubs, as follows:

No.	Clubs.	Entrance Fee.	Annual Dues.	Date of Organization.
1......	New-York....................	$50	$25	July 30, 1844.
2......	Eastern....................	50	20	1870.
3......	Brooklyn....................	..	..	....
4......	Boston....................	..	10	1865
5......	Atlantic....................	25	24	1866
6......	Seawanhaka....................	25	15	1871
7......	Portland....................	7	3	April, 1869
8......	Dorchester....................	10	5	1870
9......	Knickerbocker....................	10	12	1874
10......	South Boston....................	5	5	Feb. 5, 1868
11......	Beverly....................	5	5	Feb. 1872
12......	Columbia....................	5	12	1867
13......	San Francisco....................	20	15	1867
14......	St. Augustine....................	15	15	1872
15......	Manhattan....................	..	15	1870
16......	Jersey City....................	10	24	July 23, 1858
17......	New-Jersey....................	5	12	1871
18......	New-Bedford....................	..	15	Mar. 16, 1877
19......	Lynn....................	7	2	1868
20......	Royal Nova Scotia Squadron....................	5	10	Dec. 1875
21......	Bay of Quinte....................	5	..	....
22......	Royal Canadian....................	15	Resident, $10. Suburban, $5. Absent, $2.	July 4, 1854
23......	Larchmont....................	20	$15	1879
24......	Quaker City....................	..	..	1876
25......	Hull....................	10	5	June 26, 1880
26......	Haverhill....................	5	5	Feb. 19, 1874
27......	Buffalo....................	1 50	3	1879
28......	Quincy....................	..	..	1874
29......	Southern....................	10	12	July 21, 1849
30......	Yonkers....................	..	..	....
31......	Chicago....................	10	20	1875
32......	East River....................	..	3	1880
33......	New-Haven....................	25	Resident, 15. Non-do., $12.	Nov. 8, 1881
34......	Salem Bay....................	3	5	....
35......	American....................	..	..	May, 1877
36......	Jeffries....................	1 00	25	April, 1883
37......	Narragansett....................	..	..	1882
38......	Williamsburgh....................	..	6	....
39......	Chesapeake Bay....................	..	..	....
40......	Toronto....................	..	10	....
41......	Cleveland....................	3	2	Sept. 1878
42......	Oswego....................	10	12	April 14, 1881
43......	Raritan....................	2	12	May 10, 1882
44......	Cape Ann....................	2	1	July 28, 1880
45......	Albany....................	5	12	....
46......	Bohemian....................	..	..	....
47......	Savannah....................	..	10	June 7, 1866
48......	Royal Bermuda....................	..	..	....
49......	Land and Water....................	50	25	....
50......	Hudson River....................	..	..	....
51......	Americus....................	..	..	....
52......	Eclipse....................	3	6	....
53......	Pacific....................	20	15	1878
54......	Harlem....................	5	6	June 19, 1883
55......	Newark....................	..	..	Sept. 8, 1882
56......	Carolina, S. C....................	..	10	....
57......	Mobile....................	..	..	May, 1883
58......	Bunker Hill....................	..	..	1869
59......	Oconomowoc....................	5	5	1878
60......	Kingston....................	1	1	1883
61......	Milwaukee....................	..	..	1884
62......	Michigan....................	25	5	April, 1884
63......	Neptune....................	..	..	1850
64......	Phoenix....................	..	..	Jan. 28, 1884
65......	Carolina, N. C....................	5	5	1854
66......	Pelham....................	15	10	April 28, 1884
67......	Yale....................	..	..	....
68......	Toledo....................	..	..	....
69......	Florida....................	..	..	....
70......	American....................	..	..	....
71......	Bar Harbor....................	..	..	....
72......	Corinthian....................	..	..	....
73......	Sandy Bay....................	..	..	....
74......	Great Head....................	..	..	....
75......	New-Rochelle....................	..	..	....

The total number of yachts in these clubs is 1870, the great majority of them being sloops and cat-rigged boats.

New-York is the principal centre of yachting in the United States, as appears by the list. There are 22 clubs, as follows:

Name of Club.	Membership.	No. of yachts.	Regular annual regattas.
New-York	600	166	3
Seawanhaka	210	100	3
Atlantic	245	119	2
Larchmont	400	155	3
New-Jersey	76	30	3
Knickerbocker	140	80	3
East River	71	34	2
Raritan	35	10	4
Columbia	85	22	3
Brooklyn	220	59	1
Pelham	130	53	1
Harlem	125	50	2
Umpire	75	15	1
Eclipse	60	27	2
Yorkville	44	21	3
Manhattan	30	6	1
Newark	80	30	4
Jersey City	..	..	..
Yonkers	84	21	1
Williamsburgh	..	..	..
Hudson River	..	..	..

A good many yachts appear in the lists of two or more clubs, but there are many small yachts whose owners do not belong to any club. The clubs all have houses, some of them fitted up at great expense.

There are ten yacht clubs in Boston. That is, there are ten clubs composed of Boston men, although the club houses are not all within the city limits. They rank in relative importance about as follows: (1) The Eastern Club owns a club house at Marblehead Neck with extensive grounds attached. The house is supplied with a hall, library, sleeping rooms, and other accommodations. The membership numbers 435. (2) The Hull Yacht Club, although younger than some of the others, is a very enterprising organization, and has grown rapidly within a few years. There are 483 members on its rolls. It owns a very handsome club house located at the end of Hull Pier, which, by its pretty architectural proportions, attracts the attention of the thousands who every day during the summer months go to and from Nantucket. (3) The Boston Club has a fine club house at City Point, and a membership of 225. (4) The South Boston Club has a membership of 200, and owns a club house at City Point. (5) The Dorchester Club owns a club house at Dorchester, near Commercial-st. It has a membership of 225. (6) The Corinthian is a young club and is destined to take an important place in yachting circles. Its members include many of the finest men interested in yachting. It has a membership of 185. Its club house is located in Marblehead, near that of the Eastern Club. (7) The Beverly Club has a membership of 118, and does not own a club house. (8) The Great Head Club is also a comparatively new organization, with a membership of 135, and a small house at Great Head, Winthrop. (9) The Jeffries Club owns a house at Jeffries Point, East Boston, with a membership of 75. (10) The Bunker Hill Club has a house near Mystic Wharf; membership, 85.

The membership of some of the other New-England clubs is as follows: Salem Club, 81; West Lynn Club, 60; Quincy Club, 115;

Sandy Bay Club, Gloucester, 131; New-Bedford Club, 235; Portland Club, 145 members.

There are a large number of yachts owned in Providence, R. I., both steam and sailing, but at present there is no club or club house Nevertheless, there are several good regattas on the bay in the summer time. The Sachem and other prominent yachts owned here are in the New-York Yacht Club.

In Philadelphia there are five sailing clubs, as follows: (1) The Quaker City, comprising the owners of 2 schooners, 7 sloops, 6 partly decked boats with cat rigs, and 8 open boats. The club house is at Cooper's Point, Camden, N. J., where most of the yachts have their moorings. The total of the club membership is probably 200. (2) The Philadelphia Yacht Club comprises the owners of three classes of boats. The first class includes boats of 15 feet in length and 6 feet beam, each carrying seven men. The second class includes 10 boats 15 feet in length and 4 feet beam, carrying six men. Third class, 18 boats, 15 feet in length and 3 feet 7 inches beam, and carrying five men. Each crew owns its boat and club house, the entire colony being located at Otis-st. Wharf, Kensington. The houses are two stories high and well adapted to the purposes for which they were built. (3) The Pennsylvania Yacht Club is composed of the little double end and square stern yachts known as "Tuck Ups." There are twelve in the fleet. On racing days they are restricted to 45 yards of sail around the bolt rope. Their length is 15 feet and beam 4 feet 2 inches. Each crew owns the house in which the boat is kept, and in the twelve houses there is a membership of 90. (4) The Southwark Yacht Club has two classes of boats. All are similar in build to those of the Philadelphia club. There are 120 members, representing twenty yachts. Their headquarters is at the foot of Mifflin-st. in the extreme lower end of the city. They have twenty club houses similar in construction to those of the Philadelphia Club. (5) The Bridesburg Yacht Club is located at the place named on the Delaware River and within the city limits of Philadelphia. There are six yachts, all cat rigged, which carry crews of from twelve to fifteen men. They have no club houses and the boats are anchored in the stream when not in use. The total membership is 115. There is also a steam yacht club with a fleet of twelve steamers. None of these is over 35 feet in length. Each one is owned by a company. They are devoted entirely to pleasure. The club is not regularly organized, but the members chiefly congregate at No. 1,109 Beach-st., which is in close proximity to the spot where the boats are moored.

Baltimore is far behind her sister cities in yachting. There are no large yachts here except a couple of steamers. There are a few informal clubs with catboats, and social clubs which, in summer, hire a schooner and go on a cruise of pleasure.

The Yachting Association of Cleveland, Ohio, has fifty active members. Some of the leading citizens belong to the society. George W. Gardner, Mayor of Cleveland, is the Commodore. Twelve sailing boats and two steam yachts are owned by the members. They are all good boats. One steam yacht is owned by Daniel P. Eells and cost

$30,000. The other is an ocean built yacht owned by S. V. Harkness; it cost $70,000. The Association has a club house on the river, and is negotiating for rooms uptown where the members can enjoy their leisure hours during the winter. Interest in yachting is increasing every year. There are several yachts outside of the Association which will probably be in by next season. Two or three are also being built by members.

In Chicago there are two clubs. The Chicago Yacht Club deserves the credit of fostering and sustaining whatever interest has been taken in yachting on Lake Michigan, under discouraging conditions at times. A number of disasters occurred several years ago which discouraged the purchase and building of yachts. Whatever has been accomplished since is due wholly to the gentlemen of this club. The membership is now about 75. A finely fitted up club house stands on Michigan-ave., near Jackson-st. The members own fourteen racing yachts, two of which have already made a reputation. The Countess is a craft of 110 tons, originally known as The Countess of Dufferin. She was built by Cuthbert, and once tried to capture the America's Cup, but was defeated. Among the others in the schooner class are the Idler, 95 tons, formerly an Eastern boat, the fastest boat of her class probably on the lakes; Viking, 105 tons, and Argo, 25 tons. Among the sloops are The Wasp, The Peri, Zephyr and Worthless. The fleet also includes the cutters Verve, a ten tonner, and the Una. The Verve is the English boat which defeated The Madge in British waters for international honors, and was afterward purchased and brought to this country. The club also owns the yawl Alice. The clubmen can see a growth in the popular interest in the sport in Chicago, and are confident that the city will yet boast of a great sailing fleet. The Phoenix Yacht Club is an organization with a membership of about sixty. The members own twenty or thirty sail boats, none of which, however, could be properly classed so as to enter for a cup race.

There are three yacht clubs in San Francisco. The largest in point of numbers and earnestness of the members is the Pacific Yacht Club, organized in May, 1878. It has a fleet of nine yachts, seven schooners and two sloops, and there is a fine club house at Old Saucelito, across the bay north of the city. The total membership is 249, consisting of 62 contributing members, 175 life members and 12 honorary members. The San Francisco Yacht Club is the pioneer organization, having been incorporated June 12, 1873. This club has no life members, but there are 87 contributing members. A finely appointed house has been built at Saucelito, which cost $7,000. The club has a fleet of ten yachts, several of them out of commission. Annual regattas have taken place until 1886, when the custom was omitted for that season. The Corinthian Yacht Club was organized March 25, 1886, by a number of young men, and its special feature is that its boats are owned and sailed entirely by amateurs. There are 59 members, and they contemplate erecting a club house at Tiburon Landing, across the bay from San Francisco, in the spring of 1887. With its noble bay and broad river leading up to Sacramento, and its close proximity to the ocean, San Francisco is a capital place for yachting. In addition there is the Puget Sound region, the finest cruising ground in America, on account of the depth of the water, the magnificent scenery and the opportunities for hunting wild game. The winds of the Pacific are strong and the rig of the sloops and schooners there narrow at the top. Owing to the great length of the fir timber from which the spars of Pacific coast vessels are made, the lower and topmasts are often in one stick.

A yacht club has the following officers: Commodore, who takes command of the squadron, presides at all meetings and enforces the rules. Vice-Commodore, who assists the Commodore and acts during his absence. Rear-Commodore, who assists the former two. These three officers must be yacht owners and each has a special pennant. There are also the Measurer, Fleet Surgeon, Secretary, Treasurer, House Committee and Regatta Committee. Officers and members wear blue cloth uniforms with gold or silver braid, with stripes, stars or foul anchors to indicate rank. The dress uniform for social occasions is a plain blue or black dress coat, white vest with the club button in gilt, blue or white trousers, and black or white cravat.

In all discussions of yachting attention is always drawn first to the famous large vessels, whose beauty, size, great speed and brilliant achievements have kindled the imagination and the patriotic pride of every American lover of the sea. These large vessels represent the extreme development of the maritime art, and they stand for the yachting world, as the mounted field officers of a regiment do for the regiment itself. But the great boats do not themselves constitute the yachting world. The great body of the pleasure fleet of America is composed of a multitude of small sailing boats, which swarm in and navigate the bays, lakes, rivers and sounds of the country,—moderate in size, safe in rig, low in cost and giving healthful recreation to a hundred times as many people as do the big representatives of the fleet. For instance, in the Massachusetts regattas, while there are seldom more than twenty or thirty vessels engaged in any competition for prizes, there are from 800 to 1,000 small yachts owned on the coast of that State alone. And while the great racers in all America do not exceed probably 200 in number, there are more than 1,870 in the official yachting list, and several times that number of pleasure sailing boats in the whole country. The great body of practical yachtsmen own the small boats. The following pages will be devoted, therefore, to the principal classes of small yachts.

There is keen sensibility on the part of many people to the supposed dangers of yachting. But the same is true in regard to horseback riding, gunning, swimming and other sports. The fact is, there is very slight danger in sailing, if it is properly conducted, not half so much as in travelling in a railway car. In the handling of a boat by an experienced sailor there is a nonchalance of manner growing out of perfect control of his craft, and enjoyment of the inspiring rush across the waters, which tempts the inexperienced man not only to assume the same bearing but also to be absolutely negligent in reality, in which case the chances are that he will meet with an accident. Experience teaches that accidents in sailing are due to carelessness, neglect of simplest precautions, to conviviality on board, and larking. If the helmsman attends to his business he will not meet with accidents more frequently than the business man does in walking downtown to his store. Watch the experienced and nonchalant sailor. His eye scans the water constantly and returns immediately to the luff of his sail. He is never taken by surprise, and he refuses to allow the party on board to distract his attention from the business he has in hand. If there is trouble brewing his coolness never deserts him; he knows the trouble is coming before it arrives, and he meets it in the ready, sure, safe manner which experience has taught him will defy the squall or the impending collision and set the danger at naught.

The yachtsman should always learn to swim and he should have plenty of life-preservers on board. Neither of these precautions will bring danger. The men who have made their wills live long. He should never forget his business; and he should always see that his boat is in order, everything ready for use and all the fittings stanch and strong. With these qualifications yachting becomes as safe as it is delightful and wholesome. Let the yachtsman prefer the reputation of a man who never has had an accident, rather than that of a fellow who is afraid of nothing. Then if he lives up to his reputation he never will have a mishap that he need regret.

LINES AND CENTRES OF YACHTS.

Rowing skiffs and canoes are of such simple construction that any young man handy with tools can make one of them without much trouble. There are also several varieties of sailing boats which can be built by an amateur with the aid, first, of a drawing of his design; secondly, a smooth floor for describing the lines of the boat to full size; and, thirdly, a convenient spot in the barn, woodshed or dooryard for the construction of the craft. If a young man is not destined for one of the mechanical trades, he can acquire one which will yield him a livelihood, if there be need, by building one or two good boats for himself at home in a thorough and workmanlike manner. Many of the best professional boat-builders in America will testify that they were drawn into the fascinating trade which has given them their reputation and fortune by the love of tools which first led them to build boats for their own private use.

A man does not require a college education to know how to make all the drawings and calculations for a good boat, nor does he need to be a master mechanic to construct her. So far as the mere carpentry work is concerned, the only requirement is that the amateur workman shall know how to use saw, plane, hammer, auger and square. With reference to designing, the ability to add, multiply, divide and sub tract; an eye which loves harmony of parts and can tell a true curve from a bad one; and ordinary clear judgment and common sense, are all that are necessary to start with. A knowledge of geometry will be valuable to the amateur designer, but even this is not necessary. Half the successful boat and ship-builders in America know nothing more of mathematics than the simple rules of arithmetic. All the rules employed in figuring the displacement and the centres of the boat are provided for them (in the manner in which they will be set forth here); and they use these mathematical tools just as they do their hammers and saws, for the purpose for which they were intended, without bothering themselves about the processes of manufacture by means of which the tools themselves were produced.

It is now proposed to give a lesson in drafting a boat with her sails, and the rules for making the various calculations with reference to centres and displacements.

The drawing implements are as follows:

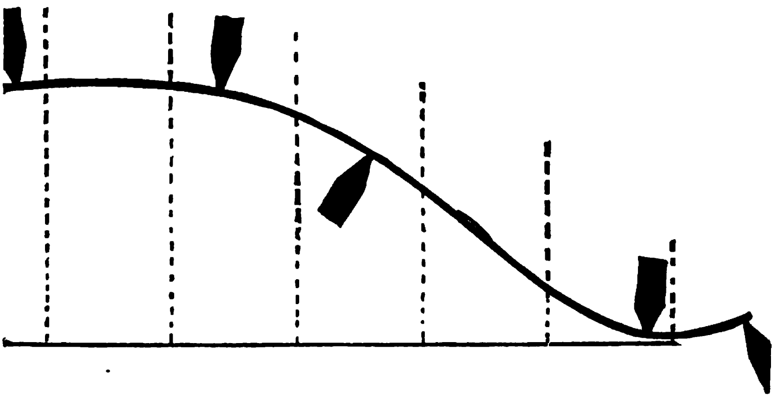
A triangular two-foot rule.

A straight-edge four feet long.

A pair of large steel dividers.

Two good T-squares, one two feet long, one four feet. The best ones are made of rubber.

Four or five French curves and a set of pear-shaped curves; the best ones are of rubber, but wood will do. These curves



Spline held in position by the weights.

are used in drawing the frames, the round-up of the forefoot, the rudder and the other quick curves in the boat.

Half a dozen flexible rubber splines, or very small wooden battens, for drawing the curves of the water lines and deck.

Half a dozen three to five pound weights with pointed ends, to hold the splines and battens in position. Sharp stout pins are used by many designers.

A good mechanical drawing pen.

A cake of India ink.

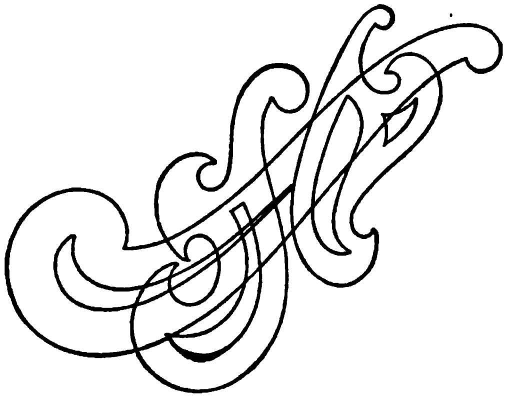
Soft rubber for erasing pencil marks.

Lead pencils.

A large drawing board or table of soft wood.

A good supply of drawing paper. White paper is best because pencil lines show upon its face so clearly, but good light-colored manila wrapping paper is good, and is in general use in many regular boat shops.

Flat-headed pins to secure the drawing paper to the board.



The Wooden Curves.

It is not essential for the amateur architect to go to great expense in purchasing his outfit for drafting. Good tools are always better than poor ones, it is true; but cheap tools, if they are accurate, are good enough.

The building lines of a vessel are produced by planes cutting the surface of the hull. It is as though a model of the hull were sawn through vertically, by transverse planes, to get the shape of the frames at various points; then sawn through horizontally to get the water lines; and lengthwise, vertically, in the middle, to get the shape of bow and stern and the sheer line of the deck and gunwale.

Each point in any one of the lines is found upon the principle that "a point in space is determined by its perpendicular distance from a given plane, or from two planes at right angles to each other." For instance, each point in a water line is determined by its distance from the vertical middle line plane, measured out along a line drawn at right angles to that plane.

The building lines are represented by three plans: First, the body plan, showing the frames, which is produced by vertical planes, spaced at equal intervals, and standing at right angles to the middle line plane of the vessel. Secondly, the half breadth plan, in which the water lines are exhibited, which is the result of slicing the vessel with horizontal planes spaced at equal intervals. Thirdly, the sheer plan produced by a vertical middle line plane fore and aft, which shows the profile of the vessel at bow, keel, stern and gunwale. In the body plan it is usual to draw the midship section complete, and then on the right hand side of the central perpendicular to draw the lines of the forward body and on the left hand side the lines of the after body. If any two of the three plans above described are given, the third can be constructed from the other two.

The sheer plan is the first one drawn. A base line must first be adopted; and in yacht building this base line always represents the load water line plane. In the construction of a merchant vessel, the builder takes the top edge of the keel as his base line. But in yacht building the vessel is pretty sure either to sail with a drag or have a curved keel, and there is no alternative except to start with the load water line plane as a base line. And this is the natural base line in a yacht. The draft of water is set off below it; and the height of the deck from the water is set off above it; and when the vessel is built her ballast is put in so as just to bring her down to the bearings designed for her from the start, namely, to this same load water line plane. Mark off on the base line the water line length of the vessel, and through these points draw lines at right angles to the base line These two lines (which bound the water line length) are called the forward and the after perpendiculars, respectively. Divide the base line into an even number of equal parts, and draw through the points of division intermediate perpendiculars. These represent the trans verse sections, which being seen edgewise in this plan take the form of straight perpendicular lines; they are called the "square stations." One of them should be at the broadest part of the vessel, which is called the midship section. Now draw in the fore edge of the stem, the round of the forefoot, the lower edge of keel, the after edge of stern post and the overhang of the stern. Mark three points, one on the stem, one on the square station at the midship section, and a third on the extreme stern, showing the exact height of the vessel above the load water line at those places. Then bend a spline or batten to pass through these three points; hold it firmly in position; and, with pencil or pen sweep in the curve of the gunwale line. The lines now drawn are "the fixed lines" of the vessel. They are never altered in the subsequent operations. Draw in an even number of water lines, parallel to the base line at equal distances apart, one passing through the top of the keel at the lowest point of its drag or curvature.

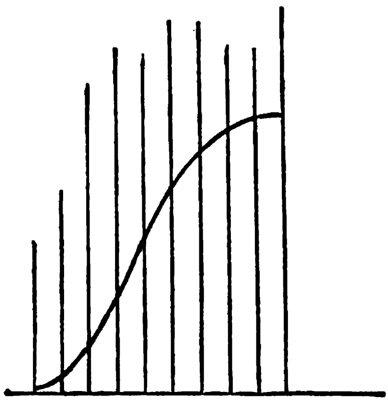
The half breadth plan is drawn next, and should be exactly underneath the sheer plan. Only one-half of the vessel need be shown, because the two halves are exactly alike, and if one half is obtained the other is understood. Draw a straight line to represent the middle fore and aft line of the vessel; set off upon this the length between perpendiculars; and draw in the square stations perpendicular to the middle line. In the sheer plan the square stations are represented by lines perpendicular to the load water line plane; in the half breadth plan they are represented by lines transverse to the longitudinal middle line of the vessel. Lay off on the various square stations the widths of the deck and of the various water lines, marking the points with dots. Then sweep in the shape of the deck and the various water lines, with the aid of a batten or the French curves and a pencil. It will probably be found that the edge of the batten does not pass through all the points marked on the different square stations exactly Bend the batten so that its edge will pass fairly through the greates number of points; then sweep in the curve.

A word now about ending the water lines. In the construction of a large vessel it simplifies all the work of design to consider the lines as all representing the surface of the vessel *before the planking is put on.* The amateur should accustom himself to understanding that method of procedure. For various reasons, however, it is easier and simpler for the yacht-builder to design his boat first *with the planking on.* He will then make no mistakes either in his measurements or his calculations of displacement, centres, etc. To end his water lines properly, in this case, he will draw into the sheer plan the fore edge of planking on the stem, the outside edge of planking on the keel, and the after edge of planking on the stern post. To end any water line properly, find the point in the sheer plan above, where that water line intersects the outer edge of planking. Project that point downward by a true perpendicular until it intersects the half siding of stem or stern in the half breadth plan below. End the water line at the point of intersection. Now if he were drawing the vessel before the planking is put on, he would proceed in this way: Draw in to the sheer plan the inner edge of planking on the stem and stern post; (the inner edge of planking on the keel is the top of the keel itself). To end any water line, find in the sheer plan the point of intersection of the water line with the inner edge of planking. Project that point downward by a true perpendicular until it intersects the half siding of stem or stern post in the half breadth plan. Using the last-named point of intersection as a centre, describe with the dividers a circle having a radius equal to the thickness of the planking. End the water line on the inner edge of that circle as a tangent to it.

For the body plan, begin by drawing the base line, which is the load line of the yacht. Set up a perpendicular to represent the middle line plane of the vessel. Draw in, upon the right hand side, the half siding of stem and keel in the forward body; upon the left hand side, the half siding of stern post and keel in the after body. Then draw, parallel to the base, a series of horizontal lines to represent the water lines the same as in the sheer plan. Set off on each water line the widths of the vessel on that water line at the various square stations, picking up the widths from the half breadth plan below. The gunwale is obtained by going to the half breadth plan and getting the width a each square station, and the height above the base line from the sheer plan. Now sweep in the curves in the body plan with the battens, using the French curves for places where the battens will not bend without breaking. The midship section is drawn first. The lines in the body plan show the outer surface of the planking at the square stations. To end the lines properly upon the keel, follow the same method as in the half breadth plan.

It should be stated here that in the regular shipyards of America the first operation on the part of the designer is to make a wooden model of his vessel. This model is made of thin layers of dark and light-colored wood alternating, which are doweled or tacked together The lines for the first drawing are taken from the model after it is fully fashioned by separating the layers of which it is composed, placing them on a sheet of drawing paper and running a pencil around them. Sometimes the layers are glued together, and then the lines are taken off by squaring off the distance from a perpendicular outside the vessel to each square station in the model. It is a good plan for the amateur architect to make models of his boats. He can saw them across and take off the lines that way. A complete model, with sails, masts and rigging, will be a great aid.

Now comes the important process of fairing the lines. No matter how fair to the eye each separate curve appears to be, in either the body or the half breadth plan, there is no security that each one succeeds its predecessor in exact harmony until a test is made and errors are corrected. Fairing is based upon the principle that if the whole surface is perfectly true, then when it is intersected by any new plane the line of that intersection will itself be a true curve. So the vessel is tested, first, with diagonal planes, and afterward at bow and stern by perpendicular planes. Draw in the body plan two or three diagonal lines from the upper part of the perpendicular out to the side bilge and bottom of the boat.



Water Line, faired by contracted method.

Draw on another sheet of drawing paper a straight base line, and set up from it at equal intervals a number of perpendiculars to represent the square stations. Space these perpendiculars apart only about one-fourth or one-sixth the actual distance of the stations in the main drawing. Now measure with a pair of dividers, along any given diagonal line, the distances from the middle line to the intersection of the diagonal with the several square stations, and set up these distances on the several square stations of your new diagram. Now apply a batten to the points thus obtained in the diagram. If the batten passes in a fair curve through all the points, the surface of the boat where it is cut by the diagonal plane in question is fair. If the batten should pass one side or the other of one or more points, correct the two plans accordingly. Follow this plan with all the diagonal lines; and with the vertical bow and buttock planes. This is called the "contracted method of fairing." It is perfectly correct in principle; and owing to the fact that the perpendiculars are placed nearer together than the square stations are, the battens are more likely to bend fairly into true curves than when they are more extended. The bow and stern are faired by the perpendicular planes, or bow and buttock lines.

It is probable that in the process of fairing a good many errors in the original drawing will be found. If any part of the boat looks wrong in the drawings, test it by fairing; and the cause of the trouble will come to light. To provide for corrections, make the first drawings of the body and half breadth plans in pencil. Then when the erroneous lines are rubbed out with India rubber and the right ones put in, and when the whole boat is fair, the lines can all be drawn with ink.

The bearding line must be found in the drawing, in order to determine the moulding depth of the stem and stern post. The bearding line is the inner edge of the rabbet of stem, keel and stern post. It is the same as the inner edge of the planking. As the upper edge of the keel is the bearding line there, no work is there necessary. But to get the bearding line on the stem and stern post an operation is necessary which, for other purposes, will have to be undertaken at some stage in the proceedings and is best performed now. Draw in to the body plan the inside edge of the planking at each square station. The proper thickness of the planking is found in the specifications of scantling; and remember that the planking is thinner at bow and stern than on the middle body. Mark where the inner edge of plank cuts the half siding of stem, keel, skag and stern post; and project these points into the sheer plan. From a number of points thus obtained the bearding line can be drawn.

When the boat is fair, copy off all the measurements to the outside of planking with as great accuracy as possible upon a sheet of paper. In time, when all corrections have been made, they can be put into a measurement book, and preserved for future use.

The lines must now be laid down to the full size of the boat on a smooth floor in the garret, woodshed, or barn, which answers the purpose of a mould loft floor. In "laying down," the fixed lines of the sheer plan in the small drawing are followed literally. But in the body and half breadth plans, the lines laid down on the floor are those of *the surfaces of the frames,* that is to say, the inner surfaces of the planking. Long battens of pine or cedar, from one-half inch to an inch square, are used to sweep in the curves, and brad-awls are stuck into the floor to hold them in position. In laying off to full size, errors that were invisible in the drawing will be magnified many times, and will reveal themselves upon testing the lines with a new fairing process. Always fair the lines anew on the floor of the mould-loft. The lines are marked upon the floor with a carpenter's pencil. You can now draw, in the half breadth plan, as laid down on the floor, additional perpendiculars to represent the frames between the square stations. Transfer them to the body plan and you have the exact outline of every frame in the boat. All the different parts of the boat can now be gotten out, their shape and dimensions being picked up from the floor.

The sail plan and spars of the boat can be drawn to a scale of, say, one-quarter inch to the foot, on a piece of drawing paper, which will answer all purposes. (See "Canvass.")

So far, the supposition has been that the youthful builder is in possession of a model of his proposed yacht, from which he has taken the various dimensions; or that he has the lines of some other boat. If he has nothing at all to guide him, except a general idea of what he wants, he will draw first the sheer plan; next the load water line in the half breadth plan, giving it the proper keenness of entrance, placing the midship section from 3 to 5 per cent of the length aft of amidships, or wherever his judgment dictates; and next he will draw the midship section in the body plan, shaping its fulness and curvature to suit the purposes of his boat. He will then draw in additional water lines and the deck in the half breadth plan, transferring them one by one to the body plan, fairing them as he goes along, and altering and correcting until he has a boat that suits his ideas perfectly. A model may be useful to a beginner; one is not at all necessary to the advanced student. The advanced student is referred to Nystrom's Parabolas in the "Engineer's Pocket Book," published by that engineer.

An interesting fact in regard to the water lines and other curves of the surface of a vessel may be briefly referred to. These curves are all parabolic. A true parabola may be constructed by selecting any straight line for the "directrix"; drawing a line at right angles to it for the "axis" of the parabola; choosing a point on the axis for the "focus" of the curve; and then drawing ordinates at right angles to the axis. The points where the parabola crosses these ordinates will in each case be equidistant from the directrix and the focus. They can easily be found and the curve drawn. A great variety of these parabolas can be constructed; and the scientific amateur will derive much enjoyment from the task. Nystrom has given the following formula for a true parabola: y, any ordinate; b, the base of the parabola, answering to the half breadth of vessel at dead flat; x, distance from the ordinate to the vertex of the parabola, or bow of vessel; l, length of the axis from vertex to base. Then any ordinate $= b\left(1-\frac{x^1}{l^1}\right)^{0.5}$ Now to vary the parabola, the vary power to which the terms are raised. Vary 0.5 to 1, 1.5, 2, 2.5, etc. Vary x^1 and l^1 to 1.125, 1.25, 1.375, etc. To work out these problems requires a knowledge of logarithms.

The considerations that govern the general form of the boat are: Draft of water, probable weight of the boat and cargo, and speed. Light draft requires a wide boat with a round or flat floor. Carrying capacity requires fulness of body. Speed is dependent on a sharp bow, a moderate midship section (which may be either wide and flat or narrow and deep), a good run, easy lines and large sail area. Large sail area requires good beam and ballast placed low down. Stability is gained by good beam, weight of the vessel and ballast low down.

The various calculations used in vessel building refer to the mensuration of areas and volumes, and the location of centres. The following are the rules in common use:

SQUARE OR PARALLELOGRAM.—To find the area, multiply the length by the perpendicular height.

TRAPEZOID.—To find the area, multiply half the sum of the parallel sides by the perpendicular distance between them.

TRIANGLE.—To find the area, multiply the base by one-half the perpendicular height.

TRAPEZIUM.—To find the area, draw lines dividing the figure into a trapezoid and two right angled triangles; the area is the sum of the areas of the three figures.

CIRCLE.—The area is equal to the square of the diameter, multiplied by 0.78539.

ELLIPSE.—Multiply the product of the two diameters by 0.78539.

PARABOLA.—Multiply the base by the height; two thirds of the product is the area.

FIGURE BOUNDED BY A STRAIGHT LINE AND A CURVED LINE.—To find the area, divide the figure into any even number of equal intervals and draw ordinates perpendicular to the base. Add together the endmost ordinates; multiply the *even* ordinates by 4, the odd ordinates by 2. Find the total sum. Divide by 3, and multiply by the common interval. The result is the area. This is Chapman's and Simpson's rule, and is in universal use among ship-builders. Expressed in a formula the rule is: Area = one-third of the common interval $(a + 4b + 2c + 4d + 2e + 4f + g)$.

VOLUME OF A CUBE.—Multiply the area of the base by the perpendicular height. The same rule for parallelopipedon, prism, or cylinder.

VOLUME OF A CONE OR PYRAMID.—Multiply the area of the base by one-third of the perpendicular height.

VOLUME OF FRUSTUM OF CONE OR PYRAMID.—To the sum of the areas of the two ends add the square root of their product; multiply by one-third of the perpendicular height.

VOLUME OF A SPHERE.—Multiply the cube of the radius by 4.1888.

VOLUME OF A PARABOLOID.—Square the diameter of the base; multiply by the perpendicular height and then by 0.3927.

VOLUME OF A PLANE FIGURE REVOLVING AROUND ITS AXIS.—Multiply the area of the figure by the circumference of its centre of gravity.

VOLUME BOUNDED BY PLANE AND CURVED SURFACE.—Divide the length into an even number of cross sections at equal intervals. Find the area of the cross sections by Chapman's rule for plane areas. Then add together the endmost areas; multiply the even numbered areas by 4, and the odd numbered areas by 2. Find the total sum; divide by 3, and multiply by the common interval. The result will be the volume. This is the same rule as before given for areas. The approximation to a mathematically exact result is so close that the difference is inappreciable for any practical purpose.

TO FIND THE TONS OF DISPLACEMENT.—Divide the volume of displacement in cubic feet by 35 7/8 for fresh water; 35 for salt water. The result is the Displacement in long tons of 2,240 lbs each. The American ton of 2,000 lbs, or short tons, is not usually employed in stating displacement. To find the Displacement in short tons, divide the volume in cubic feet by 32 for fresh water, 31¼ for salt water, they being the number of cubic feet of water to the ton.

AREA OF A CURVED SURFACE.—Measure the girths at equal intervals, and treat them as though they were the ordinates of a plane surface, by Chapman's rule. The result will be the area of the curved surface.

CENTRE OF GRAVITY OF A VESSEL.—Ascertain the height of the c. gr. above the base line, and the weight, of each separate timber, beam, mast, sail, and other part of the vessel, including the anchor and outfit. The deck, where evenly floored, and the outside planking if all of one thickness, can be considered as a specific area of a given weight, and the c. gr. of the whole area found, without calculating each plank. Multiply the weight of each part by the height of its centre of gravity above the base line; add the moments thus obtained; divide the sum of the moments by the total weight. The result will be the height of the c. gr. of the vessel above the base line. The longitudinal position of the c. gr. is found by a kindred process, the distances being taken from the middle of the length.

CENTRE OF GRAVITY OF A SQUARE.—The point of intersection of the two diagonal lines. The same in a parallelogram.

CENTRE OF GRAVITY OF TRIANGLE.—From the middle point of any two sides draw lines to the opposite angles. The point of intersection is the centre of gravity. Or, drawing a line from the middle point of any side to the opposite angle, the centre of gravity is on that line one-third of its length from the given side.

CENTRE OF GRAVITY OF A TRAPEZOID.—Bisect the parallel sides and draw a straight line A B between their middle points. Subtract from 1, one-third of the difference in length of the two parallel sides divided by the sum of their length; multiply the result by one-half the length of the bisecting line A B. Set off the measurement thus obtained on the line A B from the longer of the two parallel sides. The point thus obtained is the centre of gravity.

CENTRE OF GRAVITY OF A TRAPEZIUM.—Draw a diagonal, dividing the figure into two triangles. Find the centre of each triangle, and join them by a straight line. Now divide the trapezium into two new triangles by a diagonal between the remaining corners, find the centre of the new triangles and join by a straight line. The point of intersection of the two straight lines is the centre of gravity.

CENTRE OF GRAVITY OF A FLAT CURVED LINE.—Draw the chord of the curve. Bisect it, and from the middle point set up a perpendicular toward the curve. The centre of gravity (approximate) is at two-thirds the height of the perpendicular. If the curve reverses, draw a chord between the two ends, find the centre of gravity of each section of the curve, join the centres by a straight line; the middle point of this line will be the centre required. This calculation is exact only in case the two parts of the reverse curve are nearly of equal length.

CENTRE OF GRAVITY OF A CONE OR PYRAMID.—At one-fourth the perpendicular height.

CENTRE OF GRAVITY OF CONIC FRUSTUM.—Let the radius of the base be R; the radius of the top be r; the height be h. The rule is: Distance of c. gr. from base equals $R^2 + r\,(2\,R + 3r)$ divided by $R^2 + r\,(R + r)$; the result multiplied by one-fourth the height.

CENTRE OF GRAVITY OF PYRAMIDIC FRUSTUM.—Let the area of the base and top be respectively A and a; the height, h. The rule is: Distance of c. gr. from base equals $A + 3a + 2\sqrt{Aa}$ divided by $A + a + \sqrt{Aa}$, the result multiplied by one-fourth the height.

CENTRE OF GRAVITY OF AREA OR VOLUME.—In this calculation the area is bounded on one side by a straight line and on the other by a curve, or if a volume bounded in part by a plane and in part by a curved surface. This calculation proceeds upon the principle that the figure or volume is divided into a great number of very thin slices. The weight of each slice is in exact proportion to its length in the plane figure or its area in the volume. Each slice is multiplied by its leverage or distance from one end of the figure; the products or moments are added together, and the total sum of the moments is divided, in the one case by the total area of the figure in square feet, and in the other by the total volume in cubic feet. The result is the distance of the c. gr. from the end of the figure. In practice, the calculation for centre of gravity is carried on simultaneously with the calculation for area or volume. It saves much trouble to take the midship section as the starting point for leverage. Proceed as follows:

Area and Centre of Gravity of a Load Water Line of a Schooner.

No. of the respective ordinates of the water line beginning at the bow.	Length of the ½ widths, feet and decimals.	Simpson's Multipliers	Products	Multipliers for leverage.	Moments.
Stem, or 1.	0.25	1	0.25	8	2.00
2	1.00	4	4.	7	28.00
3	2.40	2	4.80	6	28.80
4	4.21	4	16.84	5	84.20
5	5.69	2	11.38	4	45.52
6	6.95	4	27.80	3	83.40
7	7.65	2	15.30	2	30.60
8	7.94	4	31.76	1	31.76
Dead flat, or 9.	8.	2	16.	0	0.
10	7.94	4	31.76	1	31.76
11	7.35	2	14.70	2	29.40
12	6.05	4	24.20	3	72.60
13	4.10	2	8.20	4	32.80
14	1.50	4	6.00	5	30.
Stern post, or 15.	0.25	1	0.25	6	1.50
			3 | 213.24	Moments forward	334.28
			71.08	Moments aft	198.06
			6.		3 | 136.22
		½ area of water line	426.48		45.4066
					6.
					272.4396
					6.
				426.48	1634.6376

Centre of gravity of water line area forward of dead flat............ 3.83

Or, to simplify, divide 136.22 by 213.24, and multiply by the common interval 6. Area of whole water line, 852.96 square feet. Centre of gravity of the water line area, aft of middle, 2.17 feet.

Volume and Centre of Gravity of a body bounded by a plane, and a curved surface. This being a Calculation for Displacement of the Schooner above.

No. of vertical cross sections beginning at bow.	Area in square feet of ½ cross section.	Simpson's Multipliers	Products......	Multipliers for Leverage.	Moments.
Stem, or 1.	0.50	1	0.50	8	4.00
2	1.87	4	7.48	7	52.36
3	6.54	2	13.08	6	78.48
4	12.70	4	50.80	5	254.00
5	19.24	2	38.48	4	153.92
6	25.26	4	101.04	3	303.12
7	30.06	2	60.12	2	120.24
8	33.14	4	132.56	1	132.56
Dead flat, or 9.	34.20	2	68.40	0	0.
10	32.33	4	129.32	1	129.32
11	27.10	2	54.20	2	108.40
12	19.24	4	76.96	3	230.88
13	10.10	2	20.20	4	80.80
14	4.	4	16.	5	80.
Stern post, or 15.	.50	1	0.50	6	3.00
		3	769.64	Moments forward....	1098.68
			256.546	Moments aft..........	632.40
			6.	3	466.28
½ volume of displacement in cubic feet..			1539.276		155.426
					6.
					932.556
					6.
				1,539.276	5,595,336

Centre of buoyancy of Displacement forward of dead flat, in feet.........................3.63
Or, to simplify, divide 466.28 by 769.64, and multiply by the common interval 6.
Total Displacement 3078.552 cubic feet. Centre of buoyancy of Displacement, 2.37 feet aft of *middle*.

Note :—The proper multipliers for leverage are of course the distances from the starting point; but as the cross sections are equidistant, the distance of each one is a multiple of the common interval. It promotes ease of calculation to use the multiples only at first, the result being finally multiplied by the common interval to make the work complete.

CENTRE OF EFFORT OF THE SAILS.—Trim the sails straight fore and aft. Find the centre of each sail. Set up a perpendicular through the middle of the vessel's length. Find the moment of each sail forward, or aft, of the perpendicular. From the sum of the moments forward, substract the sum of the moments aft, or vice versa, and divide by the total sail area. The result will be the distance forward, or aft, of the perpendicular of the centre of effort. The perpendicular height above the load water line is found by the same process.

CENTRE OF LATERAL RESISTANCE.—Find the centre of the vertical middle line plane of the immersed body of the vessel, including centreboard. The true centre is slightly forward of this point, but cannot be exactly determined.

AVERAGE SECTIONAL AREA OF A VESSEL.—Divide the total volume by the length. The average width of a plane area is found by dividing the total area by the length.

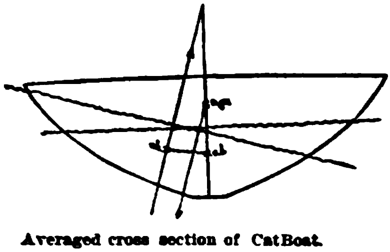
TO FIND THE SURFACE STABILITY.—By surface stability is meant the tendency of a vessel, when heeling under the wind, to return to an upright position, so far as this tendency is due to her form. The young yachtsman will seldom have occasion to calculate the stability of a small boat. Nevertheless, to understand the principles governing stability will always be of service to him. The centre of buoyancy (which is the centre of gravity of the volume of water displaced by the immersed part of the hull) and the centre of gravity of the whole vessel, are always in a vertical line, one above the other. That which supports a weight must be under the weight or over it. If the c. gr. is below the c. b. the vessel will be too stable; she will roll with a quick, jerky motion, very trying to the masts, sails, and hull. If the c. gr. is at a moderate distance above the c. b., the boat will roll easily and comfortably. If the c. gr. is too high, the yacht will be top-heavy and will capsize upon slight provocation.

A few actual trials will demonstrate better than any calculations whether the c. gr. of a particular yacht is too high or too low; and if there is any trouble it can be corrected by proper stowage of ballast. All the same, a builder should always learn, long before his boat is launched, where the centres of buoyancy and gravity are coming.

Another element of stability that comes into play is the height of the centre of effort of the sails. The force of the wind is exerted with a power equal to the total pressure upon the sails multiplied by the height of the centre of effort above the surface of the water. This leverage, which tends to capsize the boat, is offset by the far greater leverage of the weight of the whole boat, outfit and cargo, acting through a distance that will now be explained. When a broad-bottomed boat inclines sidewise, part of the hull rolls under water and a part that has been under rolls out, and the shape of the volume of water displaced is considerably changed. The centre of buoyancy rapidly moves out sidewise beyond a perpendicular dropped through the centre of gravity of the boat. The horizontal distance between the centre of buoyancy in its new position and the perpendicular through the centre of gravity forms the lever, which, multiplied by the total weight of the boat and ballast, offsets the leverage of the sails, and restores the boat to its upright position. The amateur will gain a good many valuable ideas on the subject of different models by studying how the centre of buoyancy changes in different boats. In an ordinary barrel, for instance, it always remains exactly under the centre of gravity; a barrel will therefore roll over and over continually; there is nothing to bring it upright again. In a broad-beamed boat there is a powerful leverage. In a narrow and deep boat like a cutter there is an exceedingly small leverage and no stability whatever, so far as the vessel's form is concerned; and a cutter could never put out to sea at all, nor even stand up in still water, were it not for a quantity of lead ballast in the keel, sometimes equal to the weight of a locomotive, which brings the centre of gravity far below the centre of buoyancy.

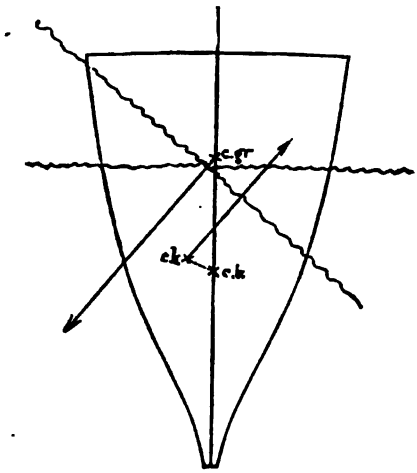
To demonstrate these points, and calculate the stability of any vessel, let the amateur draft an averaged cross section of the vessel. To do this, proceed by the rule to find the average width of each water line, and the average width on deck. Construct the whole average cross section, as in the process of making the midship section in a body plan. If, now, a vessel could be built with vertical ends, having this averaged cross section at every point in its length, its stability would be exactly the same as that of the original vessel. Stability can therefore be calculated from this averaged cross section. Now select the load water line and draw a new load line, showing the vessel inclined at any reasónable angle. Notice the wedges of immersion and emersion. As large a volume of the vessel must roll under water as comes out; and the newly emerged and immersed portions of the volume are in the shape of wedges. The two wedges must be exactly equal in size; if they are not, move the new load water line upward or downward until the wedges are equal. Now find the centre of the immersed body of yacht in its new position, both vertically and horizontally. Drop a perpendicular through the centre of gravity, which is usually at or a little above the load line of the vessel, and measure the distance from the new centre of buoyancy to that perpendicular. This distance is the righting lever. As soon as the righting leverage is known and the weight of the vessel, the amount of sail she will stand can be immediately calculated.

The following illustrations are the averaged cross sections of a catboat and a cutter, both extreme types of vessels. In the inclined position, the catboat has a strong leverage which



Averaged cross section of CatBoat.

tends to right it. In the cutter, which has no stability of *form*, there is no righting leverage at all; on the contrary, the leverage is all exerted to capsize the vessel. The arrows shew in which direction the buoyancy and the weight of the vessel respectively act. As stated before, the only way to hold a cutter up at all is to put an enormous quantity of ballast in her keel and add to it by ballast inside until the centre of gravity comes below the centre of buoyancy.



Averaged cross section of Cutter.

SURFACE STABILITY BY CALCULATION.—Divide the load water line plane into a even number of equal intervals, and measure the half-breadths. Cube the half-breadths, and multiply them as though they were ordinates of a curve with Chapman's multipliers (1, 4, 2, 4, 2, 4, 1); divide the sum of the products by 3, and multiply by the common interval. Two-thirds of the area of the curve thus ascertained, multiplied by the sine of the angle of heel, will be the moment of stability at that angle of heel.

DYNAMICAL STABILITY.—The dynamical stability is the resistance opposed to heelingn growing out of the fact that when a properly modelled vessel is on her beam ends, the centre of gravity of the vessel is raised and the centre of buoyancy depressed. To find the dynamical stability, first find the height of the metacentre above the centre of buoyancy. Proceed as in the rule above. Two-thirds of the area of the curve divided by the cubic feet of displacement is the height of the metacentre above the centre of buoyancy. Now find the centre of gravity of the vessel. The tons of displacement, multiplied by the height of the metacentre above the centre of gravity and by the versed sine of the angle of heel, is the moment of dynamical stability.

TO APPLY THE LINES OF A VESSEL TO ONE OF A DIFFERENT SIZE.—The shape of each cross section below the load water line and of each water line fore and aft, is that of a parabolic curve having its base in the greatest width of the cross section or water line. Consider the greatest width of any cross section or water line plane as 1, a unity. Divide the cross section or water line by equi-distant parallel lines, and reduce the width at each point of division to perrentage of the greatest width. For instance, the widths of a 36-foot Connecticut sharpy and of a 60-foot Roslyn yawl, are as follows:

Connecticut Sharpy.			Roslyn yawl.		
	Gunwale widths.	Floor widths.		Gunwale widths.	Floor widths.
Stem.	0.	0.	Stem.	0.	0.
1	.538	.467	1	.453	.356
2	.846	.782	2	.726	.656
3	.969	.921	3	.881	.886
4	1.00	1.00	4	.961	.970
5	.969	1.00	5	1.000	1.000
6	.82	.956	6	.948	.950
7	.763	.848	7	.801	.843
Stern.	.615	.721	Stern.	.587	.714

Now to build smaller boats on those models, select the proper width of beam on gunwale and floor, and multiply by these percentages. A 30 foot boat with 6 feet beam on the gunwale and 4 feet on the floor, modeled after the Roslyn yawl, would measure as follows :

	Gunwale widths.	Floor widths.
	ft. in.	ft. in.
Stem.	0	0
1	2.8½	1.5
2	4.4¼	2.7½
3	5.3 1-3	3.6¼
4	5.9	3.10½
5	6.0	4.
6	5.8 1-8	4.
7	4.9½	3.4½
Stern.	3.6	2.10¼

Nystrom, the American engineer, and Constructor Pook, of the United States Navy, have both printed elaborate tables for recording the lines of vessels upon this plan.

TOOLS AND MATERIALS.

Few special tools are required in boat building. The most that the amateur needs is an ordinary carpenter's outfit. If he were going into the business as a vocation, he could lay out $200 to good advantage. But $25 will buy all the tools that are really necessary. They are, according to John T. Smith, boat builder in New-York, as follows :

A good hammer.

A large hand-saw, a small, fine-toothed one.

Two chisels, one-fourth inch and one inch respectively, with wooden mallet.

Steel square.

Jack plane, smoothing plane, a hollow plane for mouldings, a round plane for the inside of planks; and a rabbet plane can be added if desired.

A half dozen brad awls.

Four-foot rule.

Spirit level.

Two or three wrought-iron clamp screws, for holding planks in position while they are being nailed.

A nipper, for biting off the ends of copper nails.

Gimlet bits for different sizes of nails; one long gimlet bit, say ten inches, for going through deep wood.

A half-round bastard file.

Plumb bob and line.

Chalk line.

Two gouges.

Burr starter, two sizes, which can be made of short lengths of small gas pipe filled with lead.

A set, a piece of bar iron, an inch square, fifteen to eighteen inches long, bent to form three sides of a square, for holding on the inside of the boat while driving nails from the outside, or vice versa; its weight is about five pounds.

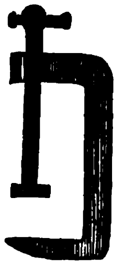
Caulking iron and mallet.

Putty knife.

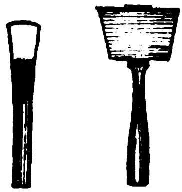
Reamer for iron.

Three or four light cedar or white pine battens, five feet long for the frames and twenty to twenty-five feet long for the water lines, or longer, according to the size of the boat. Shipbuilders use battens from forty to sixty feet long, and in Washington Territory up to ninety feet long.

One adze, for dubbing off the stem and stern post and any other heavy timbers, though practically this tool will not be much used.



Planking Screw.



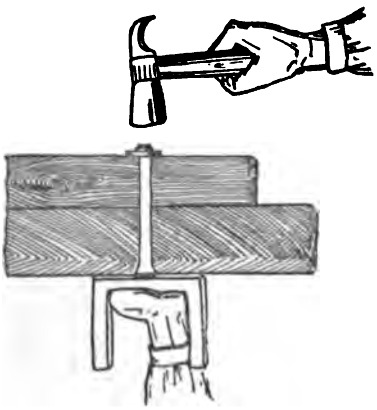
Caulking Mallet and Tool.

With this outfit the amateur yachtsman can construct almost any vessel up to fifty feet in length.

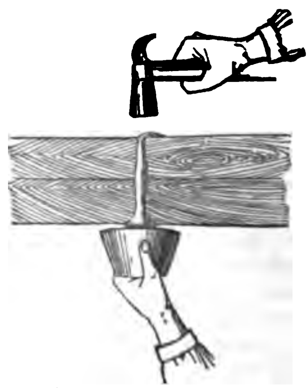
The most bulky article in the plant remains to be mentioned. This is the steam box, in which the frame timbers and outside planks are steamed, in order to render them tough and flexible. The box is about a foot square and about twenty feet long. It is made of one inch pine plank, closed at one end and furnished at the other with a strong and tightly fitting door. Steam is produced from any old iron kettle, which is fitted with a strong wooden lid of one-inch pine, two thicknesses, the seam between the lid and kettle being closed with red lead. The lid is held in place by the weight of one end of the long steam box. Any boy can construct an impromptu brick furnace, with an iron door, and stove-pipe chimney, for holding the fire. Two holes are made in the wooden lid. One is closed with a wooden plug; the other is for a little square wooden pipe, which runs up into the steam box and supplies it with steam. When the boiler requires water, the wooden plug is pulled out and the water poured in there. If the outer end of the box is supported on a wooden horse, and is tilted up above a level, the condensed water in the box will continually run back into the boiler.

With regard to the materials of which a boat is built, a word may be said. In large trading vessels there is no material that is better than American white oak for the frames, stern posts, keel, keelson, planking and ceiling. Owing to the growing scarcity of oak, however, Southern pine is now generally used for nearly the whole vessel, except that the frames are made of oak and the decks are almost invariably laid with white pine. Sometimes hackmatack and spruce are used for the upper part of the frames, in order to lighten the vessel; and maple, beech and birch are used for the lower parts of them. The large wooden knees, which secure the beam ends to the frames, are of hackmatack or oak, natural crooks cut from stump and roots of the trees.

The fastening of the vessel is heavy iron and copper bolts and spikes, and wooden treenails. If a yacht is to cross the ocean, or be used in stormy waters anywhere, or carry heavy cargoes, she ought to be built in the same substantial style as a merchant vessel. But a different principle prevails in small yachts as they do not have hard service to perform. We want the vessel as light as possible, in order that the weight necessary for stability may be put just where it does the most good, namely, as low down in the hold as possible, or into the keel. So the rule in yacht building is: the lightest possible form of construction, and the lightest materials, consistent with safety, the whole craft fastened in the lightest and most secure manner. Oak is used for the centre work, namely the stem, keel, keelson and stern post; oak or cedar roots for the frames in small boats; and in large boats oak, hackmatack and spruce. The planking is either white pine or cedar, with garboards, gunwale streak and covering plank of oak. Deck beams are made of white pine or spruce. The deck plank is



Riveting a Boat Nail.



Clinching a Clout Nail.

always of white pine. The spars are of white pine or spruce. (For weights of American woods see "Specific Gravity.")

For the fastening the builder will buy galvanized iron nails for those places where a plank is fastened to a timber by driving a nail. For work where the end of the nail is to go through two thicknesses of wood, and be clinched on the inside, he must buy copper boat nails. There are two kinds, the clout nail, the sharp end of which is hammered over upon the surface through which it projects. The other is the boat nail; when this nail is driven through, a burr, or washer, is put over the sharp end of it and driven down to the wood by the burr starter; and then the end of the nail is hammered over upon the burr and then riveted. The nail should be long enough to go clear through the two thicknesses of wood and leave half or three-quarters of an inch projecting. With the nippers all but a quarter inch of the end is cut off; the set or riveting iron is held against the head of the nail; and the hammer taps the small end until the nail is clinched.

Sails are made of strong cotton cloth or twills, which comes in various widths. For trading vessels the bolts are 22 inches wide. The yachts use narrower widths so that the seams (which hold the sails flat as a board) shall come nearer together.

Standing rigging should be of wire rope, because it is smaller and lighter than hemp.

BUILDING A SAIL BOAT.

Before attempting to build a boat, it is better for the amateur to have sailed one for a year or two and to have done all the repairing of her himself.

If he buys an old boat to experiment upon, it is astonishing how much he will learn of the mechanics of construction, after about two seasons of overhauling the ancient craft. When the planking and timbers begin to decay, the pieces that are defective must be taken out and replaced with sound wood. As a rule, the moment a man begins to repair a pretty old boat, he finds that he must go on carpentering for a considerable time. If a streak of planking has to come off, as likely as not the opening will reveal decay in a frame somewhere; the frame must then come out to make way for a new one. If the stern post is weak, its removal may expose decay in the skag. And so on clear through the boat.

The schooner America that won the cup at Cowes in 1851 has been repaired, until there is not now a single ounce of wood, iron, or other material of the original boat left in her. In large trading vessels, the operation of opening up the hull in order to repair a defective part frequently reveals such a state of general decay that the vessel is more than half rebuilt before the shipwrights finish their work. In New-York there is on record one case of a ship which was hauled out for repair, and which, when launched anew to resume her voyages, had nothing left in her of the original ship except the keel.

These matters are referred to, to show the advantage to the amateur builder of taking his first lessons in construction in the excellent school of mending an old boat. The "reason why" of many things will come into his mind without a master. Besides that, the experience of sailing the boat for two seasons will teach him whether or not he needs more or less beam in the new boat, a larger or smaller sail, and whether easy handling of the vessel will be promoted by shifting the position of the mast; and he will also learn the points about the craft which demand special strength and exactness in construction. If he should terminate the career of the old boat by pulling her to pieces, he would derive great advantage from studying how the parts were fitted together and fastened.

For all practical purposes a boat eighteen feet long on the water line, to have a cat rig, is the most convenient size for the amateur to make his first attempt upon. In deciding upon the other dimensions, the builder will be governed by the purposes for which the boat is intended. If for racing, the beam can be as narrow as seven feet, and the sail long both on the boom and gaff. If he wants a boat that is perfectly safe, for carrying pleasure parties of friends, and for knocking around comfortably in all sorts of places, he will give the boat from eight to nine feet of beam and use a sail with a narrower head. An able, safe, satisfactory boat for general purposes with safe and manageable sail will have about the following moulded dimensions: Length on water line, 18 feet; beam, 8 feet 4 inches; depth from gunwale to keel amidships, 2 feet 1 inch; sheer forward, 9 inches; aft, 6 inches; deck width at stern, 6 feet; dead flat, 10 1-2 feet from stern; overhang of stern, if there is one, about 2 feet.

Half breadths on the different water lines and the deck, at the square stations:

Half breadths on the different water lines and the deck, at the square stations.

Stations.	1st water line above keel. Feet, inches, and 16th of an inch.	2d water line above keel. Feet, inches, and 16th of an inch.	3d water line above keel. Feet, inches, and 16th of an inch.	4th water line above keel. Feet, inches, and 16th of an inch.	Rail widths Feet, inches and 16th of an inch.	Sheer heights. Feet, inches, and 16th of an inch.
Forward perpendicular or 1.	0.0 .8	0.0 .8	0.0 .8	0.0 .8	0.1 .0	2.10.0
2	0.5 .7	0.8 .8	0.11.0	1.0 .8	1.1 .14	2.8 .0
3	0.9 .8	1.5 .2	1.9 .2	1.11.12	2.1 .3	2.6 .1
4	1.3 .7	2.0 .12	2.6 .0	2.9 .1	2.10.9	2.4 .8
5	1.10.0	2.9 .0	3.2 .6	3.5 .2	3.6 .0	2.3 .0
6	2.3 .10	3.3 .8	3.8 .6	3.10.8	3.10.13	2.1 .14
7	2.6 .0	3.8 .0	4.0 .0	4.1 .1	4.1 .2	2.1 .4
8	2.6 .8	3.9 .0	4.1 .2	4.2 .0	4.2 .0	2.1 .0
9	2.4 .0	3.6 .10	4.0 .4	4.1 .12	4.1 .12	2.1 .7
10	1.5 .4	3.2 .8	3.10.8	4.0 .12	4.0 .12	2.2 .6
11	0.7 .10	2.2 .0	3.5 .0	3.10.1	3.10.13	2.3 .9
12	0.4 .8	0.8 .8	2.3 .0	3.3 .8	3.6 .11	2.5 .4
After perpendicular	0.0 .12	0.0 .12	0.0 .12	1.6 .8	3.0 .0	2.7 .0

Water lines 6 inches apart. Square stations 18 inches apart.

SCANTLING.—Keel: White oak, free from flaws and stains, 8 inches wide at the centre board, tapering to 2 inches at the stem, and 2¼ inches at the stern post; 2 inches thick. Stem: White oak, moulded 6 inches, sided 2 inches, with a scarf of 12 inches on the keel; rabbet ½ in. deep. Stern post: White oak, moulded 6 inches, sided 2¼ inches. Skag: Oak, sided to suit the width of keel. Frames: Cedar roots, natural crooks of oak, or pieces of oak bent after steaming, moulded 2 inches at the keel, sided 1¼ inches, and tapering to 1½ by 1¼ inches at the gunwale; spaced 12 inches apart. (Frames as light as 1¼ by ¾ inches are used, but the larger size makes a strong boat.) Garboards: White oak or pine, 1 inch thick, about 7 or eight inches wide. Planking: Cedar or pine, ¾ inch thick, put on in streaks from 4 to 8 inches wide. Deck beams: White pine or spruce, 2 by 2½ inches, one to each frame; camber, 2 inches. Deck plank: White pine, 1 inch thick, 2 inches wide, if laid to suit curvature of gunwales; if laid straight fore and aft, ordinary matched pine flooring, 1 inch thick. Bed piece of centre board trunk: Oak, 2 inches thick, the width of the keel; head pieces, oak, 3 by 1½ inches, planked with pine 1 inch thick, 8 to 12 inches wide. Centre board: Oak, 6 feet long, 1¼ inch thick, strapped with iron. Rudder: Oak, 2 feet 9 inches long. Ballast: 400 to 500 lbs. of pig iron.

Mast, total length..23 feet.
Boom..20 feet.
Gaff...11 feet.
Hoist of sail................19 feet; foot, 19 feet; head, 10 feet.

Canvas for the sail, 7 ounce twills, 30 inches in width, each cloth bighted once or twice according to fancy.

The weight of this boat, without ballast, will be about 1,500 pounds. She will carry 500 pounds of ballast, and a company of six people, on a draft of 15 inches aft and about 8 inches forward. She can carry fifteen people. She will carry 200 pounds of ballast more without any other effect than to increase her draft an inch or so and promote her stability. If, from his previous experience, the young builder does not value so much freeboard, he can lower the sheer heights two or three inches the whole length of the boat. First make a careful drawing on a scale of two inches to the foot; fair the lines; then lay them off to full size on the floor of the barn or woodshed.

From the drawing a fair estimate can be made of the lengths of the stuff to go into the boat; the thicknesses are already given in the specifications. The planed lumber can be ordered from the lumber yard. The spars should be ordered from a professional spar-maker, if there is one. To obtain suitable frame timber is sometimes difficult. The usual plan is to dig up one or two large cedar stumps, with their roots, and send them to the sawmill, where they are sliced down by parallel cuts, spaced so that the slices have the siding thickness of the frames of the boat. By this process, nearly, if not all, the frames of the boat can be cut out of natural crooks. If the builder is compelled to use straight stuff, the curved pieces must be steamed and bent on a form, and then cooled; they will retain their shape when thoroughly cool and dry.

The keel will be fashioned out of an oak plank of the requisite thickness. This is the backbone of the vessel, and must be free from cracks and the stains which promise decay. Draw with black pencil the taper toward the ends and the centre-board slot; and shape the keel with saw, chisel and plane. Then stretch it on four wooden horses about three feet from the ground, in order to build your boat where you can get at any part of it. Stretch it exactly level. The upper edges of the keel must be rabbeted to receive the edges of the planking; the depth and width of rabbet can be taken off from the mould loft floor with a pair of compasses. The ends of the keel can then be fashioned to receive the stem and stern posts, following the plan laid down in the drawing. In all the work of the boat, from the outset, make all the edges of the timbers true and every line as exact as possible.

Stem and stern posts are gotten out from oak plank of the proper thickness, and are moulded in accordance with the drawing. By first marking the moulded outlines of the pieces on the side of the plank, the saw will get them out in a few moments. The stem sometimes has a tapered siding, being thinnest at the upper end; the lower end must be of the exact siding of the keel at that point. The outside edge of the rabbet must then be drawn on both sides of the stem and stern post, and the rabbet cut in part way; it is usual to leave a little wood to be trimmed off in fairing, while fitting the planking into place. Fit a piece of dead wood upon the keel in the bow to receive the heels of the forward frames, if necessary. Now get out the skag pieces, taking the siding thicknesses from the keel, and the outlines from the floor of the loft. Stem, skag, and stern post must now be set up exactly perpendicular and bolted in position. Be sure that they fit closely.

Next get out the bed pieces to the centre board well, and bolt them securely in place either with bolts or strong nails driven from below and clinched inside. Paint the surfaces of keel and bed piece which come in contact with white lead and place a piece of cloth between them, a simple and effective manner of caulking these seams.

The next operation is to put in the frames. The amateur will do well to get out three or four moulds, composed of light pine boards tacked together, giving in their outer contour the exact shape of the frames at the points in the boat where they are to be used. On the outer edge of these moulds mark the exact height of the gunwale and draw a vertical line across them in the middle to aid in setting them up exactly in the middle of the keel, in a true perpendicular. Get out the stern board and bolt it in place. Now shore up the frame moulds in place, and tack upon them a temporary gunwale streak or a pine batten, extending from the stem to the stern board in order to hold the moulds securely in place. It will be well, also, to tack a second batten the whole length on both sides along the bilge of the boat, ending on the stem and stern post, both for additional security and as a guide to the eye afterward in planking.

The frames can now be made. In boats of this size the frame on each side of the keel is a single stick extending from the middle line of the keel (or from the bed piece of the centre board) to the gunwale; the two sides of the frame are joined by a floor piece, which crosses the keel and extends two or three feet each way up toward the bilge. This floor piece is fastened to the frame by strong wooden pins or copper nails riveted. This constitutes the single frame. In large vessels double frames are used, because it is difficult to obtain long pieces of timber of the right curvature, and the frame must be made up of two sets of short pieces, which break joints and thus support each other. In a small yacht single frames are sufficient. Each frame is now put in and securely fastened to the keel by a screw bolt through the floor piece driven through from below and fastened inside; strong copper or galvanized iron nails will do if riveted. At the proper time the temporary moulds which give shape to the boat can be taken out and permanent frames be inserted in their place. If the work is being properly done, the battens tacked to the outside of the boat will fit closely to every frame, and show that the surface of the boat is fair. If the surface is not fair the planking will not fit. Make the upper ends of the frames an inch or two longer than necessary. At the proper moment the gunwale line can be marked off on them and the tops sawed off.

The gunwale can now be marked off. This is usually done by attaching a light batten to the frames, the edge passing through the proper points marked on stem, stern and the dead flat frame. The depth of the boat and the sheer adopted in the drawing can be altered during this operation, if desired. A strong inside gunwale is often put in at this stage of the proceedings. It should be fitted to the frames at a depth below the gunwale line equal to the depth of the deck beams. Drive the nails clear through and clinch them on the outside of the frames. This inside streak answers to the shelf in large vessels.

In putting in the centre board well, insert the head pieces into the ends of the slot, and plumb them exactly perpendicular. Fasten them strongly. In planking up the sides of the well, use broad planks; the fewer seams there are to caulk the better. Take special pains to fit the inside edges of the planks closely. If a boat leaks anywhere it is usually around the centre-board.

Before going any further, the deck beams of the forward half of the boat must be put in. The beams rest on the shelf and are secured by galvanized iron nails, riveted, to the side of each frame, close to the gunwale line. They can also be fastened to the shelf. The proper round of the middle of the beam, or camber, is given by springing it up by a shore underneath. This rounding of the beam gives a curved surface to the deck and causes the spray and water to run off rapidly. The beams of the strip of deck around the cock-pit are sustained at the inner ends by light stanchions resting on the frames.

Now comes the most important operation of all, the putting on the outside plank, the operation that gives the boat its strength and safety. The planking is put on smooth, the edges of the streaks fitting closely against each other. In order to prevent the planks from going to pieces during the twisting they receive while being fitted to the curved surface of the boat, it is necessary to render them flexible and tough by a bath of from two to three hours in the steam box.

The first streaks of plank to go on are one of the top streaks (either the gunwale or the plank below it) and the garboard. If boards can be obtained to reach the whole length of the boat, well and good; there will be no butts amidships to be secured and caulked. Ordinarily, however, a good many streaks will go on in two lengths. Butts of adjacent streaks should be shifted to a distance of three or four frame spaces from each other; the further they are apart the better. The butts of two streaks should not end on the same frame, unless there are three or four planks between. Owing to the twisted surface of the boat, and the difference in girth at different points in its length, the different planks are all broader in the middle than at the ends, with the sole exception of the garboard, which is broader at the ends than in the middle. Make the garboard about six and a half inches wide amidships and about nine inches at the ends. Then if there are eight other planks on each side of the boat, they would average five and three-quarter inches in width amidships, three and one-eighth inches at the bow, and a little more than the latter figure at the stern. The lower planks are as broad as can be had, say six or eight inches; the upper ones narrower. The widths of all the planking can be marked on the body plan as laid down on the mould loft floor, amidships and at two or three other points, and can then be picked up with a pair of dividers and marked off on the frames of the boat. Each plank can then be trimmed accordingly. If a plank will not come into place, it can be sprung sidewise one or two inches at the ends; but this operation must not be resorted to unless the plank, when brought into place, fays closely its whole length to the plank adjacent to it. It is usual to plane each plank down for a few feet at each end to reduce the thickness at the end a quarter inch.

Before steaming, apply each plank to the boat to be sure that it will fit snugly into the rabbet and fay closely to the frames. Remove any inequalities in the rabbet or frames. Then send the plank to the steam box. Have your hammer, nails, burr starter, clamp screws, nipper and riveting set ready. Then bring the steamed plank from the box. If it is to go on a very curved surface, lay it on the floor, put your knee upon it and bend it a trifle with your hands. Then either fasten it in place with the clamp screws, or have a boy hold one end of it, while you operate upon the other. Fasten it at bow or stern first with strong nails an inch apart, and work toward the middle of the boat, bringing it snugly down to the next plank below with the hammer, and fastening it upon each frame as you go along with nails an inch apart, riveted inside. Two kinds of nails may be used, copper, which resists salt water, and galvanized iron, which answers for fresh water. The prettiest job in appearance is made with the copper boat nail; but an equally secure fastening is gained with the clout nail, the sharp end of which is bent over with the hammer and imbedded in the wood. Having brought the plank into place, bore a hole through plank and frame with a fine gimlet bit, a trifle smaller than the nail; drive in the nail gently as far as the head, then sink home both plank and nail. Hold the set against the inside of the frame. If the ordinary boat nail is employed, drive down the burr with burr starter and hammer, nip off all but a quarter inch of the projecting end, and rivet it down upon the burr with the hammer, holding the set against the head of the nail duing the operation.

Especial pains must be taken throughout the whole process of putting on the plank to make the edges of adjacent planks fit each other to a hair's breadth, and the inside surfaces to rest solidly and smoothly upon the frames.

The garboard may be made of a little greater thickness than the rest of the plank, and is best when made of white oak. The gunwale streak should also be of oak.

A covering plank, or plank sheer, about four inches wide, must now be laid around the edge of the deck from stem to stern. The plank sheer covers the gunwale streak, the tops of the frames and the ends of the beams; if strongly fastened it adds great rigidity to the boat.

In laying the deck, two plans are followed. Narrow matched and grooved pine flooring may be employed, the planks laid straight fore and aft, the outer ones being trimmed to suit the curvature of the sides of the deck. A prettier result is obtained by using narrow stuff, springing the outside streaks to suit the curvature of the gunwale line. In the latter case, the strips will be one inch thick, two inches wide and have two good nails into each deck beam they cross.

The carpentry work about the cock-pit is too simple to require explanation. The combing should rise four or six inches above the deck.

Every seam in hull and deck must now be securely caulked with a light thread of oakum (care being taken not to start the planking while driving home the oakum) and fayed with hot pitch or red lead. Every little hole and crack must be stopped with red lead and putty. The hull can then be painted to suit the owner's fancy.

The final operation is to fit up the boat with rudder, cleats, stem-iron, with a stout ring for mooring, iron horse for the main sheet, and the spars, rigging and sail. The builder's own common sense will tell him that the safety of a vessel and its crew often depends on the excellence and strength of a single cleat. All the fittings should be sound, well-placed and securely fastened.

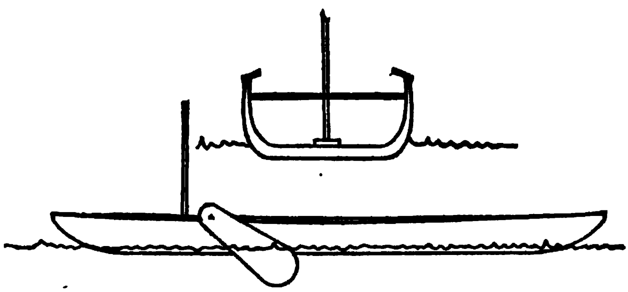
If the boat is well built, the amateur will experience the joy of a creative artist at every step in the process of construction, and a pride and happiness in its triumphant conclusion which will repay him for the hard labor, the expense and the loving care he puts into the work.

The skill acquired in the construction of this little craft will enable the builder to fly higher in the art. The larger his boat, the heavier must be the scantling and the stronger the fastening; the operations of building are all the same.

SHARPIES.

BY THOMAS CLAPHAM, OF ROSLYN, N. Y.

Any one who remembers the coast of Connecticut forty years ago, will recall the long narrow canoes which were then in common use among the inhabitants of the fishing villages as oyster and fishing boats. Those canoes, many of them twenty-eight feet long, three feet wide and fifteen to eighteen inches deep, were each shaped and hollowed out from a single pine, poplar or chestnut log. They had come down to the period named from the Indians, who had made and



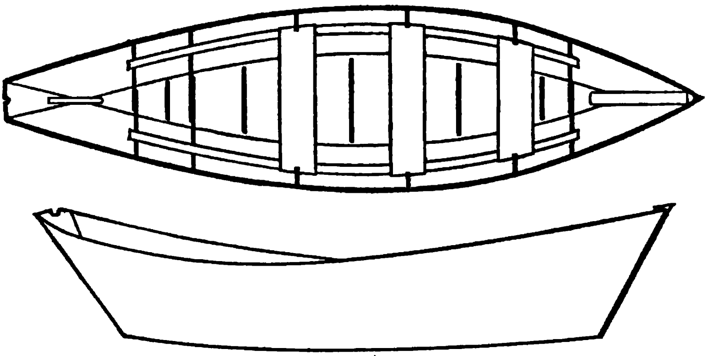
The Connecticut predecessor of the Sharpy.

used boats of that construction before the coming of the Puritan settlers 200 years before.

The canoes answered the purposes of oyster fishing; but they were heavy and the construction of them was a tedious process. After a while the supply of large forest trees, suitable for canoes, gave out; and these primitive craft were then made for a few years on the head-waters of the Connecticut River; afterward on the banks of Cayuga Lake, in New-York State, where there were still a few large pine trees. But the supply of proper timber finally failed and the Connecticut fishermen had to adopt another style of boat.

Just in the nick of time a Down-East Yankee appeared, who was familiar with the beautiful light fishing skiff of Massachusetts called the "dory." He showed the Fair Haven fishermen how to replace the canoe with a lighter, cheaper and better boat, by setting up a midship section of proper form, bending around it a suitably shaped plank for each side of the boat, securing it at both ends to timbers forming a bow and stern, and nailing short planks crosswise to form the bottom of the boat. The boat thus briefly described was flat-sided, very sharp at the bow, and flat-bottomed. On account of the fineness of her bow she was called a "sharpy"; and all of her kind have, since that time, not only retained the name but also practically the original method of construction. The only changes have been such details, relating to the frames and finish, as have been found necessary to adapt them to their many new uses.

The sharpy was remarkably well fitted for rowing, on account of its light weight, light draft and sharp bow. In fact it has ever since remained the handiest form of board skiff in America, not excepting the dory, which, however, it very closely resembles, the chief difference between these two rowing boats being that one is adapted for compara-

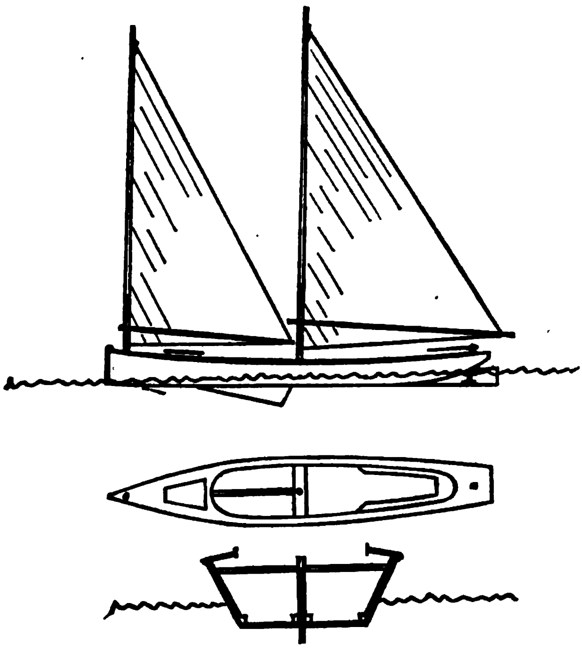


Fishing Dory.

tively smooth water, whereas the dory is used on the open ocean and is deeper and has more sheer. Of course the model of the sharpy was gradually improved and the size increased; and, after a while, the boat was fitted, as the canoes were, with a light pole mast spreading a leg-of-mutton sail. Then a second mast and leg-of-mutton sail, and a centreboard were added, the latter to prevent leeway in beating to windward. The old canoes had used a leeboard, hung over the leeward side of the boat. By these additions the Connecticut fishermen finally gained a boat having the length, the narrow beam, light draft and general handiness of their old canoes, and surpassing the latter in lightness, cheapness and speed.

For a long period the sharpy's bottom remained perfectly flat from stem to stern. The next change was to give the floor, aft, a round up toward the stern, beginning at a point the length of the vessel's beam from the stern.

As a sailing boat the sharpy proved a great success from the start. Not only could she navigate waters so shoal as to be quite unapproachable by any other craft, but she was found to possess remarkable speed, and, what has always seemed strange, in view of her light draft, first-rate sea-going qualities. Few persons are aware that we have in America a species of narrow-beamed yachts of native invention, which out-Herod even the long narrow-beamed cutters of England and sail swiftly past all other styles of yachts in waters that are suited to them. While the attention of yachting men and the public is concentrated chiefly on sloop, yawl, schooner and cutter, the sharpy remains in favor with those who know her properties, and has a great future before her as a cheap, swift, handy pleasure boat of light draft and general utility.

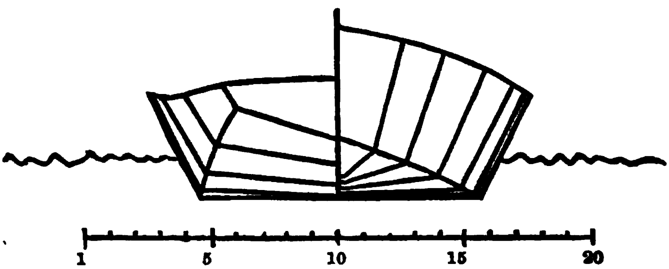


The Connecticut Sharpy.

As for her sea-going qualities, many people will not believe, even yet, that a sharpy can be seaworthy. They do not know the excellent record the sharpy has made. It is a fact that one of these boats, drawing no more than twelve inches of water, has been in constant use on Long Island Sound near Bridgeport for twenty years, and has often been seen beating to windward with ease and comfort in gales which the large coasting schooners that throng these waters did not dare to face. The advantages that sharpy yachts of proper design possess over any of the much vaunted and now thoroughly beaten cutters, are as follows: As single-hand yachts they are speedier, more comfortable, handier, stronger and safer; they are equally good sea boats; they can sail in water only a few inches deep, whereas the cutter cannot come anywhere near the shore without floundering like a stranded porpoise on a sand bar; they will not sink even if the bottom is knocked out; they can lie-to longer and keep their crew drier in a storm at sea; and their cost is not more than a third that of any other yacht of equal size.

But the sharpy with its flat floor has always "pounded" when striking a heavy sea, which has rendered the boat noisy and disagreeable to those who were out sailing for pleasure. Although they were in constant use along the Sound as open pleasure boats, they had not been thought suitable for regular cruising on account of the way they thrashed in stormy waters. In the spring of 1879 the writer became convinced that the sharpy possessed all the elements required for safe, pleasant and comfortable yachting; and he began a series of experiments, which resulted in his designing a yacht which, while retaining all the essential features and good qualities of the original sharpy, would not pound disagreeably while beating to windward. The principal improvement was in the shape of the bow, which was changed to a sharp V form. Built in this shape, the bow was found to divide the water gently instead of striking it with a shock.

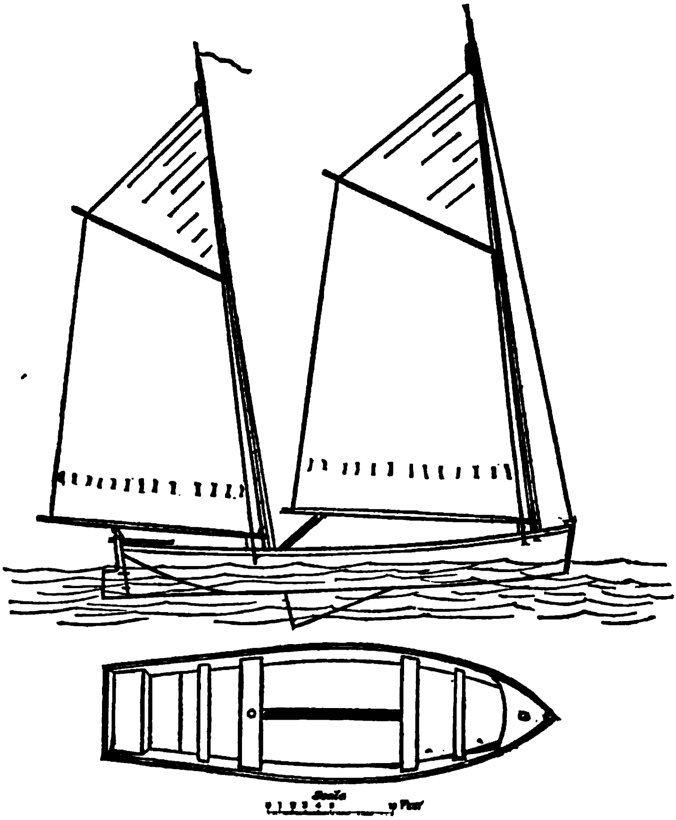
This new model is now favorably known throughout the United States, Canada and even in England, as the "Nonpareil" sharpy. A number of these yachts have been built, each more than sixty feet in length. Several have sailed to Florida and back in the winter.



Body Plan of the Nonpareil Sharpy.

Hundreds of sharpies are now in use upon Long Island Sound and around New-York, both as open fishing and pleasure boats and as decked yachts. Another fleet of them is owned on the lake coast of Ohio, where they are called pound boats. They are used on Lake Erie for fishing purposes, and are broader and heavier than the Connecticut and Long Island sharpy. The average size of the Lake Erie boats is thirty-six feet in length, ten and a half feet beam, and three feet in depth. The small boats are twenty-four feet in length; the large ones forty-two. The thirty-six-foot boats are fitted with two masts, forty-eight and forty-six feet in length, and carry large sails, spread by boom and gaff, with gaff topsails, all in one sail. On account of their width they do not have the speed of the clippers of Connecticut and Long Island, but they are very able and excellent boats. In short, the sharpy has finally, once for all, established her position as one of the best fishing boats in America, and as a pleasure boat, the cheapest, handiest and safest yacht extant.

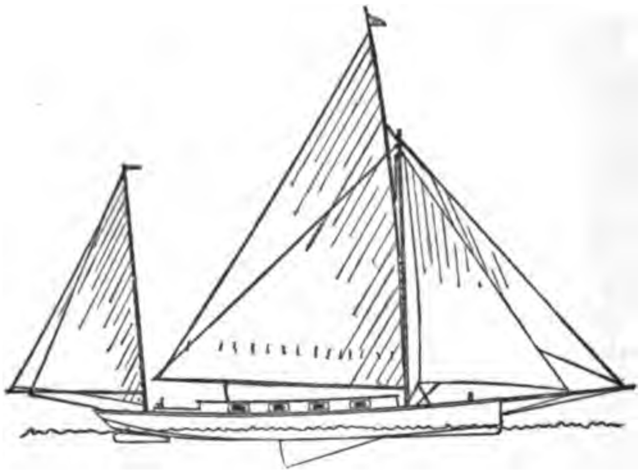
The fishing sharpies of Long Island Sound all carry one or two leg-of-mutton sails and a centreboard; and when they are used for racing they are loaded with men who sit upon the windward gunwale, and by their weight keep the boat very nearly upright, in which position they sail better to windward. If the wind is very fresh and the boat inclined to heel too much, a board sixteen feet long is put out to windward and one or more men sit upon this impromptu outrigger, in order to keep the weather bilge down to the surface of the water. In pleasure sailing, however, it is not agreeable to compel one of the



Fishing Sharpy of Lake Erie.

party on the yacht to sit outside of the boat, on a narrow plank, hanging on for dear life and ducking his feet occasionally as the sharpy rolls. To adapt these boats more perfectly to pleasure sailing, a number of them have been built recently with a keel, carrying iron or lead ballast. By this change something is gained and something lost. Inside space is gained by the removal of the centreboard trunk, and the boat is rendered virtually non-capsizable; a fine sea boat is the result. On the other hand the keel sharpy must necessarily draw more water and thus be shorn of much of her usefulness for harbor and river cruising; and she loses speed on account of the keel, the principle of this having been repeatedly proved not only by her own experience but by all the races for the America's Cup and in a thousand other contests in American waters.

Most of the sharpies on Long Island Sound, which are under twenty feet in length, have one pole mast, planted in the bow. The leg-of-mutton sail is spread at the foot by a sprit. In larger boats, as before stated, there are two masts, the second one being placed about midships. In very large boats the sprit is replaced by a boom, to which the foot of the sail is laced. In a thirty-five-foot boat the masts would be about thirty-six and thirty-nine feet in length. In experimenting with the sharpy the writer discovered that the ordinary rig, here described, while well adapted to small craft, and especially to those used for business purposes, did not fully meet the requirements of yachting



The Roslyn Yawl, with Cabin and Double Head Sail.

and regular cruising. This was chiefly because with the old style of sails, spars and gear, reefing could not be quickly and easily done, when it was desirable to shorten sail. He therefore designed a handy form of rig, called the "Roslyn yawl rig." This rig is now accepted as the best for all sharpy yachts more than twenty-five feet in length. It consists of two masts and three sails, jib, mainsail and driver. The sails are all triangular in shape and are so placed, with reference to the lateral resistance of the hull, that no reefing is ever necessary, even in the stormiest weather. If it become desirable to reduce the canvas, one or more of the sails is lowered and furled. The boat steers perfectly well to windward, or free, with such sail as remains spread. As a consequence of this simple arrangement a sharpy yacht forty-five feet in length can readily be managed by one man in any weather, thus becoming a single-handed cruiser, while at the same time accommodating four or five persons with roomy quarters for sleeping and cooking. This is a result never accomplished in any other form of craft. In some of the Roslyn yawls a jib topsail is added to the jib.

All the small sharpies have a scrap of deck in the extreme bow, with a narrow washboard along the gunwales the whole length of the boat, and a light hatch-combing on the inner edge of the washboard. In the large sharpies nearly if not quite all of the boat is decked; and a cabin is built amidships with a rise of twelve or fifteen inches above the deck or whatever is necessary to give head-room to stand up in. Cruising would become fatiguing if the yachtsman could not stretch himself occasionally in both a standing and horizontal position. The cabin will be narrow but long, and will afford ample room for all the furniture and paraphernalia of a long cruise.

A very popular sharpy of the new type is the fifteen-foot cruiser In model, this cruiser is exactly like a sharpy yacht sixty feet in length; but her rig consists of only one sail, triangular in shape, bent to a long slender gaff and boom and hoisted on a short mast less than twelve feet in length. These small sharpies are fast, safe and good boats. While serving all the purposes of ordinary sail boats, they are light and easy to row, if the wind fails. The proper dimensions of a fifteen-foot cruiser are: length over all, 15 feet; breadth of beam, 4 1-3 feet; depth of hull, 18 inches; draft of water in sailing trim, 5 inches; area of sail, 125 square feet. The cost, complete, with sail, spars, oars and anchor will be from $100 to $125, if built at Roslyn.

For these small sharpies a new appliance has been invented which entirely does away with all necessity for a centreboard. It is called a "Weather Grip," and consists of a floating lee-board, held vertically in the water, its flat side parallel to the boat at a distance of three feet from the boat's side, by two metal arms. The attachment is so arranged that the board automatically retains its proper depth and vertical position in the water at all times, no matter to what extent the sharpy may heel or pitch. The weather grip can be attached or detached in thirty seconds; and can be applied to any rowboat, converting her at slight cost into a weatherly sailing boat.

To illustrate the roominess of even the smallest sharpy, a well-known gentleman of New-York has virtually lived and slept in a fifteen-foot Nonpareil during the past two winters in Florida. The writer himself, during two weeks in the summer of 1886 with the American Canoe Association on the St. Lawrence, sojourned with comfort in his fourteen-foot "Red Jacket," sometimes even cooking his meals with an alcohol stove while the little boat was sailing. At night the boat was anchored, a wolf-skin robe spread on the bottom of the cockpit and a snug tent-awning swung over the boom. Within there was nothing but comfort. The "Red Jacket" was a sharpy with both ends sharp. She was fitted with a weather grip; and while being more roomy and comfortable than any canoe, among the hundreds assembled at the meet, it could outsail any of them, although not overloaded with sail as many of the canoes were.

The following will show the dimensions of a number of sharpies of different sizes:

The following will show the dimensions of a number of sharpies of different sizes:

Dimensions.	15 foot open boat.	20 foot open boat.	25 foot open boat.	35 foot open boat.	35 foot cabin yacht.	40 foot cabin yacht.	45 foot cabin yacht.	50 foot cabin yacht.	60 foot cabin yacht.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Length over all	15	20	25	35	35	40	45	50	60
Length on water line	13	17	22	30	30	34	39	43	51
Widest beam, on top	4	5	6	9	9	10	11½	12½	15
Widest part of floor	3½	4¼	4¾	7	7	7½	8	8½	10½
Depth amidships	1 1/12	1⅓	1½	2½	2½	3	3½	4	5
Draft	⅛	½	⅔	1	1 1/12	1¼	1⅛	1½	1¾
Foremast, length	18	23	29	39	39				
Foot of foresail	16	10	13	18	18				
Hoist of foresail	16	21	26½	36	36				
Mainmast	..	22	27	38	38				
Foot of mainsail	..	10	12	17½	17½				
Hoist of mainsail	..	20	25½	35	35				
Jib, hoist of									
Jib, foot of									
Mizzenmast, if rigged as a yawl									
Foot of driver									
Length of centreboard	5	7	8½	11	11				
Weight of ballast, lbs									

Note.—This table refers to "leg of mutton" rigs. The dimensions of spars and sails for yachts over 35 feet in length are not given, because the uses to which boats of large size are put, the varying purposes of their owners, etc., usually make the form and arrangement of the sails special in each case.

A suitable size for open-boat sailing, large enough to accommodate four or five persons and to carry two leg-of-mutton sails, is twenty or twenty-five feet. There are plenty of open sharpies, however, up to thirty-five feet in length, and even forty. In these large sizes it is customary to deck over from four to ten feet of the bow. A size suitable for cabin accommodations for from one to four persons is: Length over all, 25 to 35 feet; beam, 6 1-2 to 9 feet; depth of hull, amidships, 18 to 30 inches; draft, 9 to 12 inches. Price, with complete Roslyn yawl rig, and with oars, rowlocks, awning, oilskin tent, anchor, etc., complete, from $350 to $1,000 according to the luxury of the owner. No sharpy yacht has yet been built of more than sixty-five feet length over all; but if one of say eighty or ninety feet is properly designed and constructed she will prove the best "all round" pleasure sailing and cruising craft ever produced. Her draft of water would not exceed thirty-six inches. Her depth of hull would give more than six feet height under a flush deck, without any house whatever. Three men would manage her in all weathers. While her speed and fine sea-going qualities would enable her to sail around the world.

The skipjack is a sharpy, the floor of which is not flat crosswise of the vessel, but which is carried down sharp to the keel, as in the bow of the Nonpareil sharpy.

In construction, the sharpy is simplicity itself. It is the easiest and cheapest boat in the country to build. The amateur, if handy with tools, can make an excellent sharpy without any other guide than the specifications, drawings and instructions he finds in this chapter. The specifications of scantling of three different sizes will now be given, and after that such simple instructions as are sufficient to guide any one to build a sharpy. In all large sharpies the sail plan should be designed by a competent specialist:

20-FOOT SHARPY.—Frames, oak, 1¼ by 1¼ inches, spaced 18 inches apart. Plank of bottom, white pine 1 inch thick, put on in strips 6 inches wide. Plank of sides, white pine 1¼

inches thick, put on in one or two widths. Stem, oak, with a crook or knee at the bottom of the boat. Bed-piece of centreboard well, oak, 6 wide by 2 inches thick; head-pieces, oak, ¾ inch by 2 inches; plank of well, pine 1½ inches thick; centreboard, 7 feet long, 3½ feet wide, 1¼ inches thick. Washboard, 8 inches wide, composed of light pine stuff 1 inch thick. Combing, 2½ inches high. Thwarts, three in number, a broad one at the stern. Skag, 1¾ inches thick. Rudder, 4½ feet long and 8 inches wide. Fastenings, galvanized iron, riveted or clinched where possible.

30-FOOT SHARPY.—Frames, 2 by 2 inches, spaced 18 inches apart. Plank of bottom, white pine 1½ inches thick, put on in strips 6 inches wide. Plank of sides, white pine 1½ inches thick, put on in two streaks, with an extra piece to give the sheer forward and aft. Stern, oak, with knee on the floor of the boat. Bed-piece of centreboard well, oak, 7 by 3 inches; head-piece, oak, ⅞ by 2 inches: plank of sides of well, pine, 2 inches thick; centreboard, 10 feet long, 4 feet wide, 1¾ inches thick. About 7 feet of deck at bow, supported by white pine deck beams, 2 by 2 inches, one on each frame. Washboard, 12 inches wide. Combing, 3 inches high. Thwarts, three in number. Skag, 2½ inches thick. Rudder, 6 feet long and 10 inches wide. Fastenings, galvanized iron.

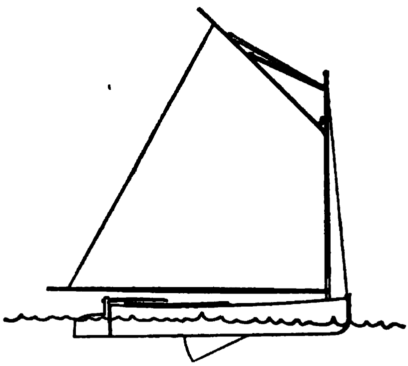
45-FOOT NONPAREIL SHARPY.—Frames, oak, 2½ by 2½ inches, spaced 15 inches apart. Plank of bottom, white pine, 1½ inches thick, 6 inches wide. Plank of sides, yellow pine, 1½ inches thick, put on in streaks 4 inches wide. Stem, oak. Head-pieces, oak, 2 inches by ¾ inch; plank of sides of well, pine, 2 inches thick. Centreboard, 15 feet in length, 4½ feet wide, 1½ inches thick. Keelson, oak, 4 by 9 inches, fastened with galvanized iron bolts ½ inch by ⅝ inch diameter. Deck beams, 2½ by 2 inches, of chestnut. Deck plank, 1 inch thick by 2 inches wide. Cabin, 15 feet long by 10 feet wide, house rising 2 feet above the deck. Rudder, 8 feet in length, 1½ feet in width. Overhang of stern, from 4 feet to 6 feet, according to design. This kind of sharpy is sometimes built with keel instead of centreboard; but the keel construction should not be undertaken by any one not thoroughly experienced in the proper methods.

The process of construction is as follows: First draw the vessel on paper, to a scale of one inch to the foot. Take off the shape of the midship section, that is to say the section at the widest part of the boat. Make a temporary midship section mould of pine boards. Get out the stem and apron, and the stern board, and the plank for the sides. Hold stem, midship section mould, and stern board in position by a light batten nailed to them at the gunwale line. Then spring the planks of the sides around the midship section mould, and fasten them strongly with strong galvanized iron nails, an inch apart, first boring a small hole with a gimlet bit for the purpose. Complete the planking of the sides. Turn the boat over and plank her across the floor, her whole length. Turn her back again and put in the frames, keelson, thwarts, etc., one after the other. Caulk her, paint her, and then rig her.

With reference to sailing a sharpy the amateur needs very little instruction. Owing to the triangular shape of the sails, the centre of effort is very low; and in a squall it is only necessary to put the helm gently to leeward and bring the boat's head into the wind. The weight of the crew should be kept to windward, both for the sake of stability and in order to keep the boat on an even keel, where she will sail better. If there are two sails the foresail will take care of itself in tacking. Bring in the mainsail with the sheet, as you come about, and ease off to leeward, changing your seat to the windward side of the tiller and transferring your crew to windward at the same time. In a yawl all the sails will take care of themselves; and in this respect, as well as because with the yawl rig the yacht can actually be steered entirely by her sails, if desired, it is the handiest rig known, but should always be planned in each individual case by a designer who thoroughly understands it, both scientifically and practically. The amateur can of course make his own experiments, designing his sail plan according to his own ideas; but he will save money and get a better boat, which is right from the start, by going to a scientific builder.

OPEN BOATS, WITH CAT RIG.

The smallest of the carvel built yachts of the United States is the catboat. Most of the amateur sailors of our ocean and lake coasts make their first acquaintance in seamanship in the building of one of these excellent little vessels. The model of this boat is peculiar, and is of purely American origin. It has been evolved by 250 years of fishing and pleasure sailing in the shallow waters of our sandy ocean coasts from the old shallops or ship's boats in use among the Pilgrim fathers, and in which they traded for many years in the early history of New-England. The catboat is simply an open boat, partly decked, of very shallow draft, broad-beamed and fitted with one sail and a cen-

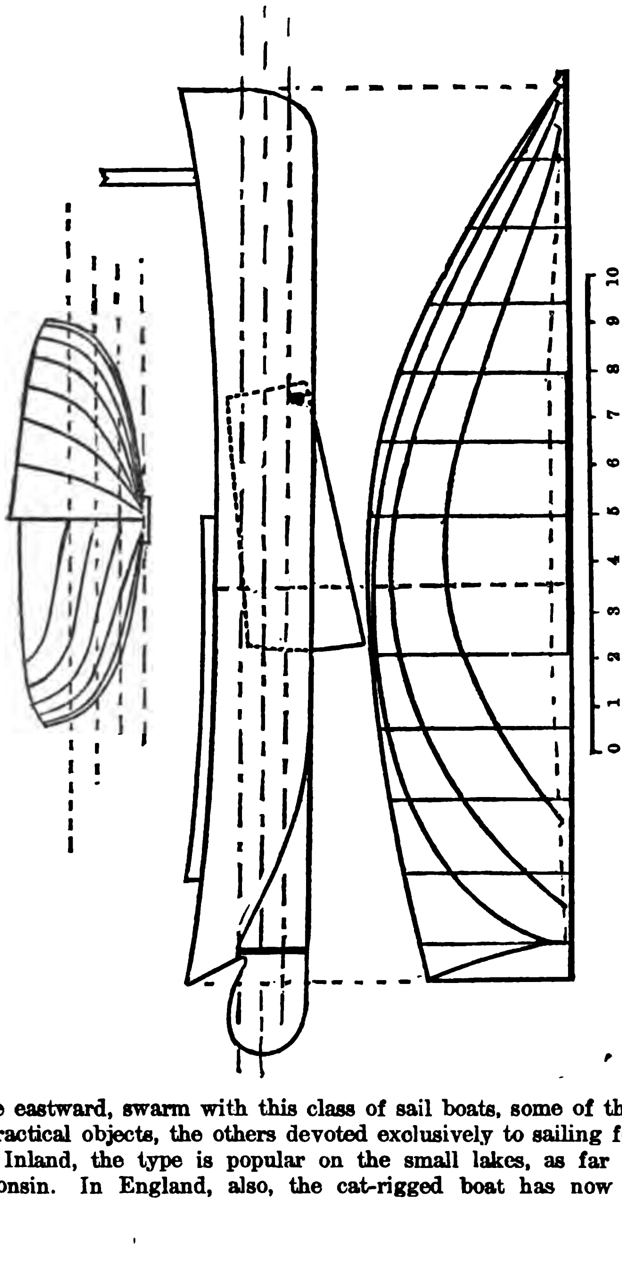


Open Boat with Cat Rig.

treboard. It is regularly framed, and is thus a step in advance of the sharpy. It is a boat remarkable for its ability to go anywhere in shallow waters and crooked channels, for its ease of management, and for its extraordinary speed in any ordinary weather and in waters to which it is adapted.

It is on the New-Jersey coast, along in the vicinity of Barnegat, that this boat is built in its greatest perfection. It is the regular fishing boat in use among the oystermen of the sounds and inlets of that region; and there is a great deal of truth in the saying that the first thing a boy learns in New-Jersey is how to handle a gun; the next, how to sail a cat-rigged boat; and the next, how to build one. In the sounds and bays in the vicinity of Barnegat and Tuckerton a multitude of these boats are built every year. They are used both for business and pleasure. In the warm summer months, when the hotels open their doors on the sandy islands lying off that shore, these boats are employed in taking out pleasure parties composed of the guests of the hotels; but when the month of September arrives and the visitors depart, the boats are put back into their regular occupation of taking oysters and clams and transporting loads of the shell fish to market.

Hudson River, Narragansett Bay, Boston Harbor, and many ports



Building Lines of a New-Jersey Catboat.

to the eastward, swarm with this class of sail boats, some of them used for practical objects, the others devoted exclusively to sailing for pleasure. Inland, the type is popular on the small lakes, as far West as Wisconsin. In England, also, the cat-rigged boat has now been in fashion for many years. It was introduced there from America by the Una, built by Robert Fish for an Englishman who sent her to Cowes. The speed and handiness of this novelty from the new world caused a sensation at Cowes, and set the fashion for the construction of a large number of "Una boats," as they are called in England. The boats are still popular there, and it is believed that the original Una is still in use on Lake Windermere.

As before stated, the cat-rigged boat belongs to the class of open boats—that is to say, she is only half decked and there is no cabin except in the larger specimens of her class. A large cockpit aft, occupying about one-half of the deck space, accommodates the owner and his friends. In model this boat is wide, broad-beamed, and very shallow, the purest specimen in existence of the "skimming dish" type. Her general shape on deck is that of a huge flat iron. The decking covers the forward part of the hull and runs around the sides of the cockpit and across the stern. The boat can careen with safety until nearly a foot of the side of her deck is washed by the waves. For all practical purposes, therefore, she is as good as though completely decked. The stem is perpendicular, though gently rounded off at the forefoot. The stern is also plumb, but, above the water line, broad and V shaped. This form of stern has an ungraceful bobtailed look; and in recent boats, especially in those used for pleasure only, this appearance has been obviated by giving the stern from one to two feet of overhang. Not only is there an improvement in looks in consequence of this addition, but there is gained by it additional room for the boy whom the yachtsman will perch out there occasionally to tend the sheet while he tends the tiller.

In draft this "skimming dish" boat justifies the name of its type. In the smaller boats the draft does not exceed 12 or 13 inches. In the larger ones, say from 18 to 25 feet in length, the draft is from 18 inches to 3 feet.

There is only one mast and one sail. The mast, a strong pole of white pine, is planted in the bow within one or two feet of the stem, and is set up either exactly perpendicular or with a slight rake forward. It is stayed by a wire rope running from a point near the head of the mast to the top of the stem; and, in boats of good size, by one shroud of wire rope on each side. The big fore and aft sail is spread at the foot by a good sound boom of white pine; at the top, by a long gaff. In the earlier boats there was only one halliard; but in those of the later build there are two halliards, one to hoist the throat of the sail and one to hoist the peak. They are rove through single blocks on the gaff, and small single or double blocks, on the mast. Each halliard is caught under a cleat or sheave on the mast near the deck and brought aft to the cockpit, where it is belayed upon a larger and stronger cleat. A down-haul is seldom used.

A topping lift is necessary in order to set the boom up at a height where it will clear the water when the boat is running before a stiff breeze and rolling among the waves. This lift should pass down along the mast, under a sheave near the deck, and come aft to a cleat by the side of the cockpit, so that the boom can be topped or lowered as circumstances demand, without compelling the helmsman to leave the tiller.

The mainsheet is attached at one end to a ring on the stern of the boat. It then passes through two double blocks, one on the boom, the other attached by a ring to an iron horse just aft of the cockpit. The fall of the sheet finally comes to the hand of the steersman from the block on the boom. A strong cleat is fastened to the side of the cockpit, in order that a half turn may be taken around it with the sheet, if necessary, when the boat is carrying a weather helm in a stiff breeze.

An essential feature of this type of boat is the centreboard. In the old kettle-bottomed Dutch yachts of 250 years ago, the skippers prevented their vessels from drifting to leeward by dropping one end of a broad board into the water on the leeward side. The centreboard is simply the ancient lee-board, encased in a well built into the vessel and playing up and down on a pivot through a long slot in the keel, like an ivory memorandum pocket tablet in its case. Even a mere scrap of a centreboard improves the weatherly qualities of a flat-bottomed boat; and with one of proper size, the "skimming dish" can go into the wind in a way that a keel vessel can never approach.

A cat-rigged boat is always sailed with a drag. The centre of effort of the sail is so far aft that the boat tends constantly to fly up into the wind; and while this fact is an element of safety in a sudden blow, yet too great ardency is embarrassing. To carry a weather helm half an hour at a time in a lively breeze is fatiguing to the steersman; and to fly up into the wind and hang there in irons places the party on board in an awkward predicament. To counteract the difficulty the lateral resistance is brought aft as far as possible, not only by employing a centreboard, but by ballasting the boat under the floor of the cockpit, so as to give her from 6 to 9 inches greater depth in the water at the stern than at the bow. To facilitate the deeper immersion aft, the run of the boat is made lean and fine; in fact, is usually reduced to a mere skag. As a further correction to ardency, the rudder is lengthened out to a size unusual in other types of small yachts. Even with these aids a weather helm is always necessary while sailing in the wind. In order to relieve the strain on the muscles of the steersman, a cord is lashed to the tiller and a half turn is occasionally taken with it around a cleat on one side of the cockpit, the end remaining in the hand of the steersman, ready for slipping or hauling as the tiller plays from side to side.

A catboat must be ballasted with from 400 to 600 pounds of stone, brick, sand in bags, or pig iron, which is stowed away under the floor of the cockpit. It is generally the expense which determines the kind of ballast used. In racing it is usual to place bags of sand, weighing from 25 to 50 pounds each, on the deck outside of the cockpit; they can be rapidly shifted from side to side of the deck, as the boat changes tacks. The winging out of these weights in this manner is a valuable aid to the helmsman in carrying sail in heavy weather. To have a number of men aboard is another way of securing movable ballast.

It is a good plan to fit up the boat under deck with either an air-tight bulkhead or with a few hermetically sealed tin cans to serve as floats in case of a possible overturn. A cubic foot of air will support about 63 pounds dead weight in the water. As a wooden boat is naturally buoyant to a certain extent, anyhow, the air cans need only be large enough to offset twice the weight of the ballast.

The depth of hold under deck in boats under 18 or 20 feet in length is from two to three feet. While there is plenty of room for stowing away all the small stores of the boat and the baskets and baggage of an excursion party, the depth is not sufficient for a cabin. If there must be a cabin (in order to adapt the vessel for cruising) part of the deck must be cut away and housed over with a trunk from eight to twelve inches high. In the larger boats there are four feet of space below deck, and with a trunk, as above, nearly five feet in the clear can be obtained. Into this cabin, which will be divided into halves by the centreboard, the owner can introduce bunks, a swinging leaf to serve as a dining table, a small lamp cook stove, bookshelves, looking-glass, and the other furniture for a long cruise. In small boats a tent or canvas cover is used in place of a house.

The larger boats are readily convertible into sloops by the simple process of moving the mast back two or three feet and rigging out a jibboom with proper stays. They make excellent racers when thus fitted out.

No one has ever claimed that the cat-rigged boat is suitable for sailing on the open ocean in rough weather. On the contrary, she is as much out of place there as an ocean steamer would be for the navigation of the Ohio River. In shallow waters, the sounds, bays, small inland lakes and rivers of the country, where the waves never attain a great height, she is nearly perfection. No one ever took a cat-rigged boat out to sea or far from shore on one of the great lakes, and encountered the experience of a heavy blow, without wishing himself well out of it. In a tumble of heavy waves the boat thrashes around violently. The spray dashes all over the deck. The craft yaws on the crest of every billow; and in scudding before the wind in heavy weather she is liable to fall off, broadside to, in the trough of the waves, and capsize. But in waters suited to her, she is perfectly at home; and while close hauled the wind may blow a gale without affecting her stability a particle. Her deck is comparatively level, and dry; and the party on board may enjoy all the beautiful exhilaration of yachting without the discomfort of sliding around on a deck standing at an angle of 45 degrees with the horizon or being obliged to wear rubber overcoats to keep off the spray. One peculiarity of these broad boats is that with their ample beam for a bearing, they are still safe, if properly ballasted, even while the foaming water is rushing along and over the lee gunwale. The prudent seaman will, however, remember that when the lee gunwale is well into the water the vessel has reached a degree of inclination where her stability suddenly vanishes, and in a puffy wind a slight gust would capsize her. He will therefore ease off the helm to leeward and luff the boat more into the wind; or, if he must hold his course, ease off the sheet.

The speed of these boats going to windward in a light air is remarkable. Sloops and schooners are no match for them in this work I have myself in an 18-foot boat, while beating to windward on a lazy summer afternoon, sailed clear through the whole beautiful and towering fleet of the New-York Yacht Club, which were out for an afternoon's turn down the lower bay of New-York. Going to windward is the catboat's best point of sailing. In this position it carries an easy helm and is safe against squalls. In going before the wind the boat is fast, but uneasy, yawing on the crest of the waves and requiring the constant vigilance of the helmsman.

For single-handed sailing and for cruising along shore or exploring a large river, the catboat is unsurpassed. For a cheap but delightful vacation's cruise of two or three weeks with a party of two or three it has no superior. It is a favorite practice at New-York to spend a vacation cruising along the Hudson River as far as Albany, visiting the places of historical interest on the river shore, obtaining occasional meals in the cities passed, and lunching and sleeping on board the boat. Many young men cruise through Long Island Sound, making the entire voyage around the island. Others sail southward to the Delaware and Chesapeake bays and the James River, and even go through the Dismal Swamp Canal to the sounds further south, and on to Florida. In trips of this sort economy (as well as pleasure) ranks as a prime consideration. Nothing answers the joint purpose so well as a stanch catboat, strongly rigged and fitted up with bunks and the other paraphernalia of a voyage.

The cat-rigged boat has the advantage of being rowable, in case of a calm. Thole pins can be put into the gunwale for the purpose. A few years ago this thoroughly American yacht came in for a share of the antagonism which the advocates of keel vessels of the cutter type manifested toward all shallow models. An effort has been made in Boston to silence these criticisms by deepening the draft of the catboat, dispensing with the centreboard entirely and loading the keel with lead ballast. She is built upon the same lines as before, but carried deeper at the keel. The new style of catboat shows greater ability in rough weather, but the deeper draft sacrifices the helmsman's choice of water in a river and compels him to keep in the channel. The old style of boat remains in favor in spite of all attacks, and within two or three years it has come into fresh popularity on account of the performances of several new and remarkable specimens of her class. The keel catboat is seldom seen anywhere except in Boston, where the waters are rougher than around New-York.

The amateur yachtsman will now want to know how to sail one of these handy and capital boats. The rules for sailing are as given below. The amateur sailor will do well to master them thoroughly and then add to them the results of his own experience:

1. Always sit to the windward of the tiller, both for the sake of bringing your weight over to windward and also in order to

manage the tiller to better advantage. Never allow any one to sit where he will be in the way of the tiller.

2. In sailing to windward watch the luff of the sail constantly. When it shivers, pull the helm gently to windward, so as to cause her head to pay off and the sail to fill again. In going before the wind watch the leech of the sail, and either keep the sail full by paying out the sheet, or, if the course requires it, jibe the sail over gently to the other side of the boat.

3. While running before the wind, guard against jibing the sail. A slight alteration of the course under certain circumstances, or the dipping of the boom into the water and its swinging aft in consequence, might jibe the sail without warning. Keep her before the wind by putting the tiller up, and top the boom more if necessary to keep it out of the water. If the water is rough and the crests come aboard over the stern, the waves can be broken by lashing a rope to almost any stuff aboard that will float, a basket, an oar, or a life-preserver, and towing it about twenty-five feet astern.

4. In jibing, haul in the sheet as fast as the helm is pressed inboard; take a turn around the cleat; and ease off the sheet when the boom passes over. If the wind is blowing hard it is better to wear, but if you must jibe, it is safer with a large sail to ease off the peak halliards first, a process which lessens the sail area for the moment, the peak being hauled up again when the sail is full.

5. In tacking put down the helm gently, so as not to stop the headway; let the sail swing in naturally, but do not let it go over until it has caught the wind.

6. Occasionally, in a heavy sea, the boat will miss stays in tacking and will hang in the wind. You can let go the peak halliards (if you have a big sail and the wind is fresh), haul in the sheet, back the boat by putting the tiller clear over, and when she has gathered headway again watch for the smoothest water and tack before the next big wave. Be careful not to stop her headway.

7. Always keep a lookout upon the surface of the water to windward for puffs and squalls. Look out also for gusts coming from ravines or beyond head-lands while sailing in rivers. Be careful also while coming out from under the lee of a ship at anchor or under sail.

8. In a squall keep the boat on her course, but ease off the sheet, keeping the sail just full enough to maintain headway. If the blow is heavy, it may be necessary to luff; and if the situation is perilous, lower the sail and drop the anchor.

9. In reefing, lower the sail. Stand to windward of it, and tie the reef points, beginning at the ends of the sail. In shaking out a reef, loosen the reef points in the middle of the sail first and work toward the ends.

10. If you have guests aboard, never allow the merriment or sociality of the occasion to distract your attention for one

moment from sail, helm, or breeze. Most of the accidents grow out of inattention, conviviality and larking on board the boat. The helmsman must be all eyes and use them all the time.

11. Sheets, topping lifts and halliards should be belayed by taking just enough turns around the cleat to make them temporarily secure. If tied so that they cannot be cast off in a twinkling, there may be serious trouble in an emergency. Always have the various loose ends of the running rigging coiled up neatly, so that they will pay out, without kinking, from the top of the coil.

12. The sheet should always be held in the hand; but if the wind is strong and gusty the sheet can be passed once or a half around the cleat, the end being held in the hand.

13. The boat will always sail better with the sail eased off a little; do not trim it in too flat.

14. Whenever you change tacks shift your weight and let your friends shift theirs over to windward at the moment when the boom comes aboard. This places your live ballast where it operates with the greatest power in promoting stability.

15. In order to be prepared for all the glorious uncertainties of yachting, fit out a boat with the following handy utensils: A lead line with bob to take soundings if you are out in a fog or after nightfall. A lantern. A flambeau for making a flare in order to warn off other vessels and prevent being run down. A good compass, with a chart, for use in case of fog or darkness. A good anchor with plenty of line.

16. Last, but not least: Make it a habit to overhaul the boat before spreading sail, and see that the equipment is in perfect condition, ropes, blocks, cleats, tiller, rudder, anchor, all in place and sound; ballast suitable; centreboard manageable; lantern in order; and in general everything in readiness for a safe, comfortable and successful voyage, and a happy return.

17. The following Rules of the Road have been adopted by the United States Congress and by the various leading yacht clubs, and should be well understood by amateur sailors if they are cruising about harbors among other craft: Yachts on the port tack must give way to those sailing on the starboard tack; in all cases of doubt, the yacht on the port tack must give way. Yachts going free before the wind must give way to those going on either tack. If both are going free, the one having the wind on the port side must keep out of the way of the other, but if both have the wind on the same side, then the windwardmost must give way. If two yachts meet end on, both must put the helm to port. To avoid collisions in a race, if two yachts which are in the wind are approaching a mark, buoy or stake boat, and so close together that the outermost cannot tack to clear the weathermost, and yet would be in danger, by standing on, of running ashore or touching the buoy or stake boat, the [illegible] the other boat, and the [illegible]

tack immediately; the leeward boat will also tack the moment the course is clear. If the two yachts are sailing free, and the weathermost cannot bear away clear of the leewardmost, then the leewardmost upon being hailed must bear away at once, the other yachts following suit.

To enjoy yachting with all its romance it is never necessary to have a large and costly boat. But the owner must have a good boat, sound in planking and timbers, strongly fitted, the sails well hung and the model and canvas giving stability and an easy helm. To go to sea in a large sloop or a schooner, of the class which make up the crack vessels of the large clubs, is no more essential to enjoyment than to go to a picnic in patent leather shoes, tall hat, kid gloves and a full dress suit. It is the saying that a handsome and costly yacht is frequently no more than an attachment to the fashionable establishment of a rich man, who keeps a vessel (at a cost of a hundred dollars a day during the summer season) on exactly the same principle that he keeps a summer cottage in the country and a coach and pair with liveried footmen in the city. All that a real yachtsman needs is a substantial and handy boat, the cheaper the better (within the limits of safety), in which he can knock around the harbors, lakes and rivers, skimming over the shallows, threading the most intricate channels, minding the helm, sheet and halliards himself, with perhaps the assistance of one boy, and taking storm and sunshine alike in the solid comfort of his old clothes and the consciousness that he is spending less money in this bracing, manly, instructive sport than he would have to in many other forms of amusement ashore. The catboat answers these purposes as well as any other type of vessel in the whole varied fleet of small yachts.

The following elements of catboats of different sizes as built on the Barnegat coast of New-Jersey, are supplied by John P. Kirk, yacht designer, at Tom's River, N. J.:

15-foot Yacht.—Length, 15 feet. Beam, 5 feet. Total depth amidships, 20 inches. Draft aft, 16 inches. Length of centreboard, 5 feet. Racing sail—hoist, 14½ feet; head, 14 feet; foot, 24½ feet. For a cruising rig—hoist, 10 feet; head, 6½ feet; foot, 14½ feet.

20-foot Yacht.—Length on water line, 20 feet; on deck, 24 feet. Beam, 10 feet. Total depth amidships, 30 inches. Draft, 18 to 24 inches. Centreboard, 6½ feet. Sail for general purposes—hoist, 20 feet; head, 14½ feet; foot, 26 feet.

25-foot Yacht.—Length on water line, 25 feet; over all, 29 feet. Beam, 11 feet. Depth, 32 inches. Draft, aft, 24 inches. Centreboard, 8 feet. Sail—hoist, 24 feet; foot, 31 feet; head 16½ feet; material, 8 ounce canvas.

30-foot Yacht.—Length on water line, 30 feet; over all, 35 feet. Beam, 13 feet. Depth, 40 inches. Draft, 36 inches. Length of centreboard, 9½ feet. Sail—hoist, 27 feet; foot, 36½ feet; head, 19½ feet.

In order to make these yachts capable of being handled nicely, the centreboard when down should be exactly under the centre of lateral resistance. The centre of effort of the sail about twelve inches forward of the centre of lateral resistance.

There is an interesting point in regard to the "balance" of a catboat, which may be mentioned. The great majority of catboats carry a strong weather helm. The owner of each one wants a big sail for driving power, broad at the top and long on the boom; the centre of effort is too far aft. With a sail of proper shape, and mast in the right place, the boat will carry an easy helm and be safe, fast and comfortable.

SLOOP AND CUTTER.

BY DAVID KIRBY, YACHT BUILDER, RYE, N. Y.

After sailing an open boat with a single sail for a few seasons, the young yachtsman will discover that his boat would be better going to windward if it were rigged with a head sail.

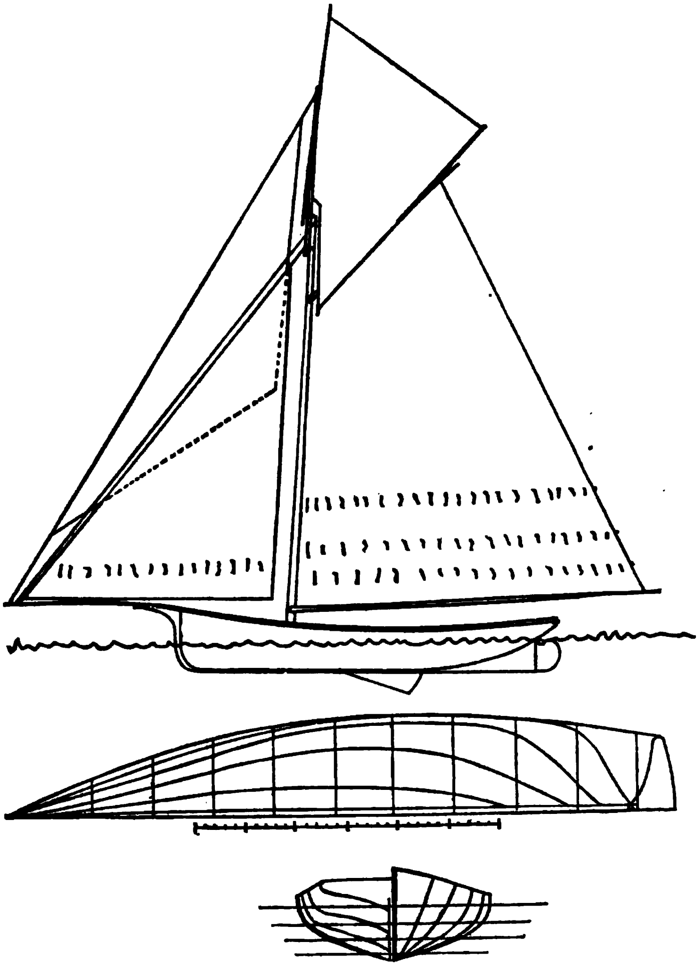
A suitable jib imparts an easier helm, and gives great command of the vessel, especially with a side wind and when close hauled. A catboat can be converted into a sloop by moving her mast back to another mast hole provided for the purpose, running out a bowsprit, and stowing additional ballast in the bottom of the boat, so that the increased motive power will not endanger the stability. In making this change, the yachtsman must not carry his mast too far back. Plant it so as to keep the centre of effort on the sails a foot or two forward of the centre of lateral resistance of the hull. With the additional sail, he will find that his boat has acquired an entirely new character. It is now a sloop, and will sail faster, steer more easily, and move with a steadier motion.

Sloops comprise more than half of the yacht fleet of the United States. They range in water line length, as a rule, from twenty to thirty-five feet. There are a few racers as long as sixty and seventy feet, and six which were built to defend the America's Cup, which vary from sixty to eighty-five feet in water line length. The number of large sloops, however, is limited. Owners prefer the schooner or yawl rig for general cruising, when the length on water line reaches sixty feet. The small size of the majority of small sloops makes it possible for them to sail at the discretion of their owners either as catboats or sloops. Many owners race their boats, rigged as sloops, and put them under the single sail when off for a cruise.

The model of the small centreboard sloop is similar to that of the catboat, broad in beam, shoal in draft. The average proportions are: Beam, 40 per cent of the length; draft, 10 per cent of the length. The greatest beam is about 5 per cent of the length aft of the middle of the boat, in order to bring the lateral resistance aft and also to give the hull a broad bearing under the weight of her passengers. In laying his plans for a sloop, a yachtsman is usually compelled to decide upon the draft of water first on account of the harbors or rivers in which he intends to sail. Sometimes, he chooses length or beam first, because there is plenty of water and other considerations will control. He will adopt his dimensions first from the formula above given, and can then modify any one of them to suit his convenience. A slightly wider beam will give lighter draft and more safety; a slightly narrower one more speed. If he wishes to build a keel boat, he will use about these proportions: L. by L.40 by L.17, in sloops up to 35 feet in water line length. In sloops from 40 to 70 feet, the proportions are about L. by L.35 by L.15. In the six big sloops, built to defend the America's Cup, the proportions were:

	Length.	Beam.	Depth.
Pocahontas	1	0.x107 L.	0.973 L.
Mischief	1	0.325 L.	0.873 L.
Puritan	1	0.279 L.	0.103 L.
Priscilla	1	0.263 L.	0.93 L.
Atlantic	1	0.267 L.	0.112 L.
Mayflower	1	0.276 L.	0.112 L.

But these larger boats have substantially schooner hulls, and their proportions should not govern small boats. In Boston the sloop



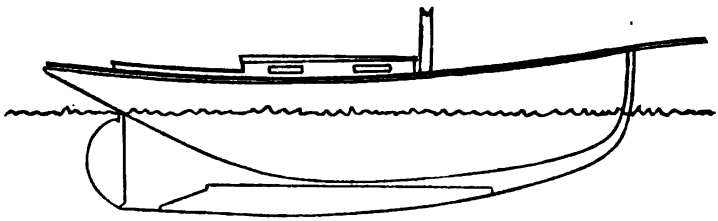
Sail plan and lines of the sloop Arrow, built by David Kirby, Rye, N. Y.

Theus, which has vanquished the cutter Stranger, is L. by 0.297 by 0.129.

In drafting the lines of his sloop the amateur will proceed as in the designing and construction of a catboat, taking care, however, that his sloop is very able aft, and that the centre of lateral resistance is behind the centre of effort of the sails. In a keel sloop, the general shape of the body will be retained, but the floors over the keel will be carried down further, so as not to make the cross sections sharper at the keel.

A sloop, well balanced, the sails properly shaped and hung in the right place, the mast raking, the centreboard in its proper position and with ballast low down, is not only a beautiful and comfortable, but a manageable craft, steering easily and giving general satisfaction. The model will not permit the cabin to be placed entirely below deck, except in large sloops; but there is no practical disadvantage in raising the trunk a foot or two above the deck to gain head room. Her deck and cockpit will still afford ample accommodation for pleasure parties.

The full sloop rig is a jib and jib topsail; a mainsail laced to boom and gaff; and a gaff or club topsail, the latter being spread by short yards at head and foot. In recent sloops, the jib is divided into



American Keel sloop, with ballast in the keel.

forestaysail and jib; and the usual light sails for racing are employed, namely, spinnaker and balloon jib.

The great majority of American sloops are of the centreboard model. Still, there are a large number of sloops of a different form. On the Massachusetts coast, the builders (as elsewhere in America) have been unhampered by straightjacket rules of measurement, and perfectly free to model their vessels to suit the waters they were to sail in; and they long ago evolved a vessel approximating the cutter in form and possessing all its good qualities, while retaining the good ones of the sloop. This was the keel sloop. As a rule, the waters are rougher and the winds stronger on that coast, than they are to the southward. To suit the requirements of yachtsmen the builders retained the broad beam, sharp bow, and easy lines of the centreboard sloop, but carried the frames at the keel deeper and replaced the centreboard with a broad keel, frequently weighted with iron or lead. In this beautiful model, nothing was lost and something was gained. Sail carrying power was promoted, the thrashing of the boat in a seaway was obviated, and stability was augmented. When the cutter mania broke out in America, the Boston builders did nothing more than to narrow the beam of some of their keel boats and deepen the draft a little; and their sloops became cutters in name as well as in fact.

A cutter was built in Rhode Island in 1866; one at Chester, Pa., in 1871; one at Scituate, Mass., in 1873; and seven at Boston, eight at New-York, two at Salem, one at Marblehead, and one in Pennsylvania, during the years from 1877 to 1881, inclusive. In 1881, there arrived at New-York the Scotch cutter Madge, a vessel of extreme type, having a midship section like a splitting wedge, and an entrance like a butcher's cleaver. Her performances here created a great sensation. This vessel was 46 feet long, 39 3-4 feet on the load line, 7 3-4 feet beam, 9 feet 7 inches of depth from the plank sheer to the bottom of the keel, and 7 2-3 feet draft. She had 10 tons of ballast in the keel, and half a ton inside, and displaced only 16 1-2 tons. Her mast was 33 1-4 feet long above deck, topmast 25 feet, bowsprit 20 feet outboard, boom 36 feet 2 inches, gaff 25 feet, spinnaker boom 38 feet. The area of her midship section was about 29 feet. This litle craft spread in our light airs an astonishing amount of sail, about 1,600 square feet, not counting her light canvas. She was remarkably small on deck and sat low in the water. The little there was of her long, lean, scythe-like body was chiefly under water. The Madge won many races in the fall of 1881. In the seven in which she has sailed so far she has lost only one. This little boat was hardly fit for cruising, for the reason that in any blow her deck was always aslant, and the manner in which she went through waves rather than over them, made her a wet boat. Nevertheless her speed was unquestionable, and proved a great comfort for a time to those who had come to believe in the cutter model. The result of her victories was that 13 cutters were built at Boston and New-York in 1882, 8 the next year, and 9 the year following, with several at other places. Since that period, however, the fever for cutters has almost entirely subsided.

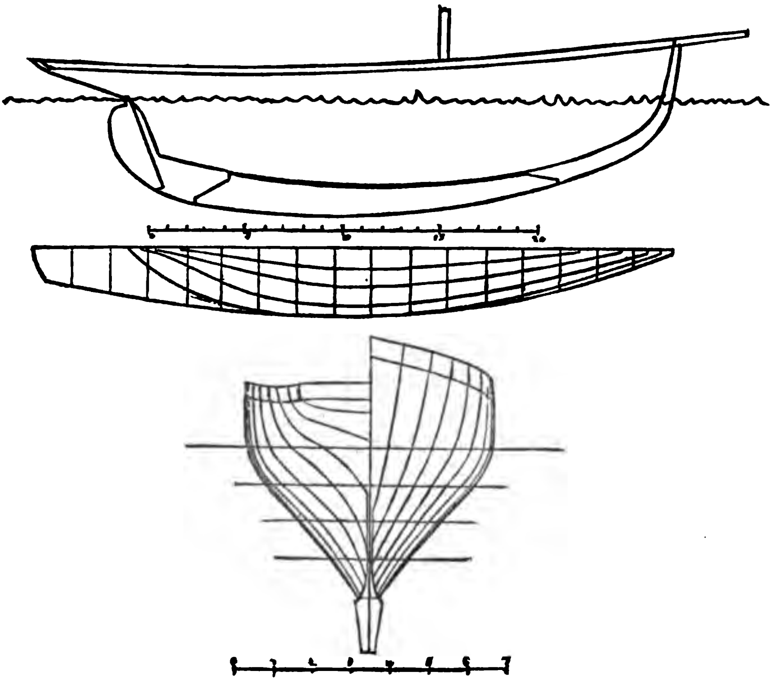
The centreboard sloop remains the representative American yacht; and experience has proved not only her greater beauty and comfort for pleasure sailing as compared with the English cutter, which is her especial rival, but also her greater speed.

The cutter is the English sloop. It is a single masted, narrow-beamed, keel vessel, with a length varying from 3 to 6 times the beam. In the racers, it is either 5 or 6 times the beam. In small cutters, varying from 20 to 35 feet in length on the water line, the average proportions as they are built in this country are as follows: Length by 0.334L for the beam by .202L for the draft. In the large cutters, from 40 to 70 feet long, the average is: Length by 0.26L by 0.167L. The proportions of a few noted cutters are:

	Length.	Beam.	Draft.
Bedouin (American)	1	0.221L.	0.165L.
Genesta (British)	1	0.185L.	0.16 L.
Galatea (British)	1	0.173L.	0.155L.
Winona (American)	1	0.233L.	0.166L.
Oriva (American)	1	0.23 L.	0.19 L.
Madge (British)	1	0.20 L.	0.207L.
Maggie (British)	1	0.195L.	0.192L.

The overhang of the stern will vary from four to ten feet in small cutters; from eight to fourteen feet in large ones. The keel of the cutter is an extreme rocker, the fore foot being cut away from a point just below the water line and sweeping away in a complete curve to the stern post. The keel is deep, so as to allow for the introduction of a casting of lead or iron, weighing from thirty to seventy-five tons in the larger boats, according to the size of the vessel. To the stern post is given a strong rake, and the stern has a long overhang, entirely new to America. The cutter rig consists of mainsail spread at the foot by a boom but not laced to it, with gaff or club topsail, a forestaysail, jib and jib topsail. In cutters, as in sloops, the usual light canvas, or kites, is carried in racing, namely, a spinnaker and balloon jib.

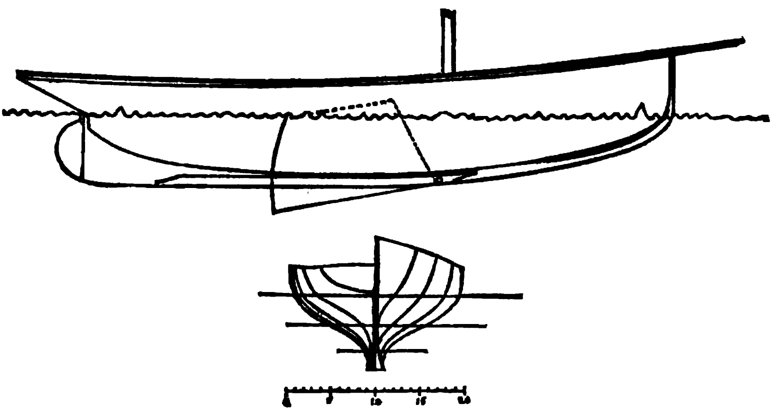
The natural freemasonry which exists between the people of the two great Anglo-Saxon nations, America and England, leads to a continual interchange of ideas between the two countries. And so there has been a considerable introduction of American nautical ideas into England



Building lines of an English Cutter.

and of English nautical ideas here. The exploits of the cutters in their native waters and a few victories obtained by them here, led to the building of a number of that type of boat in the United States, as above recited, especially at Boston and New-York and on the Lakes. The American Yacht List, which comprises over 1,800 vessels, now includes about sixty cutters.

For the last ten years an excited controversy has raged among yachting men concerning the relative merits, and especially the speed, of the two types of boats,—the broad-beamed, shoal draft American centre-board sloop, and the narrow-beamed, deep, lead-weighted English cutter. The agitation has been kept alive by the performances of specially fast specimens of the different types. At one time the cutters had a run of winning the prizes, and then cutter stock went up. At another time the sloops had a run of success, and sloop stock went up. On the face of things there seems to be no accounting for these differences in performance. Cutter men have claimed that in a strong wind with a rough sea their vessels are superior to the sloop; but they have been beaten by the sloops in heavy weather, and they have won in light. This has frequently occurred with the same boats. Again, the sloops are supposed to require smooth water and light airs. But they have won in heavy weather and lost in light. Who can tell why these things are so? It must be that the cutter and the sloop are about equally matched as far as speed is concerned, so that slight variations in the conditions of wind, water and tide govern the results of the race. This seems to be the present status of the case, although for the present the sloop is away ahead. The cutter has been badly beaten in the contests of 1886, especially in the races for the America's Cup, in the matches between the Boston sloop Thetis and the cutter Stranger, and the race between the Boston schooner Sachem and the cutter-hulled English schooner Miranda.



Lines of the Boston sloop Thetis.

In order that the amateur yachtsman may arrive at a sound judgment concerning the sloop, her model and rig, I now propose to discuss some of the properties of the two types of boats. The cutter has one quality which the sloop has not. She is absolutely uncapsizable. She carries her ballast in her keel, and its position prevents the yacht from being overturned. Weight in the bottom of a vessel has the further advantage that it acts like a balance-wheel to machinery. It keeps up a steady motion; this is an advantage. Owing to the sharp bow and narrow beam the cutter is also a good pitcher and diver, perhaps too good. The long overhang of the stern makes a little more deck room and some owners think it adds to the appearance. The division of the jib into two smaller sails, namely, staysail and jib, certainly promotes ease of handling. In the smaller cutters there is also more head-room for a cabin, owing to the greater depth of hull, than in a sloop of the same length. When these things are said, all has been said that can be about the better properties of the cutter. On the other hand the cutter labors under certain disadvantages. One is that when she has all the wind she can bear she heels over to a greater angle than the sloop, making life on deck and below very uncomfortable. Another is that when she heels her sails lose much of their driving power, owing to the angle they make with the wind. The straighter a vessel stands up the greater the force which the wind exerts upon the sails. Furthermore, when the cutter is over on her flat side, in which position she usually sails in a good breeze, she loses her hold upon the water to a greater or less extent, according to the angle of heel. She slides off to leeward. Hence she is often beaten in a hard blow, to say nothing about the discomfort of her passengers. It is claimed that as the cutter has a sharper bow the sea cannot strike her so heavily as it would the fuller model of the sloop, and therefore cannot knock her off so much. But if one looks at a cutter when she is heeled over he will see that she presents as flat a surface to the waves as the sloop, and will be knocked off nearly or quite as much.

The advantages of the sloop are that her more upright position not only promotes the comfort of all on board, but it presents the sails more squarely to the wind, whereby the driving power is greatly increased. No vessel can go without power. She also keeps her hold on the water and can sail closer to windward. Her lighter draft makes her handier in cruising along shore and in our harbors. She can be made very nearly uncapsizable by ballast in the keel. She can be made sharp enough forward to encounter the seas with no more resistance than a cutter. In fact, some of the best cutters do not appear to be much sharper forward than some of our best American sloops. Furthermore, the sloops as a rule carry more sail, for they not only have the advantage of ballast in the keel, but they have the broader beam that gives them a bearing; and thus they combine both of the great elements of stability—beam and a low centre of gravity. Lately, some of the English yachtsmen have seen the folly of narrow beam, and they declare they would build their boats wider were it not that the English rule of measurement taxes beam.

Yachts for sea-going should not be modelled the same as for smooth water. They should be deeper and a trifle narrower, but not so narrow as the cutter. As American yachts have to sail both in rough and smooth waters, it is necessary for them to combine the qualities of both types. With a proper adjustment of all their elements, I have no doubt that sloops can be built which will beat cutters of the same length in any weather, and will be equally safe, while being far more comfortable and satisfactory as pleasure boats. And certainly the light draft of the sloop makes her available as a pleasure craft in the sounds, bays and rivers of our country, where a cutter would be entirely out of place. Our boats are built to cruise in American waters, and should be adapted to them.

Yachtsmen will ask: "What are the points to keep in view in making a proper design for a sloop?" The main object for which the vessel is built is the comfort, safety and enjoyment of her passengers. The sloop model allows plenty of cabin room, an ample deck and all the conveniences necessary to a cruise, whether short or long. There should, of course, be a good cabin, with plenty of head-room and length enough to provide proper accommodations and shelter for whatever company is taken on board. So far as speed is concerned, there are four primary elements to be considered. The sloop must have (1) a sharp bow to take the water easily; (2) a good stern (which need not be as long and fine as the bow) to leave the water easily; (3) a good middle body to run on, and this should be neither too full nor too sharp, and should have the greatest width aft of the middle of length; and (4) most important of all, power, or the ability to carry sail, which comes from proper beam, ballast and displacement. Without proper power, all the other good qualities are useless. Whoever can combine these four elements in one vessel will produce the fastest, safest and ablest boat. The subject is a good one for amateurs to study. It is a great subject, and it taxes all the ingenuity of the experienced builder and designer. Other elements which must be considered in designing are the proper position of the mast and the weight and size of the rig; the size, position and hang of the centreboard; and the kind, quantity and location of the ballast. All these matters are of great importance, as upon them depends what is called the "balance" of the vessel. A badly balanced vessel will neither steer nor sail well, any more than a badly regulated watch will keep good time.

Beam should never be sacrificed. It is in the lack of power to carry sail that the cutter shows its deficiency. No narrow boat, with all the lead that can be hung upon her bottom, can be made to carry as much sail in proportion to her displacement as a wide one can. Extra weight will not compensate for the loss in sail-carrying power which the wider beam possesses on account of its powerful leverage. It is claimed that as the cutter carries less sail it is on that account less expensive to rig her; but while the owner saves canvas he has to buy a lead mine instead. The fact is, the cutter cannot carry more sail. On the other hand, the sloop carries a large sail area as easily as the cutter can carry a small one. Where, then, is the cutter's superiority as to sail?

Next, as to the ballast. It is now the practice to put as much lead as possible into the bottom of the sloop; and this is well, if it is properly put in. The hull and keel should be so designed that the metal does not add to the size of the vessel below the body. To drag a huge, sausage-like bunch through the water, as the Galatea does, counteracts the help which the ballast gives in carrying sail. And at this point the reader must be reminded that outside ballast is not new in America. More than forty years ago American yachts were built with iron keels, iron centreboards, and wooden keels loaded with iron. The famous sloop Maria used considerable lead, the angle formed between the keel and garboard having been filled in with that metal. The pilot boats also had iron in their keels. There is nothing new in the idea of outside ballast, excepting only the large quantity that is now put into the keel to offset the sacrifice of beam in narrow boats. In the cutters of England there is sometimes as much as eighty or ninety tons, equal to the weight of two locomotives. I repeat that outside ballast is well enough, provided that it does not alter the shape of the vessel and create resistance to motion through the water.

One question that is much discussed now is the progress made in models and rig during the last forty years, as shown especially in the big American sloops built to defend the America's Cup. To young yachtsmen it may appear that the four big sloops are an improvement in model over anything that has previously been produced. But men who were in their prime twenty-five or thirty years ago know that this is not so. It is their size only which is remarkable. Two of the sloops (the Puritan and Mayflower) are very nearly copies of George Steers's famous sloop Julia, excepting only with respect to the long overhanging stern and raking stern post. In profile they are exactly the same in style as the Julia, that is to say, they have the rocker keel and little sheer, and they sit low in the water. Their dead rise is about the same as in the Julia, and their bottoms are probably not widely different, perhaps cut away a little more. Most of the yachts built by George Steers, and some by other builders of that day, were of about the same model as these two big sloops. The bottom part of one of the other two (the Atlantic) is also nearly the same; but the hull is much higher out of water and has more sheer. This, I think, is the only one of the four fit to sail around the Bermudas. The fourth of the big sloops (the Priscilla), as she was first built, had a profile like most of the flat sloops, except the long stern; she had a straight keel, plumb stem and plumb stern post. She had a little less beam than most yachts of her type, but on the whole does not differ from them more, perhaps, than the different specimens of her class do from each other. In 1886 they cut off her forefoot and put in a raking stern post, thus cutting off her legs, as it were, and reducing her holding on power. Her original profile was better than that of the other three for fast sailing. Had she been as good as the other three in sail-carrying power she would have beaten them all. She lacked power, that is to say, she could not carry sail enough to drive her

The rocker keel is now very much in favor in sloops. A good many young yachtsmen believe this style of keel to be a new improvement. But this is not so. There have always been two types of centreboard sloop yachts, and there are only two now. One has the rocker keel, the forefoot being cut away, giving the boat a heavy drag. The other has a straight keel, with less drag. There has always been much variety in shape and rig of boats of the same type, and that point need not be dwelt upon. But the rocker keel is not new. From 1850 to 1860 a number of large rocker-keel yachts were built, such as the Una, Silvie, Julia, Widgeon, Rebecca and the little L'Esperance. These boats were popular; but when a fast sloop of the straight-keel type came out, the rockers were beaten. The sixty-foot Manersing beat the famous seventy-two and a half foot Julia as often as they came together; and the forty-six-foot Edgar served the L'Esperance the same way. The rockers then went out of fashion. Straight keels became all the rage, and such sloops as the Eva, Vision, Addie, Gracie and Fanny came on the scene. Then came the Arrow, also with a straight keel, the fastest cabin sloop ever seen in this country, and still so fast that nothing of her size could beat her twenty miles to windward and back, had not her owner altered both her hull and rig. There is a return to rocker keels again in three of the big sloops, and in many others of smaller size both at New-York and Boston. But the fashion is not new, it is not an improvement over old times, as can be seen. It is a return to old ideas, nothing more or less

Has there been any improvement in regard to depth? The Gracie, Vision, Fanny and other sloops draw from four feet ten inches up to six feet of water. The four big sloops draw from seven feet nine inches (the Priscilla) up to nine feet six inches (the Mayflower). So far as this is an increase of depth, it is again simply a return to an old fashion. Even yet, however, the recent model has not reached the depth of the old-time sloops. The Mayflower has no greater depth than the shoalest of the old-fashioned yachts, the Julia, Una, Eva, Vision, etc.; and she is actually eighteen inches shoaler than the Arrow in proportion to her length on the water line. Depth was a feature of the early yachts, and it gave them a part of their great ability.

Now with regard to rig. In the new sloops of the present time the rig is borrowed from the English cutter. The old-fashioned sloops had only one jib. The practice now is to have two. The short plumb lower mast, long topmast and long gaff are also copied from the cutter; and make a rig entirely different from that of the Maria, Una, Arrow and other fast sloops of earlier date, which had long lower masts and short topmasts. The low rig of the cutter is not, however, new. I have rigged boats even lower. My own experience is in favor of a rig like that of the Arrow,—long mast, short boom and short bowsprit, a style of sparring which brings the sail area more over the vessel. I find that a sloop thus rigged carries her sail as well as the cutter or better, and the crew will handle it better, while the boat will go to windward faster and point closer. The wind acts to better advantage on a tall and narrow sail than on a broad and lower one. In going to windward the air strikes the sail a glancing blow. It is desirable that the wind shall pass off over the leech rope as soon as possible, for after it has struck the sail its work is done; its course is changed and it runs along the sail. The quicker it passes out of the way, the more effective wind the sail receives, the faster the boat goes and the closer she points. Ability to point close is a great advantage, for then the wind strikes the sail in a way so much more glancing that it does not knock her down as much as if she were compelled to sail further off. It is well understood that a sail must be as flat as possible. Now the nearer the leech rope is to the luff rope, the flatter the sail will be necessarily. The success of the Arrow proved these points clearly, for there was not a yacht in the fleet which could out-point her. Of course, a low rig has one advantage, the centre of effort is low; and in a cutter with narrow beam the owners are compelled to adopt this rig as a matter of necessity, not because it is a better rig, all things considered. The one large jib of the old sloop rig had one advantage, which has been lost by its division into two sails. A sloop will go faster to windward with one jib than she will with two The change. to two jibs is due to the fact that a single large one is an unweildy thing to handle, particularly to reef in a blow. It is handier to have two.

Is the plumb mast an improvement? For my part, I object to it for several reasons. A raking mast makes a lifting sail, more like a jib, which is the life of a sloop. When a vessel is heeling, a plumb mast (or one leaning forward) tends to press the vessel down and over, and so sacrifices a part of the driving power. Then, with a plumb mast, the boom will not rise when the sheet is eased off, and if there is a rolling sea, down it goes into the water. A boat will ride a

Sloop with spinnaker and balloon jib coming before the wind.

sea better with a raking mast than with a plumb one. These matters should all be looked at in the light of experience and science, not from the point of view of fashion.

So far as centreboards are concerned, there is perhaps not much improvement, for many designers who have modelled a number of yachts still get the centreboard wrong. The yacht cannot use her power to advantage unless the centreboard is of the proper size, is in the right place, is hung in the right spot for the pin, is good and stiff, and is let down far enough. The board should be so hung that it will not twist; and it should help to bring the centres of the boat into proper relations to each other.

The raking stern post of the present day I regard as wholly unscientific in principle. The rudder cannot act properly in the position in which it is hung on such a post.

I regard the Arrow, as a whole, more perfect in principle for speed in a race twenty miles to windward and return than any other sloop that has been fairly tried. The large sloops Gracie and Fanny and the four big defenders of the America's Cup have greater size and more driving power; but I do not consider them the fastest that can be produced in this country. I feel confident that a sloop of their size which would embody the elements and principles of the Arrow would be faster than anything yet built, and would be a better sea-boat, because higher out of water.

The following are the elements of a few noted American sloops:

Dimensions.	Thetis, Boston...	Arrow, New-York...	Mischief, New-York...	Pocahontas, New-York...	Gracie, New-York...	Priscilla, New-York...	Atlantic, New-York...	Puritan, Boston...	Mayflower, Boston...
Length over all, feet and inches	71.9	65.6	67.5	71.11	79.10	95	95.1	93	96.11½
Length on water line, feet and inches	64	61.6	61	67.10¼	69.9	85	83	81.1½	85
Extreme beam, feet and inches	19	20.2	19.10	21.0½	21.6	22.4	23.2	22.7	23.6½
Depth of hold, feet and inches		6.10	7.9	7.3½	6.8	8.7	10.6		8.10
Draft of water, feet and inches	8.3	5.6	5.4	6.7¼	6.6	7.9	9.3	8.5	9.6
Greatest beam from bow feet and inches	36	36			41.8	51	55	47.1	
Ballast inside, tons	3.82	22					25	13	11
Ballast on keel, tons	21.18	0				45	33	27	37
Displacement, tons	66.16	52				114	108	105	110
Mast, deck to hounds, feet and inches	54	65	79		72	59	63	60	63
Masthead, feet and in's.	7	6							
Topmast, feet and inches	35	28	35		30	48	47	44	46
Bowsprit, outboard, feet and inches	27	28	38		19	39.5	38	38	38
Boom, feet and inches	61	62	63		63	77	76	76	80
Gaff, feet and inches		32	33		31	48	48	47	50
Spinnaker boom, feet and inches	57				60				
Actual plain sail area, square feet	3,825	4,021	3,200		3,800				
Area of midship section, square feet		65				86½	102	82	82

The mainsail of the sloop is hoisted by two halliards. In the ordinary small sloop the peak halliard is fastened near the end of the gaff and then passes through a double block on the mast, back to a single block on the gaff, three feet or so from the peak, returning to the block on the mast, and finally coming down to a cleat near the deck, where it may be belayed or carried back to a cleat in the after part of the boat. The throat halliard is fastened by a hook to a single block on the mast, passes through a single block on the throat of the gaff, back to the block above, and then down to the deck. Both halliards are hauled upon at once, and when the sail is up both are swayed taut and belayed. By hauling the peak a little tighter than the throat, the weight is carried more by the throat halliards. If the topping lift is then eased off a little, the weight of the boom will help hold the sail, flat. The sheet of the mainsail is arranged as in the catboat.

The jib is hauled up by a rope passing through two single blocks, one at the head of the sail, the other at the bounds of the mast. There are two jib sheets, each rove through a single block at the lower after corner of the jib, and a single block on the gunwales of the boat, each one then leading aft to a cleat within reach of the helmsman, who will sometimes sail singlehanded. The forestaysail is managed the same as the jib. Also the jib topsail.

The gaff topsail and club topsail are set from the deck. The sheet of the sail passes through a sheave at the peak of the gaff and through another at the throat. The tack leads straight down to the deck. The halliard is fastened to the head of the sail, or in case of a club topsail, to the yard about midway of its length (experience will dictate where) and passes through a block or a sheave in the topmast, and then down to the deck. When the topsail is set in the right place, it must be swayed taut.

The rules for sailing a sloop differ little from those that govern the handling of a catboat. The helmsman practically has one more sail to manage (the jib), and that is all. When running free this sail will require no attention.

1. When beating to windward or with the wind abeam, the jib should be kept full. If it shakes, it must be trimmed in a little flatter. In tacking, both jib sheets must be cast off as the boat comes around. The windward sheet may be kept taut, until the head has come around, and the jib takes the wind on the other side. The jib may then be allowed to go over, and both sheets hauled taut and belayed. The jib is often a better indication of the wind than the mainsail, and the helmsman must watch it.

2. In a squall ease off the jib, and luff the boat, but do not lose headway, and haul in the jib sheet as soon as the gust is over. Always look out for squalls. Never be taken by surprise, if you can help it; but if you are, act with coolness and decision. The Hudson River is the best cruising ground in America for experience with squalls, owing to the cliffs and mountains along shore which shelter the river in places; where they break away they give the wind full sweep, and subject the river craft to sudden gusts of air which have all the effect of squalls. While cruising in such water, sailors watch for the gusts and eddies of wind around the ends of the cliffs and through the ravines and valleys which intersect them.

3. If a squall is very heavy and the wind lasting, it may be necessary after luffing, to lower the anchor and then lower the sails. Stop her way by luffing, or lowering the sails before anchoring. Always have the anchor where it can be handled when necessary.

4. In lying-to (which is a frequent practice when from any reason the sloop needs to be kept stationary without anchoring) luff the vessel, trim in the mainsail perfectly flat, and then ease

off the jib a trifle to windward. The vessel will swing back and forth slightly, but without paying off.

5. The helmsman should always watch his boat, and study her behavior in every situation, under both a small and a large press of canvas. Whether she is balanced right or wrong, he will discover the truth quickly; and by learning her temperament, so to speak, he will soon learn exactly how to control her under all circumstances and how to get from her the greatest speed, comfort and enjoyment which is possible. Seamanship is always best learned at the tiller of the vessel herself when she is under way.

6. Always inspect the sloop and see that everything is in order and sound before setting sail.

7. Upon returning to the anchorage, furl the mainsail snugly on the top of the boom and secure it with a gasket. Put on the sail cover, and then resting the end of the boom on a crutch ease off the topping lift. The jibs must also be furled or housed.

8. The rules of the road have already been referred to in the chapter on catboats.

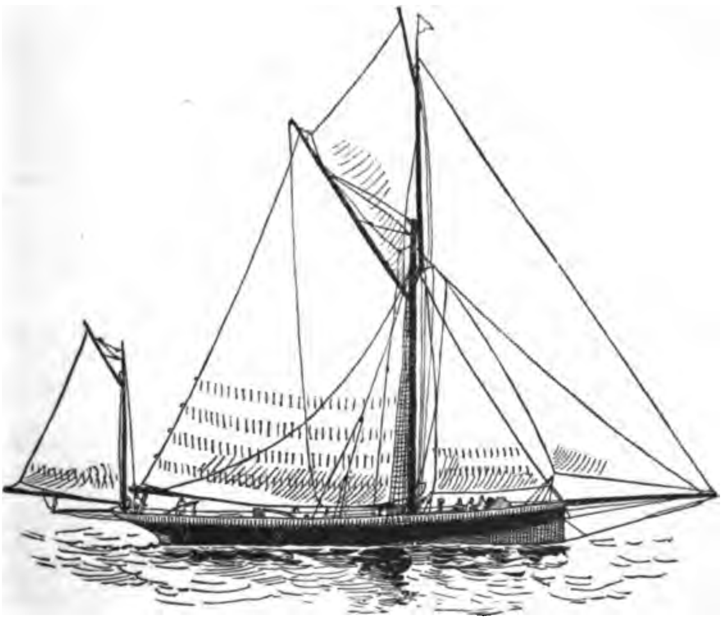
On the California coast, the sloop has undergone some modification, owing to the strong winds and rough water of that region. Matthew Turner, Measurer of the San Francisco Yacht Club, writes: "Of sloops we have but few, and the largest is less than sixty feet in length. Although it is admitted that the sloop rig is the fastest of any, yet the large mainsail and boom are so difficult to handle in our winds that the rig is not popular. In both sloops and schooners, the gaffs and topmasts are shorter than in the East, and the mast is given more rake. There is no such breadth of canvas aloft as is seen in Eastern yachts. The skimming-dish type of yacht is quite out of favor with us, although the English cutter has not been and probably never will be adopted by us. Our best yachts with slight alterations in rig and ballast would make very good merchant vessels." It should be explained that the coasting sloops and schooners of the Pacific coast are famous for their beauty, stability and speed.

We will now give the elements and specifications for scantling of a thirty-five foot sloop yacht. The amateur will want to understand whether any special sloop of that size, which he may think of buying or building, is properly constructed and sparred.

Sloop yacht, 35 feet on the water line.—Length over all, 38 feet 8 inches. Length on water line, 35 feet. Beam, 12 feet 7 inches. Depth to top of keel, 4 feet 9 inches. Length of mast, 44 feet; distance on deck from forward edge of planking on the stem to the mast 10 feet 3 inches. Length of topmast, 18 feet. Bowsprit, outboard, 18 feet; stayhole on bowsprit distant from mast, 26 feet 6 inches. Length of boom, 36 feet. Length of gaff, 20 feet. Keel, white oak, moulded 1 foot, or deeper to suit fancy or ballast; sided, 10 inches, amidships, tapering to 3 inches at stem and stern. Frames, white oak, moulded 4 inches at the keel, tapering to two and three-quarter inches at the gunwale; sided, two and a half inches; spaced 18 inhes from centre to centre; the frames are double across the floor of the sloop to the turn of the bilge; the stanchions running through the plank-sheer; fastening of frames to keel, one-half with galvanized iron. Stern post, oak, sided from truck to top 6 inches, tapering to 3 inches at the keel; moulded 7 inches. Stem, oak, sided at top five and a half inches, tapering to 3 inches at the junction with keel; moulded 8 inches. Deck beams, white pine, or yellow pine, or spruce, 3 inches square, spaced 18 inches from centre to centre. Planking, one and a quarter inch yellow pine, fastened on with one-quarter inch wrought iron spikes, 3 inches long. Deck plank, white pine, an inch and a quarter thick, fastened on with one-half inch cut spikes, galvanized, two inches long. Centreboard well, oak head pieces, wide pine planking; the board is made of oak and iron. Cockpit and cabin of white pine, the roof of white pine decking. All the seams of the planking well caulked and payed with pitch. Standing rigging wire rope. Running rigging the best manila.

THE YAWL.

A type of yacht which is growing in favor at the present time is the English yawl. The name applies merely to the arrangement of the sail area, not to the model of the boat itself, for beneath the sails of a



An English Yawl.

yawl may be seen the hull of either a sharpy, catboat, centreboard sloop, keel sloop, or cutter.

In a yawl, the mainsail, gaff topsail, jib, and, in a large boat, the forestaysail of the sloop are retained. The mainsail, however, is shortened at the foot, so that the boom reaches no further aft than to the tiller. In the stern, between the tiller and the taffrail is planted a pole mizzenmast, spreading a leg of mutton sail having about the same area as the jib, or the jib and forestaysail combined. This sail is called the mizzen or the driver. It is spread at the foot either by a boom or a sprit. The sheet passes through a block or an iron bumpkin or outrigger (which projects straight aft over the stern),and then comes aboard to a cleat near the tiller where it is belayed. This sail takes care of itself. Its effect is to balance the jib, and it will bring the yacht's head to windward as quickly as will the rudder if it is rightly handled.

There is no rig so safe and handy as the yawl, in rivers and harbors where the wind is squally and strong. The sloop is very nearly perfection, in ordinary weather, with a light or steady breeze; but every experienced yachtsman knows the world of trouble a sloop gives him in squally weather. Owing to the difficulty of reefing the mainsail of a sloop in a gale of wind, that sail must usually be lowered to the deck before the operation can be performed; and in a squall, sometimes even before the squall strikes, it is imperative to let the mainsail come down with a run, in which case the crew must undergo the labor of hauling it up again after the gust has passed. With a yawl rig, all this trouble and danger are obviated. When the squall strikes, the boat is luffed a little, the main sheet is eased off, and the mainsail is allowed to run out.and the manœuvre practically takes the mainsail off the vessel at once without either lowering away or reefing. The jib and driver keep the yacht on her course; and if they are properly balanced, the yacht can still be handled and pointed in the proper direction with the aid of those two sails, even if the rudder were carried away. If the mainsail must be reefed, the operation can be performed at leisure, the boat being completely under control by means of the other two sails. If the yacht must lie to, the mizzen will keep her head on to the seas, the superiority of the rig in this respect over that of the sloop being marked.

Owing to the remarkable handiness and safety of this rig, it is probably the best one that can be adopted for single-handed sailing. In emergencies, the helmsman can leave his seat to stow the mainsail, reef or perform any other operation that is necessary.

The whole success of the yawl depends on the balancing of the jib and mizzen. The boat owner should pay especial attention to this point. When the proper balance is obtained he will be astonished at the general handiness of his boat and the number of things he can do with her, which he would never dream of in connection with any other rig. For instance, bringing her to he can leave her there and go off in a rowboat for a friend who has dropped overboard or go ashore for provisions; and his boat will patiently wait his return without capsizing, swooping around in circles on the surface of the deep, or departing for distant shores.

The excellence of the yawl rig lies in its handiness and safety. For speed, it is not so fast as the schooner, which it is especially designed to supplant, though it is safer. Mr. Clapham, of Long Island, has introduced this rig on the sharpy yacht. In England, it is placed on large cutter hulls. It can, of course, be placed upon any type of hull, even on a catboat.

SCHOONERS.

A large yacht requires a different rig from a sloop. When the hull exceeds sixty feet in length on the water line, the vessel will have such large sails, if rigged as a sloop, that safe and comfortable cruising is out of the question, if the wind is strong and the water rough. In

Full-rigged Schooner Yacht.

order to divide the sail areas into smaller parts, a second mast is required, and the vessel is rigged either as a schooner or a yawl. In America, the schooner rig is preferred.

The two masts are called respectively the fore and main. The vessel has fore and aft sails throughout, though often supplied in addition with a large square foresail, laced to a yard, which can be hoisted when driving before the wind.

While not so fast as the sloop, the schooner is a beautiful vessel. For cruising to distant waters it is without a peer in the whole yachting fleet. In a blow, topmasts can be housed, foresail lowered and mainsail reefed; the vessel holds her course and handles to perfection.

American schooner yachts vary in length on the water line from 50 feet to 130 feet. The majority run from 60 to 90 feet. The model is the same as that of the sloop. In small vessels the length is from three to three and a half times the beam. In the large ones the length runs from four to five times the beam. Nearly all of them sail with a centreboard and draw from four and a half to seven and a half feet of water. The keel schooners draw as much as ten and twelve feet.

Owing to the cost both of construction and maintenance, the schooner cannot be the pleasure boat of the majority of yachtsmen. The ownership of these vessels is confined to a few men of great wealth.

STEAM YACHTS.

BY HENRY E. RHOADES, ENGINEER CORPS, U. S. N.

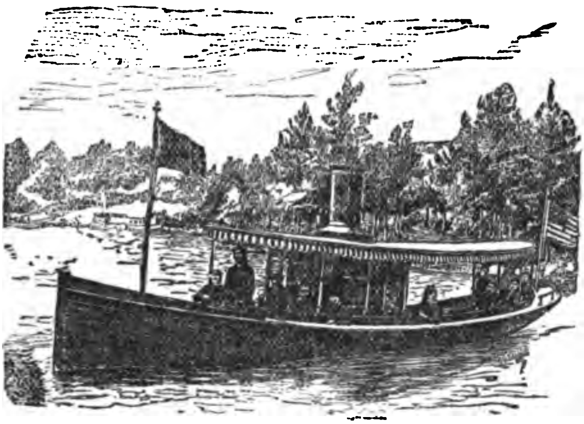
To me the most delightful form of yachting is that which is enjoyed in vessels propelled by steam.

Steam yachting is a development of the last twenty-five years, and it is now becoming more and more popular every year, not only in New-York, Boston, Philadelphia, Buffalo, Chicago and other large cities, but on the inland lakes and streams. A sailing yachtsman, of course has an utter contempt for steam and machinery. He will not admit that pleasure and romance attach to cruising in any vessels not propelled by acres of white canvas. Yet there is a multiplying class of yachtsmen who prefer the steam engine and the three or four bladed screw at the stern of the boat. With steam they can go anywhere they please, whether the wind blows or not. They can thread the sheltered streams and ponds of the Adirondacks, the inlets and outlets of the small lakes, and other rivers large and small; they can live out of town in the hot summer season upon the lakes and streams, and go to and from business daily, in rain or shine, in calm or storm; and every excursion can be taken at any hour they please and with the certainty of returning in time. Furthermore, it has at last been proved that the expense of a steam yacht is not so much greater than that of one rigged with sails as to deter a man who can afford the one from buying the other instead. The sum of $500 will buy a capital steam launch, and though an owner may spend as much as $5,000 on a boat of no great size, yet on the whole the expense compares favorably with that of a sailing yacht of the same length of water line and finished in the same style.

The steam launch is a long, narrow-beamed keel boat, without a deck, shaped very much like a fast rowing barge. The boiler, an upright, is placed about midships; the engine is aft; and the propelling power is a two, three or four-bladed screw, attached to a shaft piercing the deadwood and stern post and revolving between the stern post and the rudder. There is no house over the boat, but shelter is provided for its occupants by an awning supported by light stanchions fastened to the gunwales. The length is from thirty to forty feet, as a rule; the beam from seven to nine feet; and the draft from two and a half to three feet, although many boats draw as little as fifteen inches and a few draw as much as four feet. The depth of water is always the first consideration in a steam launch;

the hull is built to suit that requirement. The beam is one-fourth or one-fifth the length. The great majority of pleasure steam craft of the United States are under forty feet in length. Where the boat is of larger size than that, say from forty to eighty feet, the engine and boiler are housed over amidships, and there is a cabin aft, with a pilot house forward. Boats of this size are generally fitted up with considerable luxury, with choice woods in the joiner work, brass mountings on deck, and the furniture throughout of an expensive character.

There are about seventy-five steam yachts in the United States from 100 to 250 feet in length. They are the property of wealthy merchants and financiers of the large cities. Some of them are nothing less than steamships, capable of circumnavigating the globe. In vessels over 100 feet in length, the draft varies from five or six feet to sixteen feet. The length is from five to eight times the beam, the proportion varying as the owner desires speed or safety. These large boats make from fifteen to eighteen miles an hour, and can carry



Steam Launch.

coal enough for several days' steaming, either across the ocean, up or down the Atlantic coast, to the Labrador coast, among the West Indies, or for the delightful tour of the Great Lakes.

Among the class of great boats is the new steam yacht Alva, recently built for William K. Vanderbilt at a cost of about three-quarters of a million of dollars. She is a vessel of the highest grade of workmanship and is built of steel. Her length over all is 285 feet; length on the water line, 252 feet; beam, 32 feet 3 inches; depth of hold below decks, 21 feet 6 inches; draft, 16 feet 8 inches. She has three masts and is barkentine rigged. In fact, this vessel is a well-appointed ocean steamship. The internal arrangements of the vessel are as labyrinthine as those of a hotel. Virtually nothing has been omitted to insure safety, comfort and pleasure. The dining saloon is thirty-one feet wide and eighteen feet long, and in addition to this there are a library, nursery and ten private state rooms and bath rooms for members of the owner's family and guests. The construction of this steamer for Mr. W. K. Vanderbilt reminds one of the extended voyage which his grandfather, Commodore Vanderbilt, took about thirty years ago, in his own steamship.

Next in size among American steam yachts is the Atalanta, which is also a steamship and has a speed of seventeen knots an hour. She is 250 feet over all: 233 feet 3 inches on the water line: 26 feet 4 inches beam; 16 feet hold; and 13 feet draft; tonnage, 254. Then comes the Nourmahal, belonging to William Astor, of New-York, 233 feet long, a yacht capable of any service under steam or canvas

It may be mentioned that all of the large steam yachts are rigged with masts and sails, so that in case of derangement of the machinery they may be put under sail and make, possibly, half the speed of steam

Sir Thomas Brassey, the steam yacht enthusiast of England, has recently built an auxiliary screw vessel—a compromise between steam and sail; but it is doubtful if this type will ever become popular. In his Sunbeam he has circumnavigated the globe, and Lady Brassey's accounts of their trips are graphic and interesting. Of course a yacht which will both sail and steam may go on long voyages without encumbering the decks and spare places in the hold with coal, as is sometimes necessary in vessels propelled exclusively by steam; but this new type of yacht is not of such great speed; the Sunbeam makes only about eight knots under steam alone.

But the pleasure of steam yachting is not limited to the large yachts, because, if it were, comparatively few people would be able to enjoy the sport. For instance, a yacht of the size of the Atalanta requires a pilot, an engineer, a fireman, a steward, a cook, and two sailors at least (the Atalanta has double this number on an ocean voyage), at a monthly expense of not less than $300 for wages alone. In addition to their monthly pay the officers and crew are fed, and there is the additional expense of fuel and oil. There is also the cost of entertainment of guests. Two hundred dollars a day can be spent on one of these boats. The small steam launch, capable of carrying from five to a dozen persons, comes within the means of everybody with a fair salary and a few hundred dollars at command. One twenty-one feet in length may be purchased, machinery and vessel, for $500 or $600; and a person with an ordinary knowledge of steam and the construction of boilers and machinery, may obtain a license to run one. Such boat are capable of good service on the rivers, the lakes and on Long Island Sound. I recall when at sea in the Arctic in 1873, we had a steam launch which crossed Melville Bay from Upernavik to Cape York, cutting through the floe and pack ice and weathering a very heavy gale. This shows the excellent work of which a steam launch is capable.

Steam engines and boilers for yachts have received a great deal of attention within the last twenty years. A number of them have been invented which are remarkably light, safe and economical, while at the same time exerting great power. The safety coil boiler has met with great success. The water is in a coil of pipe, the flame upon the outside. This boiler absolutely abolishes all danger of explosion, and is light, strong and economical. The ordinary steam boilers, with equipments, coal-bunkers, etc., occupy so much desirable room, however, and by their weight so diminish the speed of the boat, that many attempts have been made to substitute some other motor which would produce the greatest amount of power within the smallest space, and secure economy, safety and durability. To meet this want a naphtha engine has been invented which occupies much less space than an ordinary steam engine and gives more room for passengers. No license is required; no engineer is needed, and in general the equipment is small and inexpensive.

At New-York, which is the centre of organized steam yachting at present, the popularity of this branch of pleasure cruising is due principally to the Rev. John A. Aspinwall and Jacob Lorillard, of that city, Mr. Aspinwall inherited his enthusiasm from his father, William H. Aspinwall, who, when president of the Pacific Mail Steamship Company, built a yacht about fifty feet in length, with a single paddle-wheel in the centre of the boat, working in a water-tight iron box (the invention of a Frenchman and a failure). After making some alterations in the propelling power, Mr. Aspinwall used her to come up to business from his country-seat on Staten Island and for pleasure trip, during his leisure hours. The boat was named the Fire Fly, and is said to have been the first steam yacht built in this country.

At this time John Aspinwall was a boy of thirteen years; and he built as a first experiment a flat-bottomed boat twelve feet long, fitted with an engine, the steam for which was generated by a half-dozen alcohol lamps. How many American boys have, in substance, done the same thing on the inland lakes, constructing their own steam engine with their own labor and after their own plans! Mr. Aspinwall continued to improve upon his first model until he now owns the beautiful steam yacht Sentinel, the thirteenth boat built by him. Mr. Aspinwall has not only built steam yachts, but he has served upon them in the capacity of cook, deck-hand, fireman, engineer and captain; and to-day he has a license as first-class pilot. His present yacht, the Sentinel, is an iron boat 106 feet long, with a speed of fifteen knots an hour, and with every accommodation on board for a family on a long voyage.

Jacob Lorillard began building yachts in 1868. In order to foster the fashion of steam yachting, his plan has been to build a vessel each year, and after using it throughout the season to sell it. He now owns the Reva and the Daring, the latter ninety-six feet long and only recently completed.

Organized steam yachting began in May, 1883, at New-York, by the formation of the American Yacht Club, composed of the owners of steam vessels exclusively. This club is the first and only one of its kind in the United States. It object is to encourage the development of speed, comfort and safety in steam yachting. It has annual regattas and offers valuable prizes for competition. For an international contest it offers the prize of a $10,000 cup.

The following are the dimensions of a few steam yachts of different sizes:

Name.	Owner.	Builder.	Dimensions in feet and inches. Length over all.	Length on water line.	Beam....	Depth of hold...	Draft....	Engines.
Leila........	W. Barbour, Boston.	Herreshoff, Bristol, R. I.	100	95.5	15.4	5.10	6	C. I. Cyl.; 9 and 16 by 18 in'es. Coil boiler, 7 ft. by 8¼ ft.
Stiletto......	Herreshoff.	Herreshoff, Bristol, R. I.	94	90	11.16	8	4-6	C. I. Cyl.: 12 and 21 by 12 inches. Squa'e boilers, 7 by 7 ft.
Namouna...	James Gordon Bennett, New-York.		226.10	217	26.4	15.4	14.3	Tan. Ver. C.; 4 Cyl.: 23 and 42 by 28 in'es. 2 Cyl. steel boilers, 13 by 11 ft.
Alva........	W. K. Vanderbilt, New-York.	Harlan & Hollingsworth Co., Wilmington Del.	285	252	32.8	21.6	16.8	C. I. 3 Cyl.; 32 and 46 by 42 inches. Two boilers, 17 by 10½ ft.
Stranger....	E. S. Jaffray, New-York.	Cramp & Sons, Phila.	190	170	23.8	14	10.5	C. I. 2 Cyl.; 24 and 44 by 24 inches. Two boilers, 10½ and 11 ft.
Corsair......	J. Pierpont Morgan, New-York.	Cramp & Sons, Phila.	185	165	23.8	14	10.5	C. I. 2 Cyl.: 24 and 44 by 24 inches. Two boilers, 10½ and 11 ft.
Viking......	The late Samuel J. Tilden.	John Roach, Chester, Penn.	138	121.6	20.6	11.7½	8.2	C. I, 2 Cyl.; 15 and 28 by 18 inches. Hor. Tub. boilers. 9 by 18 ft.
Nourmahal.	William Astor, New-York.	Harlan & Hollingsworth Co., Wilmington Del.	233	221	30	18.7½	14.3	C. I. 2 Cyl.; 34 and 60 by 36 inches. 4 Cyl. Steel boilers, 8¼ and 10½ by 12 ft
Sigma.......	Col. S. C. Reynolds, Toledo, O.	John Craig, Trenton, Mich.	154	130	21	10	8	C. I. 2 Cyl.; 16 and 24 by 28 inches; boilers, 13 by 8 ft
Atalanta....	Jay Gould, New-York.	Cramp & Sons, Phila.	250.3	233.3	26.4	16	13	C. I. 2 Cyl. 30 and 60 by 30 inches. 2 Cyl. Steel boilers, 11 by 10 ft.
Sentinel	John A. Aspinwall, New-York.	John F. Mumm, Brooklyn.	118	108	18.6	9.6	6.6	Tan. C. I. 4 Cyl. 12 and 20 by 12 inch. Tub. Steel boiler, 7 ft. diam.
Uarda.......	C. D. Waterman, Detroit.	David Bell, Buffalo.	110	95	17.6	8.6	6.6	C. I. 2 Cyl.; 14 and 24 by 16 inches; boiler 9 by 6 ft.
Utowanna..	E. V. R. Thayer, Boston.	John Roach, Chester, Penn.	138	121.6	20.6	11.7½	8.2	C. I. 2 Cyl.; 15 and 28 by 18 inches. Hor. Tub. boiler, 9 by 11 ft.
Yosemite....	John Roach.	John Roach, Chester, Penn.	182	170	23.0$^{8}_{10}$	18.0$^{7}_{10}$	14	C. I. 3 Cyl.; 28½ and 40 by 33 inches Cyl. Steel boilers, 11 by 12 ft.
Amelia......	Alex. Agassiz, Boston.	G. Lawley & Son, South Boston.	70	65	9	5	3.6	C. I. 2 Cyl.; 8½ and 15 by 9 inches. Boilers, 3 by 8 ft.
Rover.......	Morris K. Jesup, Newport, R. I.	Commander Gorringe, Phila.	45.5	43	7.8	4.3½	3.2	Ver. 1 Cyl.; 8 by 9 inches. Safety boiler, 4½ by 6 ft.
Xantho......	J. B. Watkins, Lake Charles, La.	Herreshoff, Bristol, R. I.	45	41	9	4.3	2.9	C. C. I. 2 Cyl.; 4¼ and 7 by 7 inches. Coil boiler, 3½ ft. diam.

Name.	Owner.	Builder.	Dimensions in feet and inches. Length over all.	Length on water line.	Beam....	Depth of hold....	Draft....	Engines.
Sphinx......	A. F. Shoemaker, New-York.	John Roach, Chester, Penn.	57	51	12.3	..	3	I. 1 Cyl.; 11 by 10 inches. Boilers 7½ by 5 ft.
Juliet.......	N. P. Rogers, New-York.	Herreshoff, Bristol, R. I.	45	41	9	4.3	3	C. I. 2 Cyl.; 4½ and 7 by 7 inches. Coil boilers, 42 by 39 inches.
Mary Anderson, late the Galatea....	W. Howard Bender, Lake Geo'ge New-York.	P. McGiehan, Pamrapo, N. J.	52	47	10.6	4.4	3.2	C. I. 2 Cyl.; 6 and 14 by 9 inches.
Arrow......		J. F. Mumm Brooklyn, N. Y.	78	76	10	5	5.2	I. 2 Cyl.; 10 by 8 inches. Boiler 6 by 5 ft.

In the racing between steam yachts it is important to arrange a system of time allowances, whereby the small yachts will be placed approximately upon an equality with the large ones. To the American Yacht Club of New-York belongs the credit of initiating the first systematic regulation of steam regattas. The first regatta of the club took place in the summer of 1884, and time allowance was made in accordance with the system of Charles H. Haswell, C. E.

Mr. Haswell's system assumes the velocity of a vessel to be the cube root of the quotient of the product of the area of her grate surface in square feet and the constant due to the character of combustion, divided by the cube root of the square of her gross Custom House tonnage. The constants are: for natural draught, 1; jet, 1.25; blast and exhaust, 1.6.

The results of the competition by this time allowance were on the whole not considered satisfactory. It was simply an attempt to credit the size of the vessel as a whole and charge for the power used; but the approximate methods of obtaining the power by the grate surface were unsatisfactory in many cases and the gross tonnages were not in all cases accurate. There were some differences of opinion among engineers as to the correctness of any such general method of obtaining time allowance.

In 1885 the Haswell system was not used. Another system was suggested by Captain C. G. Lundborg, which like Haswell's undertook to take into consideration the actual sizes and details of construction and the speeds which the sizes of such details had given in other cases. A cup was offered based on this time allowance by Mr. Washington E. Connor. The Lundborg formula for yachts of ordinary types is:

$$F = \frac{s\,(A\,P + A'\,P' + A''\,P'')}{(p\,L\,(0.5448\,B + 1.7308\,D)}$$

F in the formula represents the actual resistance per square foot of the immersed surface. (A table calculated from the mathematical deductions derived from experiment gives the value of F for speeds of every quarter knot from eight to twenty-two knots). A, A', A'', represent the area of the different cylinders of the engine. P, P', P'', represent the mean pressure of steam during the stroke in those cylinders. s is the length of stroke in feet. p is the mean pitch of the propeller. L is the length of the vessel on the water line when in racing trim. B represents the greatest breadth on the water line (or below, in case the vessel is wider below the load water line). D is the mean draught of water when in racing trim.

Chief Engineer Isherwood, U. S. N., submitted a rule as follows: Divide the speeds in knots per hour by the cube roots of the lengths on the water line of the yachts respectively; the quotients represent relatively the merits of the different yachts.

Mr. F. S. Kinney submitted a time allowance giving arbitrary values of the speed based on the length.

Charles E. Emery, Ph. D., submitted as a time allowance that the speed of a yacht in knots per hour should equal 2.7 times the cube root of the length of the yacht in feet on the water line; and tables were submitted on this basis. It will be observed that the time allowances of Messrs. Isherwood, Kinney and Emery all rejected every detail of construction except the length of the yacht. This is believed to be correct in theory and proves satisfactory in practice. Steam vessels do and should run as the cube roots of their lengths, providing the models are not abnormal and the power is applied in proportion to the displacement. Any constructor who makes the vessel of greater displacement has more room in which to place heavier machinery; and it gives much more satisfaction simply to charge the vessel for the length taken and let the designer do what he has a mind to with th room he thus obtains. The narrow boat needs less power and th wide one more; but the two vessels within considerable limits can readily be run at the same speed when of the same length. Mr. Kinney himself offered a cup under his own time allowance. The results of the arbitrary values fixed by him were practically the same as that obtained by the Emery formula, without the advantage of having any exact rule to obtain such values.

A trial of the speeds in the regatta of the year before showed that the Emery formula was applicable to yachts which would probably compete and the club offered three cups under it. A number of the yachts ran over the course with a variation of only a few seconds from the time allowance given by this rule; and the rule seemed equally applicable to small yachts as large ones. For convenience of application, the rule was developed into a table which showed the time allowed to run eighty knots, and the length of the course; and the standing of a yacht was determined by the fact whether or not it made the distance in less or more time than that allowed. Mr. Isherwood's rule was used in comparing the relative performances of steam launches.

In the regatta of the year 1886 one cup was offered under the time allowance of Mr. Haswell used on the first regatta; three cups were offered applicable to the different classes based on the length of the yachts, offered under the time allowance of Mr. Emery. A number of vessels ran over the course in very closely the time allowed under the Emery rule, showing it to be applicable, as before, to vessels of different lengths independent of other conditions.

The following is the Emery system of time allowances:

Table of the proposed time allowances submitted to the American Yacht Club by Charles E. Emery, Ph. D., based on the rule that the speed of a yacht in knots per hour should equal two and seven-tenths times the cube root of the length of the yacht in feet on the load-water line.

Length in feet load water line.	Speed in knots per hour.	Time allowed to run 80 knots.		Length in feet load water line.	Speed in knots per hour.	Time allowed to run 80 knots.	
		Hours.	h. m. s.			Hours.	h. m. s.
50	9.947	8.0424	8.02.33	115	13.127	6.0944	6.05.33
51	10.013	7.9904	7.59.18	116	13.168	6.0752	6.04.30
52	10.080	7.9360	7.56.18	117	13.206	6.0576	6.03.27
53	10.142	7.8880	7.53.09	118	13.243	6.0408	6.02.25
54	10.206	7.8384	7.50.12	119	13.281	6.0232	6.01.24
55	10.269	7.7904	7.47.28	120	13.316	6.000	6.00.25
56	10.331	7.7432	7.44.38	121	13.354	5.9904	5.59.27
57	10.393	7.6968	7.41.48	122	13.392	5.9736	5.58.27
58	10.452	7.6536	7.39.02	123	13.427	5.9576	5.57.32
59	10.512	7.6104	7.36.20	124	13.465	5.9408	5.56.36
60	10.571	7.5672	7.33.42	125	13.500	5.9256	5.55.40
61	10.630	7.5256	7.31.08	126	13.535	5.9104	5.54.44
62	10.687	7.4856	7.28.38	127	13.570	5.8952	5.53.47
63	10.744	7.4456	7.26.12	128	13.608	5.8792	5.52.51
64	10.800	7.4072	7.23.50	129	13.643	5.8640	5.51.55
65	10.857	7.3680	7.21.32	130	13.678	5.8488	5.50.55
66	10.911	7.3320	7.19.18	131	13.713	5.8336	5.50.02
67	10.968	7.2864	7.17.08	132	13.748	5.8192	5.49.09
68	11.022	7.2576	7.15.02	133	13.781	5.8048	5.48.17
69	11.076	7.2160	7.12.58	134	13.816	5.7904	5.47.25
70	11.127	7.1896	7.10.57	135	13.851	5.7760	5.46.34
71	11.181	7.1544	7.09.14	136	13.886	5.7608	5.45.44
72	11.232	7.1224	7.07.21	137	13.918	5.7480	5.44.53
73	11.284	7.0896	7.05.27	138	13.954	5.7328	5.44.02
74	11.335	7.0576	7.03.33	139	13.986	5.7200	5.43.12
75	11.386	7.0256	7.01.39	140	14.018	5.7072	5.42.15
76	11.438	6.9952	6.59.49	141	14.064	5.6880	5.41.17
77	11.486	6.9656	6.58.01	142	14.086	5.6800	5.40.48
78	11.537	6.936	6.55.15	143	14.121	5.6656	5.39.56
79	11.586	6.9056	6.53.31	144	14.151	5.6536	5.39.13
80	11.634	6.8760	6.51.49	145	14.186	5.6392	5.38.21
81	11.683	6.8464	6.50.09	146	14.218	5.6264	5.37.35
82	11.729	6.8248	6.48.31	147	14.251	5.6136	5.36.49
83	11.777	6.7952	6.46.55	148	14.283	5.6008	5.36.03
84	11.826	6.7672	6.45.21	149	14.313	5.5896	5.35.23
85	11.872	6.7384	6.44.49	150	14.345	5.5768	5.34.36
86	11.918	6.7120	6.43.19	155	14.504	5.5160	5.30.58
87	11.964	6.6864	6.41.51	160	14.658	5.4576	5.27.27
88	12.010	6.6608	6.39.24	165	14.809	5.4024	5.24.09
89	12.055	6.6360	6.37.59	170	14.958	5.3480	5.20.53
90	12.099	6.6120	6.36.42	175	15.101	5.2976	5.17.51
91	12.145	6.5872	6.35.15	176.5	15.145	5.282	5.17.07
92	12.188	6.5640	6.33.54	180	15.244	5.2480	5.14.53
93	12.234	6.5392	6.32.33	185	15.385	5.2	5.12.00
94	12.277	6.5160	6.31.12	190	15.522	5.1538	5.09.14
95	12.320	6.4936	6.29.53	195	15.657	5.1096	5.06.35
96	12.343	6.4816	6.27.30	200	15.790	5.0664	5.03.59
97	12.406	6.4480	6.26.13	205	15.919	5.0256	5.01.32
98	12.447	6.4272	6.25.53	210	16.049	4.9848	4.59.05
99	12.490	6.4048	6.24.34	215	16.176	4.9456	4.56.44
100	12.533	6.3832	6.23.01	218	16.250	4.9118	4.55.23
101	12.574	6.3624	6.21.56	220	16.300	4.9080	4.54.29
102	12.614	6.3424	6.20.40	225	16.421	4.8720	4.52.19
103	12.658	6.3200	6.19.15	230	16.543	4,8360	4.50.10
104	12.698	6.3000	6.18.02	233.3	16.621	4.802	4.48.47
105	12.739	6.2800	6.16.50	235	16.662	4.8016	4.48.06
106	12.779	6.2600	6.15.39	240	16.778	4.7680	4.46.05
107	12.817	6.2416	6.14.29	245	16.894	4.7352	4.44.07
108	12.857	6.2224	6.13.20	250	17.010	4.7032	4.42.12
109	12.898	6.2024	6.12.11	260	17.234	4.6424	4.38.33
110	12.936	6.1840	6.11.02	270	17.450	4.5848	4.35.05
111	12.982	6.1624	6.09.55	280	17.663	4.5296	4.31.47
112	13.014	6.1472	6.08.48	290	17.871	4.4768	4.28.36
113	13.054	6.1280	6.07.42	300	18.074	4.4264	4.25.35
114	13.092	6.1104	6.06.37				

A feature of the American Yacht Club races is the offer of a Commodore's Cup in each regatta for the vessel making the shortest time over the course, which is entirely independent of any conditions as to length or size, the element of time being alone considered.

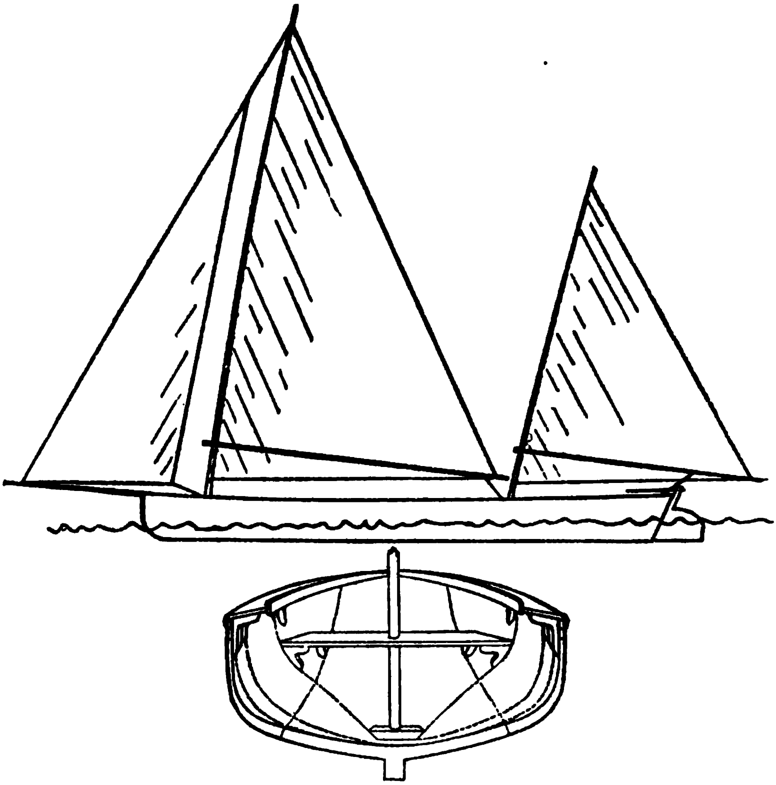
Geo. W. Hall, of the Regatta Committee of the American Yacht Club has prepared for this work a statement showing the small difference between the time allowed under the Emery rule and the actual running time of the yachts:

American Yacht Club Course—Larchmont to New-London 80 knots. Regattas 1885 and 1886.

Name of Yacht.	Length on water line.	Time allowed for 80 knots.	Actual running time.	Difference between allowed and running time.
		h. m. s.	h. m. s.	h. m. s.
Radha...............	135 feet.	5.46.34	5.46.31	+0.00.03
Inanda...............	90 feet 6 inches.	6.36.00	6.33.35	+0.02.25
Lagonda...............	118 feet.	6.02.25	5.53.39	+0.08.46
Edith...............	55 feet.	7.47.28	8.01.29	—0.14.01
Atalanta...............	228 feet 9 inches.	4.50.41	4.34.57	+0.15.44
Viola...............	52 feet 9 inches.	7.54.41	8.11.05	—0.16.24
Nereid...............	72 feet.	7.07.21	6.51.30	+0.15.51

CANOES AND BUCK-EYES.

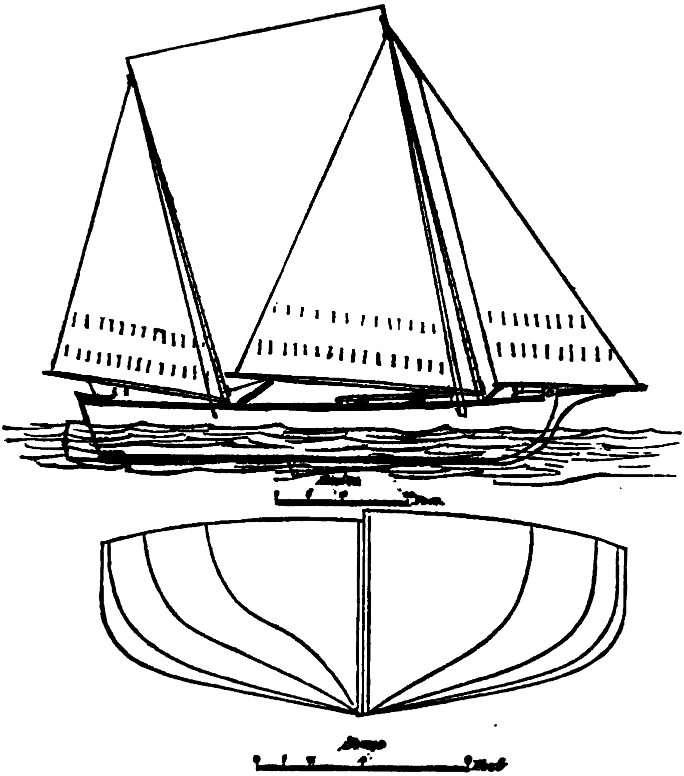
The Chesapeake Bay swarms with sailing canoes, hollowed from logs



The Chesapeake Bay Canoe.

of yellow pine or pitch pine trees. They are the regular oyster boat of that region, and the demand for them is so great that they are produced at the rate of from 150 to 200 yearly by the fishermen, farmers' boys, and regular canoe builders of both the Maryland and Virginia shores.

A canoe made from a single log is usually twenty feet in length, four feet wide across the gunwales, eighteen inches deep inside, two inches thick on the floor, one inch thick at the gunwales. The boat is sharp at both ends, the stern plumb, the rudder post raking. It is generally sailed with one leg-of-mutton sail, spread at the foot by a sprit, and furled by wrapping the canvas around the mast.



Chesapeake Bay Buck-Eye.

The large canoes cannot be made from a single log. The boats from thirty-five to forty feet in length have from six to eleven feet beam and two to three and a half feet depth, and are carved from five to seven logs each. The backbone and most of the bottom, including stem and stern post, are carved from one log; the other logs, which are bolted on, carry up the sides to the required height. A large canoe has two leg-of-mutton sails, a short bowsprit with jib, and sometimes a staysail. The rig is extremely pretty, and it is safe.

These boats float with such an astonishingly small draft that it is sometimes said of them that all they require is a heavy dew.

The body of the canoe is straight, but bow and stern are carved away into hollow lines. The after body is leaner than the forward body, the greatest beam being forward of the middle. The boat sails with a drag of from six to nine inches. There is a strip of washboard along the gunwales of all of them, and a piece of deck in the bow of the large ones, sometimes a small house.

While primarily intended for oystering, these boats are so handy and safe that a large number are employed for single-handed sailing or for small parties. Few of the younger guests ever depart from Old Point Comfort without having had a sail in one of these little craft.

The buck-eye is a boat built upon the canoe model for those who require a larger vessel than the canoe. It is regularly framed and planked and decked the whole length. There is a large hatch amidships, and a small one aft for the steersman. They vary from 50 feet in length, 13 feet beam and 3 feet 10 inches in depth, to 75 feet in length, 20 feet beam and 5 1-2 feet in depth.

ROPES, KNOTS AND HITCHES.

Nothing reveals the true sailor more quickly than the knots and hitches of his ropes. On shipboard everything must be done in the right way. A landsman's unscientific knots are either too tight or too loose. To secure the end of a rope from ravelling a sailor wants a knot which will stay forever; and the bend or hitch by means of which a rope is fastened temporarily to some object, he wants to hold tight while in use, and to be susceptible of being readily cast off when the time for that has come. The landsman would be apt to fasten a rope as tight as the Gordian knot.

The "single wall knot" secures the end of tiller ropes, life lines, etc., from fraying. Unlay the strands for a few inches. With the first strand form a bight, bringing the end down along the standing part of the rope. Take the second strand around the end of the first. Take the third over the end of the second and through the bight of the first. Haul the strands taut.

To "crown" the single wall knot, lay one of the strands over the knot, and the second over that; lay the third over the second and through the bight of the first. Draw the strands taut, and cut off the loose ends close to the knot.

A "double wall knot, double crowned" is made by forming a single wall knot, crowned. Then let the ends of the strands follow their own strands around until the doubling is complete. Haul taut and cut off the loose ends. This makes a hard, handsome knot.

A "Matthew Walker knot" is often of service. Take the first strand around the rope and through its own bight; the second around the rope through the bite of the first and its own bight; the third through all these bights. Haul taut.

It stands to reason that knots of this character should never be made in the end of a rope, which runs through a block, sheave or cleat

The proper way to prevent ravelling out in this case is to whip or serve the end with the loose tarred twine made for this purpose, called spun yarn. Place the end of the yarn on the rope and take from five to ten turns of the yarn over it and around the rope, working down toward the end; then make a large bight with the yarn, bringing it back to the rope; take a few more turns over this end of the yarn and the rope; haul taut and cut off the end of the yarn.

The most simple of the regular knots for fastening two objects together is the common "double knot." With this the reef points are tied over the boom and the head of the sail to the gaff or yard. Take one end in each hand. Pass the left over and under the right; then the right over and under the left. A landsman invariably puts either the right or the left over both times. Don't do that.

The "timber hitch" is more easily shown by a diagram than explained. See the illustration. This is a quick and secure way of bending a rope to a spar.

Two "half hitches" serve the same purpose as the last and many others. If the yachtsman wishes these knots to hold and to look sailor-like, he must copy them exactly.

A quick way of bending a rope or cable on to the hook of a block for a momentary use, to be quickly cast off again, is to make a "Blackwall hitch," which is simplicity itself.

Another simple and excellent hitch for making small ropes fast to large ones is the "clove hitch." The same thing exactly is employed for quickly attaching a cable to a post on the pier; the coils are made in the hands and thrown over the head of the post; in this case it is called the "mooring hitch."

To secure the rope to the ring of an anchor, a "fisherman's bend" is employed. It looks elaborate, but after all is simple enough. The end of the rope is passed through the ring, over the rope, and then back through both turns around the ring; then take two half hitches on the standing part. There is sometimes a great strain on an anchor. To prevent any possible loosening of the bend, secure the end of the rope to the standing part with a turn or two of spun yarn, which when necessary you can quickly cut with your sailor's knife.

The sailor must especially learn the "bowline knot," which puts a loop into the end which will not slip. This can be used in mooring, in making fast to a spar or bucket handle, and in many other ways. Make a small loop in the standing part of the rope; make in the end a bight of the proper size; bring the end back through the loop, over the standing part and back through the loop again; haul taut the knot.

An ingenious knot is the "topsail halliard bend." Take two turns around the topsail yard, pass the end over the standing part and through the turn on the yarn, and belay the end with two half hitches, of which the loop through the turn on the yard is part. Another form is shown in the illustration; there are three turns over the yard, and the end is carried over the rope, under all these turns and back under the first turn.

To bend together the ends of two ropes for hauling, etc., follow the plan of the common bend in the figure.

When the two ends are to be made fast permanently, especially when the rope is to run through block, sheave, cleat or hawse-hole, the ropes must be spliced together. This is easily learned. Unlay the strands and bring the ropes together, the strands of one rope separated alternately by the strands of the other. Take each strand in order, carry it over one strand of the other rope and under the next strand, opening the way for its passage with a marling spike. After the splice is fairly under way, it is well to shave down the remainder of the strands about one-half; then when the operation is completed, the splice will have a thickness not especially larger than the rope itself. Pass the strands through five or six times each side the junction. Haul taut, and hammer the splice down hard and round.

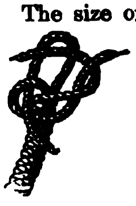
A permanent loop or "eye" can be formed at the end of a rope by making a bight, and splicing the end into the standing part. Cut off the loose ends close.

A "grommet" is a ring of rope, built up from a single strand. Make a loop of the strand, and wind the strand round and round, until you have a ring of three strands. Secure the ends by splicing.

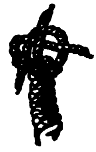
A number of other common knots and hitches are shown in the illustrations printed herewith. One word about the size of the various ropes of a yacht. The weight or stress a sound manila rope will bear with safety is one-half the actual breaking strain. An old rope ought never to be subjected to more than a third or a fourth of the ultimate strain of the new rope. To ascertain the pounds of weight the sound rope will ordinarily bear with safety, square the circumference in inches and multiply by 200. Thus a halliard an inch in circumference will bear 200 pounds with safety. In a cable laid rope, which is not so compact as a line made for the running gear, square the circumference and multiply by 120.

A yacht thirty-five feet long will require about the following sizes of ropes: Mainsail halliards and mainsheet, one and three-quarters inch. Jib halliards, one and a half inch. Ropes for the light sails one to one and a quarter inch. Wire shrouds, two on a side, one and a quarter inch.

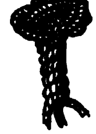
The size of ropes is measured by the circumference in inches.



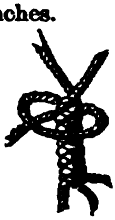
Single Wall Knot.



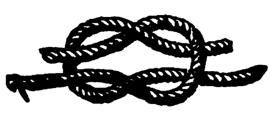
Single Wall Knot, crowned.



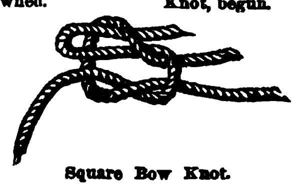
Double Wall Knot, double crowned.



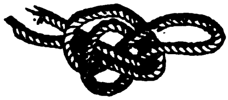
Matthew Walker Knot, begun.



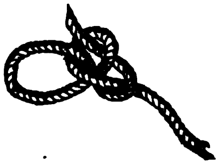
Double Knot.



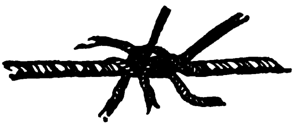
Square Bow Knot.



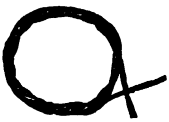
Loop Knot.



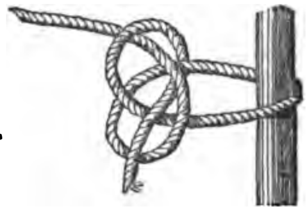
Bowline Knot.



Splicing of Two Ropes.

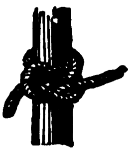


Grommet.

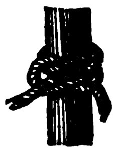


Capstan or Prolonged Knot.

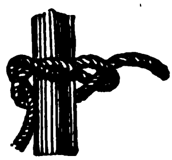
Rope end, served.



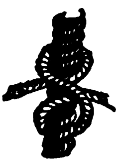
Reef Knot.



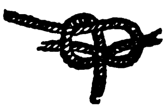
The Wrong Way to Make a Reef Knot.



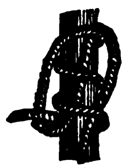
Timber Hitch.



Clove Hitch.



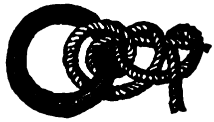
Common Bend.



Topsail Halliard bend.

Two Half-Hitches.

Blackwall Hitch.



Fisherman's Bend.

USEFUL FACTS.

Canvas.—The amount of sail a vessel will carry (its area in square feet) is twice the area of a parallelopipedon inclosing the load water line, in merchant vessels; from two to two and three-quarters times in yachts. The sail area varies in large and heavy vessels from thirty to forty times the area of the immersed midship section; in yachts from thirty to seventy-five times. This refers only to the regular working lower sails, and does not include topsails or jib topsails. A racer is usually fitted with a larger proportion of sail than a cruising yacht.

The centre of effort in fore and aft rigged vesels should be placed at a point found as follows: Take one-tenth the length of load water line; divide it by the distance fore and aft between the centre of buoyancy and the centre of the vertical longitudinal middle line plane of the immersed body; the quotient is the distance forward of the last named centre at which the centre of effort should be placed. If the vessel is full in form at the load water line and very sharp below, the centre of effort can be placed a little higher than if it were full below.

A suit of sails will last white and clean, if well taken care of, for three years. Fishing vessels wear out their canvas in two, two and a half, or three years. Traders make it last from three to four. Yachts can make it last as long as that, but to keep it white and clean, washing and scrubbing are necessary.

It is better not to stretch a new sail all it will bear at first; draw it out gradually; then it will not get out of shape, and it will not tear if it should be wet by a shower while new.

Sail lockers should be dry and well aired; examine them occasionally to see that mice have not invaded the locker.

A fore and aft sail looks best with plenty of peak. To find a good angle for the gaff, draw a line from the clew to the throat, and set the gaff at right angles to this line.

Trading ships carry twenty-two inch cotton duck, which is woven soft so that sailors can handle it easily. The thicknesses run from No. 0, which is the heaviest, to No. 12, which is the lightest. Lower sails in a large ship are made of No. 0, the upper sails of Nos. 1 to 6. Schooners carry stiff, hard-woven duck, in order to keep the sails as flat as possible. For yachts the canvas is as follows: Open sail boats, from twenty to thirty-five feet long, 8, 10, and 12 ounce duck, 28 inches wide, usually bighted once or twice, which makes the cloths 12 or 8 inches wide; for racing boats, the cloths are sometimes narrowed to 5 inches. In yachts, varying from 40 to 80 feet in length, No. 4, 5, and 6 canvas, 14 inches wide, is used for lower sails; 8 and 10 ounce ravens, 28 inches wide, for light sails. In yachts from 85 to 100 feet in length, No. 2, 3, 4, 5, or 6, 14 inch duck is used for the lower sails; No. 8 to No. 10, 22 inch, for light sails. In larger yachts, the lower sails are of No. 00 to No. 4; upper sails, same as last.

Waves.—The form of a wave undulates along the surface of water; but the particles of which it is composed do not; these particles rise and fall in a local circular orbit. In shallow water the orbit is oval. The surface of a wave forms a trochoid curve, that is to say, the curve formed by any point on the circumference of a rolling circle. The length of a true trochoid curve is 3.14159 times its height. The velocity of the advance of waves is as follows:

Length of wave in feet from crest to crest.	Velocity in miles, per hour.	Length of wave in feet from crest to crest.	Velocity in miles, per hour.	Length of wave in feet from crest to crest.	Velocity in miles, per hour.	Length of wave in feet from crest to crest.	Velocity in miles, per hour.
1	1.21	10	4.88	45	10.33	175	20.41
2	2.18	12	5.34	50	10.92	200	21.83
3	2.67	15	5.97	60	11.05	250	24.00
4	3.08	18	6.54	70	12.91	300	27.64
5	3.45	20	6.90	80	13.81	350	28.90
6	3.78	25	7.71	90	14.64	400	30.86
7	4.08	30	8.45	100	15.43	450	32.74
8	4.36	35	9.13	125	17.25	500	34.51
9	4.60	40	9.76	150	18.90		

Waves on the Atlantic have been measured thirty feet in height but it is believed they run higher than that in great storms. The longest wave ever actually measured was 500 feet. The sub-surface of a wave is the low trochoid curve passing through its centre of buoyancy, or closely in that vicinity. This is called the "effective wave-surface," and the stability of a deep vessel will cause her to remain upright to this surface. For small shoal vessels the actual wave surface is practically the effective surface; they tend to assume a position perpendicular to that surface. Rolling and pitching among waves, therefore, are really due to stability.

Wave Lines.—The speed of vessels has been greatly improved by the adoption of slightly hollow water lines at entrance and run, that is to say, the lines have received a slightly inward curve. It is considered now that the entrance should be longer than the run in the proportion of three to two. The middle body is substantially straight, and can be of any length. If great speed is required from a vessel, the entrance and run should both be longer than in a slow vessel. To obtain the length of entrance required for a given speed in miles per hour, square the velocity and multiply by 0.562. To find the length of run, square the velocity and multiply by 0.375. This is for large vessels, but the principle can readily be applied to yachts. Now to construct a wave line: The one at the bow is considered a curve of versed sines. Draw a line representing the middle line of the vessel in the half breadth plan, and set off upon it the length of the entrance. At the inner end of this line set up a perpendicular to represent the width of beam there (really the half width). Describe a semicircle with the half beam as a diameter. Divide the base line of the entrance into any number of equal parts, and set up perpendiculars from the points of division, numbering them one two, three, etc., from the bow in. Divide the semicircle into the same number of parts, and draw lines from the points of division out parallel to the base line, numbering them one, two, three, etc., from the base line up. The points where lines which are numbered the same intersect, are points in the curve, which can be swept in with a batten.

To construct the water line for the run, which is a true trochoid curve: Draw the base line, the half beam and the semicircle, and divide them both into equal parts, numbering the points of division as before. Now from the point of intersection of base line and beam, draw radiating lines to all of the points of division of the semicircle. Instead of setting up perpendiculars from the base line, draw a line from points 1, 2, 3, etc., on the base line, parallel to the corresponding radiating lines in the semicircle. Then draw the lines parallel to the base, and the points of intersection will be points in the curve. The wave-lines thus found will answer for the load water line of the vessel.

Sheathing metal.—Pure copper was anciently used; also zinc. A composition of copper, called yellow metal, is now the only metal employed in sheathing vessels. The sheets are four feet long, one foot two inches wide. The edges lap one inch. Each sheet covers practically four and a half square feet. To ascertain the number of sheets required to copper a vessel's hull, calculate the submerged surface of the hull, divide by 4 1-4, and add about 20 per cent for keel, rudder and one streak above the load line. The weight of the different thicknesses per sheet is:

Weight per square foot.	Weight per sheet.	Weight per square foot.	Weight per sheet.
14 oz.	4 lbs 1 oz.	24 oz.	7 lbs .. oz.
16 oz.	4 lbs 10 oz.	26 oz.	7 lbs 9 oz.
18 oz.	5 lbs 4 oz.	28 oz.	8 lbs 3 oz.
20 oz.	5 lbs 13 oz.	30 oz.	8 lbs 12 oz.
22 oz.	6 lbs 7 oz.	32 oz.	9 lbs 5 oz.

About five-eighths of a pound of composition nails are required for fastening a sheet of metal.

Wind Pressure.—This has long been a perplexing subject. The American rule has been to square the velocity of the wind, in miles per hour, and divide by 200, the quotient being the pressure of the wind in pounds per square foot at that velocity. The English rule has given higher pressures; squaring the velocity and dividing by 175. The United States Signal Service has investigated this subject elaborately, and has taken account of the increased density of the air produced by cold weather, and the rarity produced by high altitudes. For instance, on Pike's Peak the pressure of the wind is nearly one-half than at the level of the sea. On any given level, the variations from heat and cold and barometric pressure at the sea level are found to be small, and they are neglected in the table given below, and need not be considered by yachtsmen and designers. As the result of its experiments the United States Signal Service has adopted the theoretical coefficient of .0027, to which one-ninth part has been added for friction. That makes the divisor 333, and gives lower results than in the old tables. The following table has been supplied by Captain F. B. Jones, of the Signal Service, especially for this work:

Velocity of the wind in miles pr hour.	Pressure in lbs per square foot.		Velocity of the wind in miles pr hour.	Pressure in lbs per square foot.		Velocity of the wind in miles pr hour.	Pressure in lbs per square foot.		Velocity of the wind in miles pr hour.	Pressure in lbs per square foot.	
1	0.00	Light airs.	26	2.02	Fresh gale.	51	7.81	Storm.	76	17.33	Hurricane.
2	0.01		27	2.19		52	8.12		77	17.79	
3	0.03		28	2.35		53	8.44		78	18.25	
4	0.05	Light wind.	29	2.52		54	8.76		79	18.72	
5	0.07		30	2.70		55	9.08		80	19.20	
6	0.11	Light breeze.	31	2.88	Strong gale.	56	9.41		81	19.69	
7	0.15		32	3.08		57	9.74		82	20.18	
8	0.19	Moderate breeze.	33	3.27		58	10.08		83	20.68	
9	0.24		34	3.47		59	10.43	Hurricane.	84	21.18	
10	0.30	Fresh breeze.	35	3.68		60	10.80		85	21.68	
11	0.36		36	3.89		61	11.17		86	22.19	
12	0.43		37	4.11	Heavy gale	62	11.54		87	22.70	
13	0.51		38	4.33		63	11.92		88	23.22	
14	0.59		39	4.56		64	12.30		89	23.75	
15	0.67	Strong breeze.	40	4.80		65	12.68		90	24.30	
16	0.77		41	5.05	Storm.	66	13.07		91	24.85	
17	0.87		42	5.30		67	13.47		92	25.40	
18	0.97		43	5.56		68	13.88		93	25.96	
19	1.08		44	5.82		69	14.29		94	26.52	
20	1.20		45	6.08		70	14.71		95	27.08	
21	1.32	Moderate gale.	46	6.35		71	15.13		96	27.65	
22	1.45		47	6.62		72	15.55		97	28.23	
23	1.59		48	6.91		73	15.98		98	28.81	
24	1.73		49	7.20		74	16.42		99	29.40	
25	1.87		50	7.50		75	16.88		100	30.00	

These pressures are at the sea level.

In large vessels the strength of the wind governs the amount of sail spread as follows:

Light airs and breezes.—All sail set, aloft and alow, including light canvas.

Fresh breezes.—Royals and flying jib taken in, and up to two reefs in the topsails.

Strong breezes.—Reefing of the topgallant sails, to taking them in.

Moderate gales.—Double and treble reef in the topsails, with reef in spanker and jib.

Fresh gales.—Close reefed topsails to taking in jib, and fore and mizzen topsails.

Strong gales.—Reefed courses; close reefed maintopsail, forestaysail and mizzen topsail; taking in the mainsail.

Heavy gales.—Close reefed maintopsail only.

Coefficient of Displacement.—This term refers to the ratio between the actual displacement in cubic feet and the volume of the parallelopipedon inclosing the immersed part of the hull. This ratio in yachts varies from .35 to .45 per cent; in clipper ships from .55 to .66 per cent; in large coasting schooners and sailing ships, .66 to .75 per cent; in cotton ships and in the full models of Northern Lake schooners and steam barges, .75 to .85 per cent; in canal boats, .85 to .95 per cent. Nystrom's Engineering Pocket Book contains a system whereby the coefficient of displacement can be selected in advance, and then from a given water line and midship section the rest of the vessel can be evolved.

Resistance.—If a vessel is properly fashioned at the bow and stern, the waves caused by the displacing action of the bow, as the vessel rushes forward, will flow away naturally, making small resistance to the forward motion. At the stern, the water will flow in behind the vessel, with the speed with which water flows into a vacuum, and will not put a drag upon any properly modelled vessel. The chief resistance is due to friction of the immersed surface against the water, and as friction is due to pressure, the deeper the vessel the greater the friction. Engineers have calculated the following table of resistance to a flat-fronted vessel in pounds per square foot, at the speeds named:

Miles per hour.	Resistance in lbs per square foot.	Miles per hour.	Resistance in lbs per square foot.	Miles per hour.	Resistance in lbs per square foot.
1	2.15	6	77.44	11	260.23
2	8.60	7	105.40	12	309.76
3	19.36	8	137.67	13	363.54
4	34.41	9	174.24	14	421.62
5	53.78	10	215.11	15	484.

Now this resistance is lessened by fashioning the bow so that instead of opposing the midship section squarely to the water, the entrance parts the water gently and allows the waves heaped up each side of the bow to flow away before the midship section is reached. To find the actual resistance, multiply the immersed area of the midship section by the resistance per square foot at the given speed, and by the coefficient in table below of the water line:

Water line.	Coefficient.	Water line.	Coefficient.
Wave form, 10 to 1.	.028	Convex arc of 15° each side	.20
Wave form, 9 to 1.	.034	Convex arc of 25° each side	.31
Wave form, 8 to 1.	.043	Convex arc of 30° each side	.64
Wave form, 7 to 1.	.056	Wedge angle 35° each side	.51
Wave form, 6 to 1.	.077	Wedge angle 44° each side	.57
Wave form, 5 to 1.	.15		

For friction, employ the following formula: Multiply the area of the wet surface in square feet by the square of the velocity in miles per hour, and that product by the following coefficient: For clean copper, .007; smooth paint, .010; iron, .014; smooth plank, .016: plank with some barnacles and grass, .019; very foul, .055.

Bell Time on Shipboard.—The hour of the day is signalled to the crew on shipboard by taps on a large bell, mounted on the forward part of the deck. The day is divided into six periods of four hours each. The half hours in each period are struck upon the bell, one tap being given for each half-hour; thus the last signal of each period is "Eight bells." The following table will show the number of bells for each half-hour of the day:

1 bell.........	12:30 o'clock	1 bell.........	4:30 o'clock	1 bell.........	8:30 o'clock
2 bells........	1:00 o'clock	2 bells........	5:00 o'clock	2 bells........	9:00 o'clock
3 bells........	1:30 o'clock	3 bells........	5:30 o'clock	3 bells........	9:30 o'clock
4 bells........	2:00 o'clock	4 bells........	6:00 o'clock	4 bells........	10:00 o'clock
5 bells........	2:30 o'clock	5 bells........	6:30 o'clock	5 bells........	10:30 o'clock
6 bells........	3:00 o'clock	6 bells........	7:00 o'clock	6 bells........	11:00 o'clock
7 bells........	3:30 o'clock	7 bells........	7:30 o'clock	7 bells........	11.30 o'clock
8 bells........	4:00 o'clock	8 bells........	8:00 o'clock	8 bells........	12:00 o'clock

"One bell" is a single tap of the bell. "Two bells" is struck by taps in rapid succession. "Three bells" is sounded by tow taps in rapid succession, a pause, then one tap. "Four bells" by two taps in rapid succession, a pause, then two taps again. And so on. The extra single tap always marks the intermediate half-hour.

NAUTICAL TERMS.

ABACK.—The situation when the wind blows upon the forward surface of a sail.

ABAFT or **AFT.**—Toward the stern.

ABOUT.—To put the vessel on the other tack.

ANCHORS.—The "bowers" are the largest anchors of a merchantman and weigh from 4,000 to 5,200 lbs; "sheet" anchors are smaller and are carried on the sides of the ship; "stream" anchors are carried inboard and vary from 300 to 1,900 lbs; "kedges" are light anchors for warping the vessel into a new position; "boat" anchors are for the ship's boats. The anchor is "foul" when caught in the cable; "tripped" when disengaged from the ground; "apeak" when the vessel is over it and the cable perpendicular. Large vessels should ride with a length of cable out six times the depth of water. Yachts carry anchors weighing 1 to 1½ lbs per foot of water line length.

APRON.—A timber at the back of the stem to strengthen it.

ARDENCY.—Tendency to fly up into the wind.

ATHWART.—Crosswise.

BACK STAY.—A wire or rope extending from the heads of the upper masts to the vessel's side. "*Preventer*" back stay, an extra stay while carrying heavy sail.

BALLAST.—Heavy materials placed in the hold, or built into the keel, to give the vessel stability. Iron, lead, stone, brick, gravel and sand are used.

BANKER.—A vessel engaged in the bank fisheries.

BANDS.—Strips of canvas sewed on to prevent the sail from splitting.

BARGE.—A large and handsome rowboat, with numerous pairs of oars, for the use of flag officers and high officials. Also a large unrigged freighting vessel.

BARK.—A three-masted sailing vessel, having square sails on the fore and main masts and fore and aft sails on the mizzen mast.

BATEAU.—A narrow, flat-bottomed, broad skiff, sharp at both ends, with flaring sides used by lumbermen while rafting logs in the northern forests of America.

BATTEN.—A long, thin strip of wood, from one to three inches broad, used in drawing the curves while laying off the lines of a vessel.

BEAM.—Greatest width of the vessel. "*Beams,*" the timbers reaching across the vessel upon which the deck planks are nailed.

BEARDING LINE.—The inner edge of the rabbet on a vessel's stem and stern post, and the upper edge of the rabbet on the keel; it is the line where the inner surface of the planking comes in contact with those timbers.

BEATING.—Tacking to windward.

BELAY.—To fasten the end of a rope by turns around a pin or cleat.

BEND.—To make a sail fast to boom or yard, or a rope to an anchor, spar, or another rope.

BILGE.—The curvature in a ship's hull, between the side and the bottom.

BODY PLAN.—A drawing to show the vertical cross sections of a vessel.

BITTS.—Vertical posts or timbers projecting above deck.

BOATSWAIN.—A ship's officer whose duty it is to summon the crew, and see that they perform their work quickly. He is also general overseer of the rigging and canvas.

BOBSTAY.—A stay extending from the bowsprit to the cutwater.

BOLTROPE.—A superior and flexible kind of cordage for roping sails.

BOOM.—The pole which spreads the foot of a fore and aft sail, spinnaker, or studding sail.

BOWLINE.—A rope attached by bridles to the cringles on the windward leech of a square sail, to keep it steady, while the ship is sailing to windward.

BOWSPRIT.—The strong spar, projecting from the bow, to spread the foot of the jibs.

BOX HAULING.—Veering the ship short round on her heel, by laying the forward sails aback, and keeping the after sails full.

BRACES.—Ropes attached to the ends of the yards for hauling the yard around.

BRAILS.—Ropes to draw up the foot, leech, and other parts of fore and aft sails, for furling.

BRIDLES.—Short ropes attached to the bowline cringles of sails.

BRIG.—A two-masted vessel, having square sails, with the addition of a large fore and aft sail on the main mast.

BRIGANTINE.—A two-master, square rigged on the foremast, and sloop rigged on the mizzen mast.

BUNT.—The middle cloths of a square sail.

BROACH TO.—To fly up into the wind.

BUNTLINES.—Ropes fastened to the foot rope or square sails and passing up over the yard, to draw up the sails with.

BURY OR HOUSING.—That part of the mast below the deck.

CANTS.—The frame timbers in bow and stern, which do not stand square to the keel.

CANVAS.—The strong flax or cotton cloth of which a sail is made; hemp canvas was used during the Civil War, but not now.

CAT-HARPINS.—The rigging close underneath the top.

CARLING.—Half-sized beams, introduced between the deck beams; and short timbers extending from one beam to another.

CAT-HEAD.—A strong short timber projecting from the side of the bow, on which the anchor is hoisted.

CAT'S-PAWS.—The spots on the surface of the water when ruffled by light puffs of wind.

CARVEL-BUILT.—When the edges of the streaks of outside planking meet each other so as to form a flush surface. "*Clinker-built*" means that the edge of one plank overlaps that of the next.

CLINKER-BUILT.—See "Carvel-Built."

CATAMARAN.—Two or three canoes, or canoe-like hulls, secured parallel to each other by beams and ties, which support a deck; the whole provided with a jib and fore and aft sail.

CHANNELS.—Short shelves of oak plank projecting from the sides of the hull to give additional spread to the shrouds.

CHOCK.—A small piece of wood fitted into or upon the top of a large timber to make good a deficiency.

CROSS-JACK.—The square sail bent on to the mizzen lower yard in the merchant service; in the navy, this sail is never carried.

CUTTER.—A single-masted vessel sharp-built, with a running-in bowsprit, carrying fore and aft mainsail, gaff or club-topsail, fore-staysail and jib. Also, one of the medium-sized small boats of a ship, clinker built.

CLAMPS.—Heavy strakes of ceiling, covering the inside surface of the frames, underneath the beams.

COMPOSITE.—A form of vessel construction in which the frames, knees and deck beams are of iron and the outside planking and decking are of wood.

CAPSTAN.—A perpendicular windlass around which the table is passed for hoisting the anchor; it is operated by movable spokes or bars, called handspikes or capstan bars.

CEILING.—The planking on the sides and floor of the interior of the hull.

CLEATS.—Pieces of wood to which the ropes are belayed.

CLEW.—The two lower corners of square sails and fore and aft sails.

COMBINGS.—The raised wood work around a hatch or cockpit to prevent water washing into the hatchway.

CENTRE OF EFFORT.—That point in the sail area, where, if the whole force of the wind were concentrated, its effects would be the same as when dispersed over the whole area.

CLIPPER.—A trading vessel built for great speed, either a schooner, brig, bark or ship.

CLOSE HAULED.—The trim of a vessel's sails when she is sailing as nearly as possible toward the quarter from which the wind blows.

CLEW-GARNETS.—Tackle attached to the clews (or lower corners) of square sails, for hauling the clews up to the yards.

COMPANION-WAY.—Ladder or steps leading to the cabin.

COURSES.—The fore sail and main sail of a ship.

CHAIN-PLATES.—The iron straps or plates on the side of a vessel, to which the shrouds and backstays are fastened.

CRINGLES.—Rings of ropes, formed around iron thimbles; they are fastened to the sails as a convenient means of attaching ropes.

CROSS-TREES.—Bars of wood, placed athwart ships at the junction of a lower mast and topmast, to unite them and to spread the topmast stays.

DOWN-HELM.—To put the helm a-lee.

DAVITS.—Pairs of wooden or iron cranes, placed at the vessel's sides or stern for hoisting up the small boats.

DISPLACEMENT.—The volume of water displaced by the immersion of a vessel's hull; the total weight of the vessel, equipment and cargo.

DOWN-HAUL.—A rope passing up along a stay and fastened to the upper corner of the sail, to pull it down with.

DEAD-EYES.—Wooden blocks, the lower one firmly fastened to a chain plate; the upper one to the lower end of a shroud or backstay; the two blocks are united by a small rope called the lanyard.

DRAUGHT.—The depth of water required to float a vessel.

DRAG.—A vessel sails with a drag when she is deeper in the water aft, than forward.

EARINGS.—The upper corners of all square sails and fore and aft sails.

FASHION TIMBER.—The aftermost frame, which is secured to the ends of the transoms.

FID.—The wooden key that holds the heel of the topmast in position.

FOOT.—The lower edge of a sail.

FORE AND AFT.—Lengthwise of the vessel.

FORECASTLE.—The part of a vessel before the foremast. Top gallant forecastle, the raised deck in the bow of a large vessel, built for convenience in handling the anchor and jibs.

FRIGATE.—A war ship with one gun deck below the main deck and carrying from forty to fifty cannon.

FRAME.—One of the ribs of the vessel, upon which the outside planking or plating, and the ceiling inside, are fastened. It is composed of "floors" which cross the keel, "futtocks" which reach upward along the sides; "top-timbers," and "stanchions" which support the bulwarks.

FURLING.—The operation of rolling up a sail close to the yard, stay, mast, or boom, and winding a rope or gasket around it to keep it in position.

FUTTOCK.—See "Frame."

GAFF.—The pole to which the head of a fore and aft sail is bent.

GALLEY.—A war vessel propelled by oars.

GARBOARDS.—The heavy strips of outside planking next to the keel.

GASKETS.—Plaited ropes used for tying a sail to the yard when it is furled.

GOOSE-WINGS.—The clews of a square sail, which are let down (while the bunt or body remains furled), so as to show a mere scrap of sail while scudding before a storm.

GRAPNEL.—A small anchor with several claws.

GROMMETS.—Rings of rope.

GUNWALE.—The upper rail on the side of a boat or vessel.

HALLIARDS.—Ropes used for hoisting sails and yards.

HARPIN.—In shipbuilding, a temporary streak of plank nailed to the frame timbers at bow and stern to keep them in position.

HAWSE-PIPES.—The iron pipes in the bow through which the anchor cables are run out.

HOIST.—That part of a fore and aft sail which is extended by hoisting; a top-sail has "depth"; a course has "drops"; but "hoist" is applied to all sails by many.

HOUNDS.—The swell in the upper end of a mast, on which rests the frame of the top and the weight of the topmast and rigging.

HORSE.—A bar of iron, with a stout ring of iron on it, which spans the deck in front of the foremast or aft of the steersman, for the jib and main sheets to travel on.

JIB.—The triangular head sail, which is spread by a stay running from the head of the foremast to the end of the bowsprit. *Jib-topsail*, the headsail next forward of the jib. *Flying-jib* the next forward of that. *Balloon-jib*, a large light headsail spread in light breezes in place of the other jibs of a yacht. *Jib-foresail*, the forestaysail of a sloop.

JIBBOOM.—A pole secured on top of the bowsprit and projecting beyond the same; used for spreading additional head sails.

JIBE.—While sailing before the wind to bring the boom from one side over to the other.

JIGGER-MAST.—The small mast in the stern of a yawl; also, the aftermost mast in a four-masted vessel.

JIGGER-TACKLE.—A light small tackle, consisting of a double and single block for hauling up the bunt of a topsail.

JOLLY-BOAT.—One of the small boats of a large vessel; it is clinker built and broad and bluff in form.

JURY-MAST.—A temporary mast set up in place of one that has been lost.

KEEL.—The back-bone timber of a ship, on which the whole structure is built. The stem and stern post are virtually continuations of the keel.

KEELSON.—A heavy timber, placed upon the floor timbers over the keel and fastened with bolts driven clean through frames and keel.

KNEE.—A natural elbow or crook of timber, used to connect the deck beams with the sid of the vessel. Hanging knees are perpendicular; lodging knees, horizontal.

KNOT.—The nautical or geographical mile, representing one-sixtieth part of a degree on a great circle of the earth. In order to allow for the differences in circumference of the earth, the knot is considered by the United States Survey as one-sixtieth of a degree on the circumference of an exact sphere, having the same surface as the earth. The knot, or nautical mile, is 6,080¼ feet. The land mile is 5280 feet.

KNIGHT-HEADS.—The strong frame timbers in the bow of a vessel, each side of the stem rising up to the gunwale and serving to help hold the bowsprit in position.

LACING.—The rope used to secure the heads of the sails to the yard or gaff.

LANYARD.—The small rope rove through the holes in the deadeyes in setting up the shrouds of a vessel and serving to draw the shrouds taut.

LARBOARD.—The left hand side of a vessel.

LARGE.—A favoring wind when it comes upon the beam or quarter; the vessel advances with sheets slackened or flowing and the bowlines are not in use at all. Sailing-large is sailing with a favoring wind.

LATEEN-SAIL.—A triangular sail, hanging from a yard which is tilted up at an angle of about 45° with the deck.

LAYING-OFF, OR DOWN.—Delineation of a ship's lines to full size on a smooth floor.

LEECH.—The sides of square sails and the after edge of a fore and aft sail.

LEE HELM.—When the helm has to be kept over to the leeward side to press the vessel's head closer into the wind.

LEEWARD.—The side away from the wind.

LININGS.—The pieces of canvas sewed on various parts of a sail to preserve it against chafing and injury.

LOG-LINE.—The apparatus for measuring a vessel's speed.

LOG-BOOK.—The daily record of the progress of the vessel and incidents of the voyage.

LUFF.—The forward edge of a fore and aft sail. To luff, is to steer up into the wind.

LUG-SAIL.—A quadrilateral sail, spread at the top by a yard, which is hoisted to the mast by a block set on the yard about one-third of its length from the forward end. Seen in the fishing boats of Louisiana.

LURCH.—A sudden roll of the vessel.

MARLING-SPIKE.—A round tapering piece of wood or iron, used to separate the strands of a rope to introduce another, when splicing.

MASTS.—The stout perpendicular poles which sustain the sails of a vessel. In two-masted vessels they are called respectively the fore and main. In three masters they are called the fore, main and mizzen. A fourth mast would be called the jigger, and a fifth the mizzen-jigger. If the height of the sails require an upper mast, the latter is called the top-mast; if one above that, the topgallant mast, which is made in one spar but is marked off into topgallant, royal and skysail masts.

MOULDING.—The width of any timber in a direction from inside the vessel outward.

MARTINGALE OR DOLPHIN STRIKER.—A short perpendicular spar beneath the end of the bowsprit.

METACENTRE.—The point where a vertical line drawn through the centre of buoyancy is met by another vertical line, drawn through the new centre of buoyancy when the vessel is inclined to one side.

MISSING STAYS.—Failure to go about while trying to tack.

MIZZEN.—See "Mast."

OAKUM.—Tarred rope picked to pieces and used for caulking seams in the planking.

ORLOP DECK.—The lowest or false deck in a ship hold; it is usually a row of beams only. Contraction of "over-loop."

PARTNERS.—Planks thicker than the rest of the deck to support the masts where they pierce the deck.

PEAK.—The outer end of the gaff.

POINTS (Reef-points).—Pieces of white cordage, whose lengths are nearly double the circumference of the yard or boom, attached to the sails in rows and used for lessening the area presented by a sail to the wind.

PITCHING.—The rising and falling of a vessel, fore and aft, when among waves.

PORT.—The larboard or left hand side of the vessel.

PLANK SHEER.—The heavy plank which covers the opening between the frame timbers at the level of the deck.

QUARTER.—That part of a vessel aft of the main mast.

RIBBON.—A long piece of timber four to six inches square, used to keep the frames in place while they are being planked.

RAIL.—See "Gunwale."

RAKE OF THE MASTS.—The inclination backward of a mast, intended to bring the weight of the mast, sails and rigging, and effort of the sails further aft.

ROLLING.—Oscillations from side to side.

RATLINES.—Ropes fastened across the shrouds like the steps of a ladder.

RABBET.—A groove in a piece of timber cut to receive another piece.

REEF.—A strip of the sail which is taken up and fastened to the yard or boom by the reef points, in order to shorten sail. Large sails have either three or four reefs. Balance reef, the last reef.

RUNNING RIGGING.—All the running ropes and lines of a vessel attached to the sails and flags and employed in the handling of them.

SCUD.—To drive before a gale.

SERVING.—To wrap narrow strips of old canvas and tarred yarn around a rope to prevent it from chafing.

SCHOONER.—A vessel with two or more masts and fore and aft sails.

SHEET.—The strong rope fastened to the clew of a sail to haul and keep it in place.

SHELF.—A thick plank fastened to the inside of the frames to support the ends of the beams.

SHOULDER-OF-MUTTON SAIL.—A triangular sail, spread from the mast instead of a yard, as in the Chesapeake Bay canoes and buck-eyes.

SIDING.—The width of any timber parallel to the outer surface of the vessel.

SLINGS.—The middle part of a yard or boom, or, more accurately, the ropes and chains fastened thereto to take its weight and promote ease of handling.

SLACKNESS.—The tendency of the vessel's head to fall away from the wind, showing that the centre of effort is too far forward of the centre of lateral resistance.

SLOOP.—A one-masted vessel, carrying a fore and aft mainsail, a gaff topsail and a large jib spread by a fixed bowsprit. In modern sloop yachts the jib is divided into a staysail, spread by a stay coming down to the knightheads, a jib and a jib topsail; and the gaff top-sail is replaced by a large quadrilateral sail, with a light pole at head and foot; a spinnaker is used in light winds.

SHIP.—A three-master, square rigged on each mast.

SPANKER.—The large fore and aft sail on the mizzen mast of large vessels. Also called Spencer and Driver.

SPINNAKER.—A large triangular sail spread in light winds by sloops when sailing before the wind; it is hoisted along the mast and the foot is spread by a boom.

SPLICE.—The union of two ends of a rope by interweaving the strands.

SPRIT.—A pole for spreading a fore and aft sail, extending from the mast near the foot of the sail to the upper after corner of the sail.

SQUARE SAILS.—Sails spread upon yards hanging crosswise of the vessel.

STARBOARD.—The right-hand side of the vessel.

STAY.—A large, strong rope extending from the head of a mast to the knightheads, or to the foot of the mast next forward of it.

STAYSAIL.—A sail spread upon a stay.

STANDING RIGGING.—The shrouds, stays and other permanent rigging.

STEM.—The large frame timber at the extreme bow of a vessel, which is practically a continuation of the keel; the ends of the planking are secured to this timber.

STEERAGE.—That part of the space between decks, forward of the after cabin.

STERN.—The aftermost end of a vessel.

STEEVING.—The angle of elevation of the bowsprit with the level of the sea, being about 17° in large vessels.

STREAK, OR STRAKE.—One breadth of planking.

STABILITY.—That quality arising from the form of a vessel and the position of the weights, which, when she is inclined out of an upright position, tends to bring her back again. Stability tends to keep the vessel perpendicular to the surface of the water, whether the water is level or in the form of a wave.

STIFFNESS.—The quality which keeps a ship upright, in spite of the force of wind and waves. Too great stiffness is undesirable.

STANCHIONS.—The frame timbers which support the bulwarks.

STUDDING SAILS.—Certain sails which are set as wings to square sails, in light breezes.

STREAM ANCHOR.—See "Anchor."

SHROUDS.—The strong hemp or wire ropes, attached at the upper end to the heads of the lower masts and at the foot to the chain plates on the sides of the vessel; they secure the masts against the rolling and pitching of the vessel and the pressure of the wind upon the sails. Topmast-Shrouds—Shrouds extending from the head of the topmast to the frame of the top of the lower masts. By the aid of the ratlines tied across the shrouds, the sailors ascend from the decks to tops and yards above.

TACK.—The lower forward corner of a fore and aft sail; the lower windward corner of a square sail or studding sail. The vessel is on the *starboard tack* when the wind blows against the starboard side; on the *port tack* when the wind blows on the port side.

TAUT.—Stretched tight.

TAUNT.—High or tall; an epithet applied to masts.

TARPAULIN.—A large piece of tarred canvas, used to protect hatchways and property from rain or spray.

TRYSAIL.—A fore and aft sail, set on the fore and main lower mast of a ship. A small fore and aft sail for a sloop while cruising.

TREENAIL (pronounced trunnel).—The wooden nails, usually made of locust or white oak used for fastening the planking and ceiling of a vessel to the frame timbers.

TONNAGE.—The cubical capacity of the interior of a vessel; one ton is 100 cubic feet.

TOP.—The large platform at the head of either the lower mast or the top mast, which affords standing room to the sailors engaged in manipulating the sails or keeping watch of the horizon for other vessels or land.

TRESTLE-TREES.—A strong snug wooden frame placed around a mast and resting on the hounds, to secure the foot of the mast above and to take the weight of the same.

THROAT.—The inner edge of the gaff against the mast.

TRANSOM.—One of the horizontal, thwartship timbers, composing the stern frame, and fastened to the stern post on its forward side.

TOPPING LIFT.—The strong rope brought down from a block under the top to the outer end of the boom of a fore and aft sail, to take the weight of the boom and lift it so that it will clear the roof of the cabins.

VANGS.—Traces used to steady the gaff, extending from the gaff on each side to the bulwarks, where they are hooked and drawn tight.

UP-HELM.—To put the helm to windward.

WAIST.—That part of a ship between the forecastle and the quarter.

WATERWAY.—The large square log, laid on the ends of the beams, close against the frame timbers, and bolted to both, to give the hull rigidity.

WEAR.—To come around on the other side of the wind without tacking, an operation requiring plenty of sea room. In this operation, the bow is turned away from the wind.

WALES.—The heavy outside planking above the bilge. Sometimes called the "bends."

WEATHER HELM.—When the vessel tends to come too close into the wind, the helm is put to windward to keep her head off.

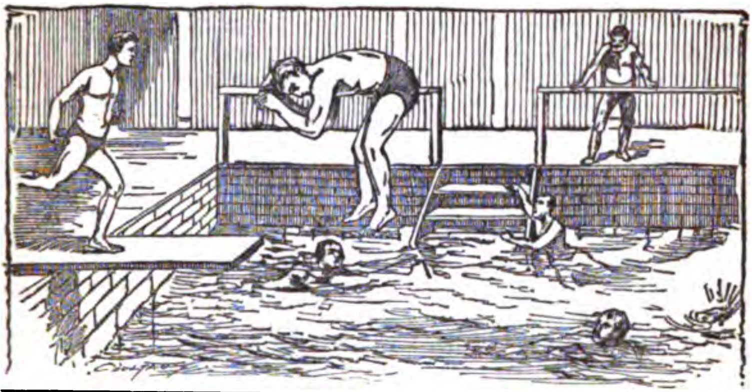
WINDLASS.—The apparatus in the bow of a vessel for hoisting the anchor; it has a horizontal barrel around which the cable is passed; it is operated by hand levers or by steam.

WINDWARD.—Toward the direction from which the wind blows.

WHALE-BOAT.—A long narrow rowboat, carvel built, sharp at both ends, steered with an oar, from 20 to 50 feet in length and from 4 to 10 feet beam, with a small pole mast and sail, very fast and able.

YARD.—A spar suspended athwartships from a mast to spread the head of a square sail

YAW.—To deviate from the course.



SWIMMING.

BY W. S. ROSSITER

ALTHOUGH swimming must be classed as an accomplishment, it is certainly an art which Nature intended mankind to acquire. The necessity of living and moving in water seems to have been apparent to all peoples even in the most remote ages. Although humanity was not endowed by instinct, as the animals are, with the ability to swim, the race possessed the next best thing, a desire to learn how. Moreover, it should be remembered that when the knowledge of swimming has once been acquired it has never been forgotten.

The art itself is nearly as old as the race. There are several hieroglyphic references to swimming on the Assyrian tablets in the British Museum. The schoolboy who digs away at the Iliad or the Odyssey will remember whatever else he forgets—Homer's frequent references to bathing, written at an early period of a most remote age.

Bathing and swimming are referred to in the works of early authors, as though the sport were well known and long practised. It is never spoken of as a novelty. Indeed, there is reason to believe that the art was even more generally practised in those early times than at the present day, for the boats of that period were small and clumsily constructed, and must have placed those who ventured out in them in continual danger of overturning.

Leander's unfortunate long-distance swim for the prize of a woman's love, is part of history.

The Spartan youths were compelled to make swimming an important feature of their regular physical exercise; and at ancient Rome swimming was regarded as a most useful and necessary accomplishment as well as an agreeable pastime. In the great athletic contests of the Campus Martius swimming races held an honored place. Probably bathing and swimming reached greater popularity among the Romans than among other ancient races. Certainly the popularity attained is proved by the erection of establishments whose massive ruins are still a marvel to travellers. With all our modern progress and sanitary science, the advantages of our large cities for public swimming and bathing are rudimentary compared with those which the Romans possessed. At one time there were 850 public baths in Rome. The Bath of Diocletian had a swimming pool 200 feet long and 100 feet wide; while the wonderful Baths of Caracalla were 1,500 feet long by 1,200 feet wide, and over a mile around.

Swimming and bathing are closely connected, and the one subject leads to the other. The art of swimming is by no means difficult of attainment. Self-confidence is required, and when this is possessed all difficulty soon ceases. Swimming in itself is one of the most unique and delightful of pastimes. The body and limbs are freed from all restraint and the stiffness which must exist where support is necessary, and one moves through the water with a feeling of freedom and ease indescribably pleasant. In an element almost unresisting, there is not even the weight of the body itself to embarrass motion. The human form is free, therefore, to assume all graceful postures that Nature dictates. "The experienced swimmer, when in the water, may be classed among the happiest of mortals, in the happiest of moods and in the most complete enjoyment of the most delightful of exercises."

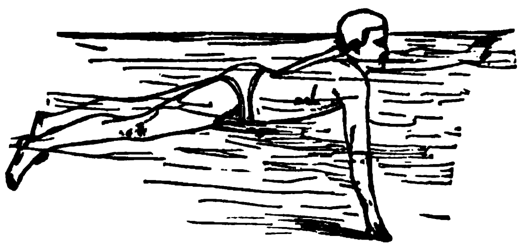
Every one can learn to swim, even the most timid and backward. So simple and easy are the steps that there is really no excuse for parents permitting their children to grow up in ignorance of the art. While the assistance of a teacher is an aid and inspiration, it is by no means indispensable; by persevering, the beginner, though self-taught, may learn a good sturdy stroke. The learner should remember, however, that faults are liable to arise if no good swimmer is watching, and the learner, if alone, should pay great attention to the fine points of his stroke.

The specific gravity of sea water is slightly greater than that of fresh water, and the human body will float more readily in the ocean than in the lake. On this account there are people who believe that the beginner will do best to learn at the seaside. But it is really immaterial where one begins. The main point is to start in smooth water, and if possible on a shelving, gravelly shore with a gradually increasing depth of water, where no rushing sweep of current may take the novice off his legs. The spot should also be free from holes, weeds and small stones. Mud bottom should especially be avoided.

It is not necessary that the beginner should have over three or four feet of water for his first operations. Indeed, it is better that the depth of water should not exceed four feet. After completing his preparations, the learner wets his head and wades out to a depth of say four feet and turns his face toward the shore. The first thing for him to notice is the great difference in the sustaining power of water and air. Let him drop some white object to the bottom and try and pick it up again, closing his mouth, holding his breath and opening his eyes as his head goes under water. The difficulty in forcing himself downward through the buoyant water will immediately become apparent; and thus he will begin to obtain confidence in the sustaining power of his new surroundings.

When he has overcome the slight tendency to gasp caused by the first dash and pressure of the water, let him make his initial effort at swimming.

It is assumed that the neophyte already knows the ordinary simple chest stroke for swimming by having watched other men in the water. If he does not, never mind. The stroke is a natural one and comes by instinct. The beginner need not spend his time hanging by the middle across a chair, trying to learn the stroke. He can go right into the water. Ten minutes' work in the water is worth ten hours on a chair. Let him wade in toward the shore until a depth



A first lesson.

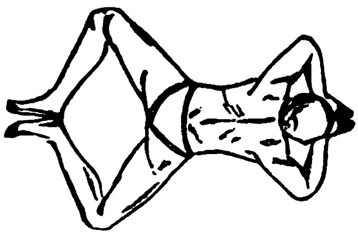
is reached not greater than the length of the arm. Let him rest the tip end of the fingers of one hand on the bottom and assume a horizontal position in the water, sinking the body entirely below the surface, throwing the head back and keeping the chin about on a level with the surface. As the swimmer is not over his depth, he can plunge forward with perfect confidence that by simply straightening out an arm when he begins to sink he can prevent his head from going under. He can therefore assume the position of a swimmer, strike out and make three or four complete strokes if possible. He will endeavor to keep from putting down his hand as long as possible. At first he will no doubt simply make a terrible splash, flinging feet and hands around entirely out of unison and with little aim; but if each time he tries he makes an earnest effort, improvement is sure to follow. When the hand has been put down to support the seemingly sinking body, the swimmer is then in a secure position and still has the other arm and both legs free. The object should now be to practise the stroke with the members which are free, occasionally withdrawing the supporting arm and making a stroke with that too. The result of this exercise will be that while at first the swimmer keeps on the surface for a few seconds only by the very violence of his splash, the period of floating gradually becomes longer and the stroke more regular. When the beginner can stay up perhaps half a minute and move a few strokes, he should go out into deeper water, say four feet, and swim in, so that if he sinks he will not do so before he reaches a point where he can touch the solid bottom again with his hand, as at first. This exercise patiently repeated will soon enable him to swim a dozen strokes. From the moment when he can do that he is a swimmer, whose further progress is only a matter of practice.

This method of beginning, though simple, is recommended by masters of the art. It is the natural way, and it is the method practised by the seal, the most expert and vigorous swimmer of all amphibious animals, which makes its earliest efforts in a few inches of water at the edge of the beach. The comical terror of a young seal, the first few times his feet are washed from under him by the splash of an incoming wave, and his awkward and frantic efforts to regain solid ground again, are a copy in miniature of the exploits of a human being in a similar situation for the first time.

VARIOUS SWIMMING STROKES.*

The common stroke in swimming may be divided into two parts, the movement of the hands and that of the legs. The stroke is made as follows:

The palms of the hands should be held down, the thumbs firmly



Starting position in the breast stroke.

pressed against the lower and outer edges of the forefingers, the hands slightly convexed and brought under the chin on a level with the shoulders, the thumbs and forefingers of both hands being in contact. The swimmer inflates his lungs and steadily inclines the body forward advancing the arms, keeping them close together, but extended their full length just below the surface of the water (two or three inches), neither elevating nor depressing the fingers. While extending the arms the swimmer springs forward from the bottom, raising the feet therefrom. He then strikes out with the hands, bringing them obliquely backward and downward, so that each hand will describe an arc of a circle, and conclude the stroke when the arms form a straight line with the shoulders. He then brings them in edgewise to their original position under the chin.

*Prepared with the assistance of Mr. Sundstrom, champion long distance swimmer of America and trainer of the New-York Athletic Club.

While the hands are executing the movements just described, the feet should be taken from the bottom and drawn toward the body, not by bending the knees under it but by opening them, as in the cut. The back should be slightly hollowed and the body nearly horizontal. The legs are now in position for the stroke, and the propelling kick then follows. The feet must be kicked backward and outward, forming a sort of "V," letting the soles of the feet strike the water flatly. In kicking care must be taken not to strike, as some do at first, with the top of the foot, or to point the toes backward. There is no propelling power in such a stroke. Oppose the water squarely with the soles of the feet. The wider apart the legs are spread the better. When the legs are fully extended they are stiffened, every muscle is set, and with all the strength he can command the swimmer brings them firmly and swiftly together. A strong effort is made to grasp the water, as it were, along the whole inner side of the legs. The more strongly the legs are closed the greater will be the impetus forward.

When the legs are brought together the stroke is concluded, and the original position should be resumed by turning the toes backward and the knees outward, and touching the heels as the legs are drawn up. The play of the foot is of great importance. In the kick the soles must push the water squarely; and in the recovery the toes and foot must be turned backward.

It should be remembered that both pairs of limbs must be used simultaneously; as the hands are being pushed out from the chin forward, the feet should be drawn up toward the body, in preparation for the next kick. As the hands begin to strike out, the legs are kicked out rapidly into the "V" position, and as the hands obtain the greatest purchase on the water the legs should be closed with great power.

It will be seen that the movement of the legs is not a simple careless kick-out,—an error frequently made by self-taught swimmers; and that the arms should never be brought around to the hips, nor indeed further backward than on a straight line with the shoulders.

In breathing it is important to regulate the inspiration with the stroke. The lungs should be emptiest when the body is receiving the greatest forward impetus; and inflated when the limbs are resuming their positions for the next stroke, because at the latter moment the body needs the buoyancy of the lungs.

The drawing up of the legs is a retarding action. In passing through water all bodies meet with resistance in proportion to their velocity. It is desirable that a minimum resistance be offered in the recovery of the legs, and the more gently the recovery is made the better. Moreover, by bending the knees laterally rather than under the body, the backward draught is decreased.

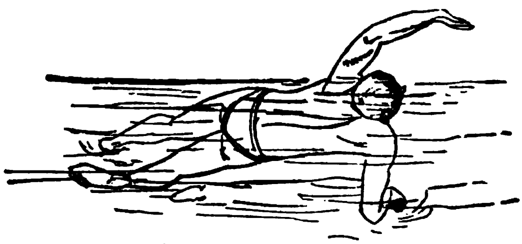
The learner must not be discouraged if progress is slow at first. One man learns to swim rapidly while others are slow. Perseverance wins in the case of all. The beginner will probably find swimming a fatiguing exercise at the outset. After taking a few strokes he will find himself out of breath. Swimming is indeed a violent exercise, and it must be practised in moderation. At all times staying in the water too long and over-exertion are to be avoided.

Should the learner wish to acquire the art of swimming rapidly, he can begin with the aid of a teacher or friend and make use of a swimming belt and support. To a stout stick, three or four feet long is secured one end of a cord of convenient length, which at its lower end is attached to a belt. The scholar fastens the belt around his body, just below the arms. He enters the water to a depth of three or four feet, while his friend remains on the bank, pole in hand, and sustains the swimmer while the latter strikes out and splashes at his ease. If he chooses, the attending friend can enter the water and hold up the learner by the chin, or with one hand under his chest.

The chest stroke is the "a, b, c" of the art. It is the standard and basis of all swimming.

The Side Stroke: Of late the side stroke has come into general use, the swimmer changing to the breast stroke as a rest. Nearly every swimmer invents a stroke of his own after becoming fairly proficient in the water, and this stroke will generally be a modification of the side stroke, with certain individualities. After acquiring the breast stroke it is the swimmer's first duty to master the side stroke.

The principle on which this stroke is founded is the very simple and proper one that the side of the body presents the least resistance to



Overhand Side Stroke.

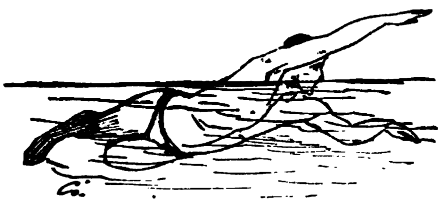
the water in the effort at propulsion. Moreover, there is no loss of momentum by cessation of the stroke as there is during the recovery while swimming on the breast. Some one limb is engaged in the act of propulsion all the while. The swimmer may lie on either side he chooses. It is well to learn to swim on both sides, in order to secure perfect command, and even development of the body. In racing swimmers will generally make use of the side, with which they can put forth the most powerful efforts. As a rule, the greatest speed can be gained by swimming on the right side, because in that case the right arm, which is usually the most muscular, makes the downward stroke.

Assume that the swimmer is beginning on the right side. The first thing is to let the head lie well forward, and deep enough in the water to allow of its being supported by the buoyancy of that element rather than by muscular exertion. The crown, not the top nor forehead, meets the water first. The neck is turned into such a position as to leave the chin lying almost on the uppermost shoulder.

The English method is to let the head lie low in the water, the swimmer breathing when the chief forward impetus throws the body almost out of water. The American method is to keep the face continually out of water. This can be easily done and is preferable.

The right hand is put straight on a line with and in advance of its own shoulder, on a level with the lower side of the head, the back of the hand upward, the palm downward. Having stretched the arm forward as far as it can reach, it is swept vigorously downward, thus giving the chief propulsion. At the end of the stroke the hand is returned along the side with the back of the wrist in advance, until half way between the end of the stroke and the shoulder, when the hand is advanced, with the fingers pointing once more in front. While the right hand is being pushed out in advance, the left or uppermost hand is being carried strongly along past the body in the direction of the legs, the palm of the hand bent so as to put the hand at right angles with the forearm, the fingers being of course turned out from the body. The stroke of the left hand is finished at the top of the left hip. The elbow need only be bent a little.

The leg movement in side stroke swimming is as follows: Bring the left knee as far up in front of the body as possible. Then send the



Overhand Swimming on the left side.

foot straight out in front of, and at right angles to, the body. Put the foot in a line with the front of the leg, and by a strong muscular movement bring it round to a line with the body where it will meet the other leg. While this is in progress, the right or lower leg is stretched as far in the direction of and beyond the back as possible, and by a strong movement brought down to meet the left leg, the whole of the front and inner part of the limb and foot forming the resisting surface. After the legs have thus been closed (forming a very important movement) they are returned toward the body by a motion similar to that of the breast stroke; the heels touching, the knees apart, the toes of the left foot pointing straight in front, those of the right pointing downward and toward the back. Keep the body as quiet as possible, and remember that the stroke requires considerable practice.

The Overhand Side Stroke.—This differs only in the action of the uppermost arm. Assuming that the swimmer is still on his right side, the left arm will be up. In the overhand stroke, the change in movement consists in sending the arm forward *out of water* as shown in the cut. The lifting of the hand from the water preparatory to carrying it forward should be done quietly and gracefully; the hand should not be swung around as though hung on a pivot.

Diving.—When the swimmer has mastered the two important strokes (breast and side), enabling him to swim a considerable distance and feel at home in the water he need go no further unless he wishes, and may feel well satisfied with his acquirements. Diving, however, is a feature of some value, and may be acquired at this point. In diving, one first observes the depth of the water. From six to eight feet will do. Swimmers vary in the depth required. In eight feet of water, one man will invariably touch the bottom with his hands, while another in diving from a height of twenty feet will not approach the bottom. This difference depends not only on the angle of entering the water, but upon the ability to check the downward impetus by a movement of arms, neck, and hands.

The art of diving is best learned by gradual approaches. The swimmer first becomes accustomed to putting the head under water

Ready for a Dive.

and keeping the eyes open. In this way one can learn to hold his breath. Then he moves to where the depth is about three feet and makes little experiments with "headers," gradually extending his operations until he can plunge from a moderate height into deep water. The position in diving will be as fancy suggests, but the accompanying cut gives a good idea of the best and most natural pose. The knees are kept close together, the body bowed slightly toward the water. The chest is inflated, and both arms are held forward, inclosing the head as in a wedge. There should be no wavering in the spring off, and the diver should throw himself forward in such a way as to enter the water headlong, with hands extended over his head as described, and legs in the air. If he should shoot out horizontally, and fall flat upon the water, he will receive such a rude slap as to make him red for hours. Having plunged beneath the surface and exhausted part of the impetus, the swimmer may guide himself to the surface by a downward stroke of the hand, or he may strike out with the regular swimming stroke.

Before diving, breathe deeply three or four times in order that the lungs may be well charged with oxygen. Then take an ordinary breath and go.

Athletes add to the straightforward method of entering the water several more energetic forms of diving. A springboard is employed, one end firmly fastened to the bank, the other projecting over the water. A man will stand on the end of the springboard, and spring into the air, turning over in his flight so as to enter the water headlong, with hands extended over his head as usual. Or, he will take a short run ending with a jump from the end of the springboard with both feet, thus making a powerful dive into the water. Or, he will stand on the end of the springboard with his back to the water and spring up, turning a backward somersault, entering the water feet first. The springboard can be employed in many other ways.

Plunging differs from diving in that no strokes are taken, the sole propulsion being the impetus obtained from the plunge.

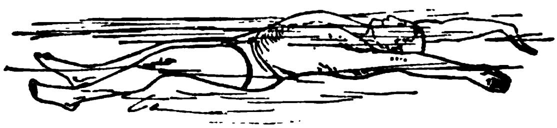
The three important elements that make the basis of locomotion in the water have now been described. All other strokes are derivative of these. Many of these other strokes are of great use, if not for making headway, at any rate for resting the muscles. Sundstrom, the champion long distance swimmer, has sixteen different strokes.

Swimming on the Back.—Let the swimmer turn easily upon his back, sinking the head and shoulders well down, but keeping the face out of water, and letting the legs drop slightly lower than the upper part of the body. The actual swimming movement must now begin. The legs are held straight and nearly together, the sustaining power and impetus being supplied by the hands. The arms are kept close to the sides, the stroke being made entirely by the hands, with a wrist movement, which is simply a semi-circular turn, a scooping or sculling motion. All the sustaining and propelling power is obtained by this simple movement, although of course the great buoying force of the water is an important factor. At the beginning of the turn, the back of the hand is uppermost and parallel with the surface of the water. At the conclusion, the palm is uppermost and parallel. The first half of the turn presses the water downward and thus sustains the body; the second half is rather exaggerated and forms a sort of scoop giving a slight forward movement. There is not much power in this stroke considered in itself, but it can be so rapidly repeated that considerable speed is the result.

Swimming on the back may be performed in many ways. The most important variation is swimming on the back with the breast stroke, the sole point of difference from the breast stroke proper being that the body lies with the back downward instead of the chest.

Additional methods of swimming on the back are: Swimming on the back head first, using the feet only, the arms being folded on the chest, or along the side. Swimming on the back feet first without using the hands; swimming on the back feet first without using the feet; swimming on the back using both legs and arms. Notice that the movement of the legs and feet in all these except the chest stroke is simply a paddling motion. While moving feet first the legs should be raised alternately (not far), extended gently, and flexed forcibly, the calf of the leg and sole of the foot making the positive stroke.

Floating and treading water.—Floating as understood by swimmers consists in lying motionless on the surface of the water. The average specific gravity of a living man is 891, water being 1,000. With the lungs expanded and additional buoyancy thus gained, the water is an ample support if reclined upon firmly. The body, arms, legs and head must be lowered just below or at the surface, the face out. Any attempts to raise much of the body above the surface will end the



Floating.

floating promptly. The average buoyancy of a man is such that when motionless one-eleventh of his bulk will be above the surface in fresh water, and one-tenth in salt water.

In learning to float the first error for the swimmer to overcome is the previously entertained belief that the keeping of his mouth and nose out of water depends on violent and continued movement of the arms and legs. He will conquer this illusion, when he has learned to float upon his back. To float, the swimmer rolls gently over upon his back, stiffening his body, his arms stretched beyond the head to their full extent, hands nearly together, and head bent back with chin up until the water reaches the eyes. The back should be slightly hollowed, the thighs open with legs drawn up under them. This is the easiest position, because the centre of gravity is thus brought nearer to the chest. Another good position in floating is lying on the back with the legs extended in a line with the body and close together. For this position the straighter and stiffer the body the better the effect; toes, chest, face and fingers are slightly above the surface.

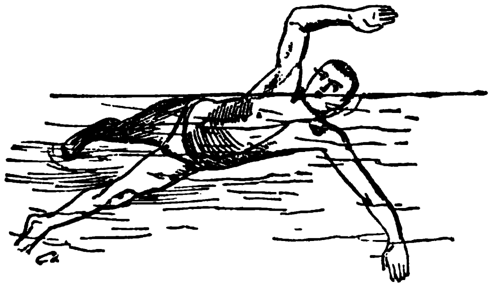
Remember that the buoyancy of the body is greatly affected by the inflation of the lungs. Therefore inhale and exhale rapidly, keeping the lungs full as long as possible.

Horizontal floating is the most difficult posture, the arms being kept close to the sides and the legs straight and close together.

From a horizontal position perpendicular floating is not a difficult transition. Remember that all changes of attitude are accompanied not by muscular effort, but simply by the weight of the limbs moved.

Floating is essentially repose. Everything must be easily and slowly done or the swimmer will go under. The amount of repose obtainable by a buoyant floater in calm water is superior to that which the best bed can afford. Reclining on such a support the floater loses all sense of weight. The numerous muscles which are at work in every other waking condition, now have rest from action There is simply nothing that equals the perfectly restful sustaining power of water. Instances have occurred where persons floating have fallen asleep.

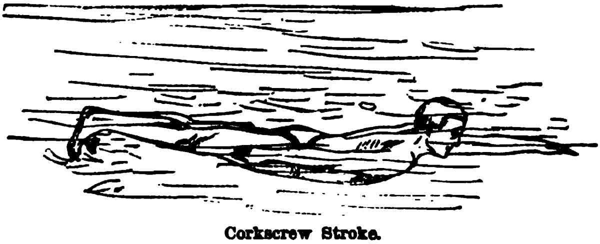
Treading Water.—This exercise is simply walking in the water. The hands should be folded on the chest or held at the side. The legs are moved very much as in the breast stroke, except that the direction is up and down, and the stroke is shorter and quicker This stroke, however, gives a bobbing movement, and a better method is perhaps an alternate motion of the legs upward and forward, somewhat as though stepping up.



Swimming Turtle Fashion.

Turtle Stroke.—This consists in thrusting forward each arm alternately, the forward movement being made above the surface. The hand, hollowed somewhat, is drawn strongly down, and toward the body, the other arm passing forward to catch the water as the positive stroke of the former comes to an end. The legs may be moved as in the breast stroke, or alternately. This stroke is a useful one, rather tiresome, but swifter than the breast stroke.

Swimming "Dog Fashion."—This stroke is similar to the one last above described, except that the arms don't emerge, but, rising near the surface, are scooped under alternately. It is very simple, and is frequently of use in learning to swim.



Corkscrew Stroke.

Swimming with a Rotary or Corkscrew Motion.—This is one of the most difficult and interesting of strokes. As performed by Sundstrom, of New-York, it is a very effective fancy stroke. It is difficult to describe, and must be acquired by hard practice. Plunge beneath the surface, place one hand and arm stiffly at the side, and advance the other straight beyond the head. The legs are held stiffly close together; and motion is imparted by a paddling movement of the feet. The are held near each other and alternately pushed outward, in a movement which can be simulated on land by sitting in a chair and tapping the floor alternately with the feet, while the heels rest on the floor. The motion thus imparted is in a direction straight forward; but, by a certain play of the muscles of the feet, only to be acquired by practice and observation of the various effects of the foot stroke, a turning motion is imparted. The body moves forward under water with a regular rotary movement. The advanced hand steers the body up or down by a slight elevation or depression.

Other Methods.—A few other styles of swimming, the directions for which will readily suggest themselves from the foregoing, are:

Breast stroke, using the hands only, or using the feet only.

Swimming on the back, using the feet with the patting motion described for the corkscrew stroke.

Swimming with one or both feet out of water.

Swimming under water, beginning with a slanting dive, and shooting along under water, eyes open, body stiff, legs straight and closed and motionless, arms closed to the sides and propulsion effected by the rapid paddling motion of the hands. A beautiful feat.

Swimming sidewise under water, rolling over and over.

Swimming bound hand and foot.—The hands are bound in front of the body. Extend them over the head; turn slowly to one side; draw up the legs gently, and then extend them vigorously; turn slowly over and repeat the movement on the other side. To alter the course simply make several strokes in succession on one side or the other as desired.

Holding one foot in the hand.

Many other ways will be suggested by the ingenuity of the performer.

GENERAL HINTS.

The thing most dreaded by a swimmer is an attack of cramp. This is an involuntary and somewhat painful contraction of the muscles of the arms or legs. It is usually caused by a strained position, sometimes by plunging when overheated into cold water, and sometimes by a disordered or acid stomach. It can frequently be relieved by change of position, by a vigorous stroke or two with the limbs affected, or by rubbing. If the cramp occurs in the calf of the leg, straighten the leg, elongate the heel and draw the toes up toward the body, regardless of pain. If relief does not result float quietly or paddle toward the shore without trying to use the limb affected. There is no danger from cramp if the swimmer does not lose his head.

Learn to swim in clothing. It may be useful in some emergency. A swimmer of moderate ability can undress in the water; a fine swimmer can undress while diving.

Remember that deformities are no impediment to swimming. A one-legged or one-armed man can swim well.

Keeping the eyes open under water, though a little unpleasant at first, is not injurious. Remember that winking is not needed, and if the swimmer insists on winking he will make his eyes bloodshot.

These facts should be remembered. It is dangerous to dive much without keeping the eyes open.

Numerous aids to swimming have been invented, but are not of enough use to supersede the old-fashioned legs and arms. New contrivances have been in the nature of plates for the hands and feet. In that direction human invention has done little and there is still a large field for its exercise.

The specific gravity of water will be interesting to the swimmer. Ranking fresh water (rain) as 1, or unity, salt water (Atlantic Ocean) is 1.0287, and water of the Dead Sea, 1.185.

Sound travels faster under water than above, the rate being as follows: In air, the thermometer at the freezing point, sound travels per second 1,120 feet; in fresh water per second, 4,475 feet.

If the swimmer intends to dive much he will do well to stuff cotton saturated with oil in his ears. In diving to great depths so that propulsion is difficult, carry a stone or weight in the hand.

Amateur swimmers are apt to remain too long in the water. The temperature of the ocean at the bathing places in the summer months is not far from 65°, which is about 30° lower than the temperature of the human body. While every human being, no matter how delicate his constitution, will derive some benefit from a cold water plunge, the stay in the water should not be prolonged past the proper point. There should be a healthy reaction on leaving the water, and after a good rubbing the body should be warm and comfortable. If the swimmer feels chilly, he has been in the water too long. In long distance swimming, say from ten to fifteen miles, where the athlete remains in the water from three and a half to four hours, the effects of the cold become very apparent. The lips become blue, the eyes are bloodshot, and the flesh shrivels and puckers in a remarkable manner. Ordinarily twenty minutes is a long enough stay for a person in vigorous health.

Contact with cold water drives the bloed from the surface of the body. Care should always be taken to wet the head before entering the water, and to duck it below the surface again before coming out. This prevents a rush of blood to the head. It is an imperative rule in the athletic clubs which have a natatorium, that members must take a shower bath (facilities for which are provided in the lobby) before entering the water.

After eating a hearty meal at least two hours should elapse before bathing. Grave consequences frequently follow carelessness and inattention to this rule.

Sometimes it is judicious to take a short run along shore before plunging into the water, to start the circulation as a means of preventing a chill. A repetition of the exercise upon coming out promotes the healthful reaction which is so much desired.

Women should acquire the art of swimming as well as men. It is strange that an accomplishment so easy to learn, so helpful and strengthening should be neglected by sensible women. A few lessons at the lake-side in the summer time with the aid of a competent instructor are all that is necessary. Women make good swimmers.

They float remarkably well. Summering at the lake and sea-side is now at last doing much to educate American women in this valuable art. But a beginning only has been made. Mastery of the essential elements of swimming is strongly recommended to all.

When swimming in rough water do not try to breast every wave. Follow the example of the dolphins. Go through them. In the surf, if the crest breaks, it is safer and easier to go through than over.

In conclusion remember that in whatever strait you may be placed while swimming, coolness and presence of mind will do you good service. The water is always ready to sustain you within certain bounds. It is a friend if you obey its laws and affords a noble sport to all who enter it.

Every swimmer will wish to know what has been accomplished, in speed and endurance, by the great masters of the art, whose achievements illustrate the capability of humanity in this direction. There are on record a great many notable feats in swimming. Some of these records will be given. The reader must remember that in the straight-away efforts the records cannot be considered as an exact indication of speed and endurance. In long distance swimming, especially in salt water, the athlete never swims against the current; on the contrary, he generally times his swim so as to receive the help of the tide or current, if there is any. Furthermore, if the swimming race is in a tank, it will be found that an advantage has been gained by the swimmer pushing off at each end of the tank. In the following tables "s. a." will mean straight-away; "t." the number of turns; and "B." will stand for "baths." Many of the records which follow have been supplied by William B. Curtis, of New-York, a leading authority on swimming. The number of English records, compared with American, is due to the fact that there are many valuable prizes competed for yearly in England, and few in the United States.

AMATEUR RECORDS.

Distance. yds. ft. in.	Country.	Time. h. m. s.	Name.	Place.	Date.	Condition.
24½	Eng.	14¼	A. Taylor.......	Marylebone B.	Oct. 3, '82.	
24½	Eng.	14¼	W. Henry......	Marylebone B.	Oct. 2, '83.	
25	Amer.	15	H. E. Toussaint	Locust Grove L. I	Sept. 5, '86.	s. a.
29	Eng.	18¼	A. F. Bettinson	Fitzroy B.	Sept. 25, '83.	
33⅓	Amer.	22½	W. H. Deyden.	Baltimore, Md.	June 25, '86.	s. a.
33⅓	Eng.	20½	A. Taylor.......	New-Battersea B	June 18, '83.	
40	Eng.	24⅕	A. Taylor.......	Lambeth B.	Sept. 10, '83.	
40	Eng.	24⅕	W. Blew Jones.	Lambeth B.	Sept. 17, '83.	
40	Eng.	23¼	P. J. Hagerty..	Lambeth B.	Aug. 19, '86.	
49	Eng.	31	W. Blew Jones.	Marylebone B.	Oct. 2, '83.	1 t
50	Amer.	36½	H. E. Toussaint	Locust Grove L I	Sept. 5, '86.	s. a.
58	Eng.	40	A. F. Bettinson	Fitzroy B.	Sept. 25, '83.	1 t
66⅔	Eng.	46½	A. Taylor.......	New-Battersea B	June 18, '83.	1 t
72	Eng.	48	W. Henry......	Fitzroy B.	Dec. 23, '84.	2 t
73½	Eng.	49	W. Blew Jones.	Marylebone B.	Oct. 2, '83.	2 t
75	Amer.	58½	H. E. Toussaint	Locust Grove L I	Sept. 5, '86.	s. a.
80	Eng.	52½	P. J. Hagerty..	Lambeth B.	Aug. 19, '86.	1 t
80	Eng.	54¾	J. F. Finnegan.	Lambeth B.	Sept. 20, '86.	1 t
87	Eng.	1.00¾	C. Depan........	Lambeth B.	Sept. 25, '82.	2 t
98	Eng.	1:07	W. Henry......	Marylebone B.	Oct. 12, '83.	3 t
100	Eng.	1:07½	P. J. Hagerty..	Lambeth B.	Aug. 19, '86.	2 t
100	Eng.	1.09	J. Nuttall......	Lambeth B.	Sept. 20, '86.	2 t
100	Eng.	1:15	W. Cole..........	Serpentine.	July 29, '72.	s. a.
100	Eng.	1:16¾	F. E. Odell.....	Lambeth B.	July 15, '78.	2 t
100	Amer.	1:18⅖	H. Braun.......	East River.	Sept. 1. '78.	s. a.
100	Amer.	1:20¾	H. E. Toussaint	Locust Grove L I	Sept. 5, '86.	s. a.
100	Amer.	1:25	H.E.Buermey'r	Brooklyn, L. I.	Oct. 21, '71.	on breast 2 t

Distance. yds. ft. in.	Country.	Time. h. m. s.	Name.	Place.	Date.	Condition.
102	Eng.	1:13$\frac{2}{5}$	B. Richardson.	S. Kingston B.	Oct. 9, '85.	4 t
108	Eng.	1:15$\frac{4}{5}$	W. Henry......	Fitzroy B.	June 12, '86.	5 t
112 2 6	Eng.	1:26$\frac{1}{4}$	A. Taylor.......	Wenlock B.	Sept. 12, '81.	1 t
112 2 6	Eng.	1:40	S C Qu'rterm'in	Wenlock B.	Sept. 16, '73.	1 t
112 2 6	Eng.	1:49$\frac{3}{4}$	E. C. Daniels...	Wenlock B.	Oct. 7, '79.	on back 1 t
116 1 6	Eng.	1:26	W. Henry......	Fitzroy B.	Nov. 10, '85.	3 t
120	Eng.	1:27$\frac{1}{2}$	J. Nuttall......	Lambeth B.	Sept. 6, '86.	2 t
133 1	Eng.	1:38$\frac{1}{4}$	C. Depau.......	New-Battersea B	May 5, '83.	3 t
147	Eng.	1:50$\frac{2}{5}$	W. Blew Jones.	Marylebone B.	July 31. '83.	5 t
160	Eng.	2:02$\frac{1}{2}$	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	3 t
200	Eng.	2:37$\frac{1}{2}$	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	4 t
200	Amer.	2:17	F. S. Campbell.	Detroit, Mich.	Aug. 14, '77.	s. a.
220	Amer.	2:51	A. Meffert......	Locust Grove L I	Aug. 15, '86.	s. a.
220	Amer.	2:47$\frac{1}{4}$	T. Meissner....	East River.	Sept. 2, '83.	with tide s. a.
220	Eng.	2:59$\frac{1}{4}$	T. Cairns........	Lambeth B.	Oct. 1, '83.	5 t
240	Eng.	3:15	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	5 t
245	Eng.	3:29	W. Blew Jones.	Marylebone B.	Sept. 11, '83.	9 t
280	Eng.	3:48$\frac{3}{4}$	J. Nuttall......	Lambeth B.	Sept. 6, '86.	6 t
330	Amer.	6:08$\frac{3}{5}$	A. Meffert......	Locust Grove L I	Aug. 8, '86.	s. a.
300	Amer.	4:57	S. Gormley.....	Philadelphia.	June 24, '76.	s. a.
320	Eng.	4:26$\frac{1}{4}$	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	7 t
360	Eng.	5:04$\frac{1}{2}$	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	8 t
400	Eng.	5:44$\frac{1}{4}$	J. Nuttall.......	Lambeth B.	Sept. 6, '86.	9 t
400	Amer.	6:15	R. Baum.........	Chic. Natatorium	Oct. 1, '83.	
440	Eng.	6:23$\frac{1}{2}$	J. Nuttall......	Lambeth B.	Sept. 6, '86.	10 t
440	Amer.	8:14$\frac{3}{5}$	A. Meffert......	Locust Grove L I	Aug. 15, '86.	s. a.
480	Eng.	7:02	J. Nuttall......	Lambeth B.	Sept. 6, '86.	11 t
500	Eng.	7:19$\frac{1}{4}$	J. Nuttall......	Lambeth B.	Sept. 6, '86.	12 t
550	Amer.	10:30	A. Meffert	Locust Grove L I	Aug. 8, '86.	s. a.
660	Amer.	12:37$\frac{1}{5}$	A. Meffert......	Locust Grove L I	Aug. 15, '86.	s. a.
770	Amer.	14:51$\frac{3}{5}$	A. Meffert......	Locust Grove L I	Aug. 8, '86.	s. a.
880	Amer.	17:07	A. Meffert......	Locust Grove L I	Aug. 15, '86.	s. a.
990	Amer.	19:18$\frac{2}{5}$	A. Meffert......	Locust Grove L I		s. a.
1,000	Eng.	16:30	H. Parker......	Welsh Harp Lake	July 31, '71.	1 t
1,100	Amer.	21:35$\frac{2}{5}$	A. Meffert......	Locust Grove L I	Aug. 8, '86.	
1,210	Amer.	23:49$\frac{3}{5}$	A. Meffert......	Locust Grove L I	Aug. 8, '86.	
$\frac{3}{4}$ mile	Amer.	26:10	A. Meffert......	Locust Grove L I	Aug. 8, '86.	
1,430	Amer.	28:25$\frac{1}{5}$	A. Meffert......	Locust Grove L I	Aug. 8. '86.	
1,540	Amer.	30:32	A. Meffert......	Locust Grove L I	Aug. 15, '86.	
1,650	Amer.	32:54$\frac{1}{5}$	A. Meffert......	Locust Grove L I	Aug. 15, '86.	
1 mile	Amer.	34:55$\frac{4}{5}$	A. Meffert......	Locust Grove L I	Aug. 15, '86.	15 t
1 mile	Eng.	29:25$\frac{1}{2}$	H. Davenport..	Welsh Harp Lake	Aug. 11, '77.	1 t
1 mile	Amer.	35:38	C. N. Lea........	Philadelphia.	Sept. 25, '75.	s. a.
1$\frac{1}{2}$ miles	Amer.	38:35$\frac{1}{2}$	A. R. Wei's'n'bu	Harlem River.	July 27, '78.	with tide s. a
1$\frac{3}{4}$ miles	Eng.	24:35	H. Parker......	Thames River.	July 22, '71.	with tide s. a'
2 miles	Amer.	54:57$\frac{3}{4}$	T. E. Ritchie...	Harlem River.	June 27, '78.	with tide s. a'
3 miles	Amer.	1:53:30	A. P. Douglas..	Philadelphia.	June 24, '76.	still water s.a'
5 miles	Eng.	1:16:20	W. R. Itter.....	Thames River	July 21, '83.	with tide s. a'
5$\frac{1}{4}$ miles	Eng.	1:18:15	W. R. Itter.....	Thames Riber.	Aug. 7. '80.	with tide s. a.
1 m. less 30f	Ger.	29:02	E. Ritter.......	Berlin.	Aug. 9, '86.	
20 miles	Eng.	6:25:00	Agnes Beckw'h	Thames River.	July 17, '78.	Greatest distance ever accomplished by a female.
76ft. 3 in.	Eng.	......	A. B. Jones...	Palace B.	July 15, '86.	Plunge.
87 yds.	Eng.	......	J. G. Rushforth	Rochdale B.	Oct. 13, '83.	Swimming under water

PROFESSIONAL RECORDS.

Distance.	Country.	Time. h. m. s.	Name.	Place.	Date.	Condition.
80 yards....	Eng.	53$\frac{3}{4}$	E. T. Jones.......	Lambeth B.....	Oct. 21, '78	1 t
100 yards...	Eng.	1:04$\frac{1}{2}$	J. Haggerty......	Blackburn B...	Sept. 11, '84	2 t
100 yards...	Eng.	1:08$\frac{1}{2}$	E. T. Jones.......	Lambeth B.....	Oct. 21, '78	2 t
109 yards...	Eng.	1:13	J. Haggerty......	Oriental B......	Sept. 29, '84	
112 yards 2 feet 6 inch	Eng.	1:26	W. Beckwith.....	Wenlock B......	Sept. 12, '82	
160 yards...	Eng.	2:02	W. Beckwith.....	Lambeth B.....	Aug. 21, '81	3 t
480 yards...	Eng.	6.57$\frac{1}{2}$	J. J. Collier......	Lambeth B.....	Oct. 23, '85	11 t
500 yards... (approx.)	Eng.	6:34	E. T. Jones.......	Leeds.............	Sept. 3, '85	S. a.
500 yards...	Eng.	7:08	W. Beckwith.....	Lambeth B.....	Oct. 23. '85	12 t
1,000 yards.	Eng.	15:56$\frac{1}{2}$	E. T. Jones.......	Waterloo Lake (Leeds)	July 8, '76	2 t
1,000 yards.	Eng.	15:56$\frac{1}{4}$	J. J. Collier......	Lambeth B.....	Oct. 25, '85	24 t
1 mile.......	Eng.	28:19$\frac{3}{4}$	J. J. Collier......	Lambeth B.....	Aug. 24, '84	
1 mile.......	Eng.	28:24$\frac{2}{5}$	J. B. Johnson....	Welsh Harp Lke	June 22, '72	S. a., still w'tr.
1 mile (20 yard tank)	Eng.	26:21	W. Beckwith.....	Westminster Aquarium.	Dec. 17, '83	Many turns.
1 mile (best record in tank over 20 yards)...	Eng.	27:03$\frac{1}{2}$	J. J. Collier.......	Lambeth B.....	Oct. 25, '85	Many turns.

PROFESSIONAL RECORDS—*Continued.*

Distance. yds. ft. in.	Country.	Time. h. m. s.	Name.	Place.	Date.	Condition.
1 mile......	Eng.	35:34½	Theresa Johnson.	Devonshire B...	Oct. 31, '83	
3 miles......	Eng.	2:09:47½	Miss Salgeman..	Hastings B.....	Sept. 22, '79	
5 miles......	Eng.	1:04:23	C. G. Whyte......	Thames River..	July 18, '70	S. a. with tide.
8 3-16 miles.	Amer.	4:00:00	G. Sundstrom.....	Locust Grove...	Aug. 25, '81	With tide.
13 miles.....	Amer.	3:37:00	G. Sundstrom.....	Macomb's Dam to Batt'ry, N.Y.	Aug. 2, '85	With tide.
20¾ miles...	Eng.	5:51:00	Fred. Cavill......	Thames River..	July 6, '76	With tide.
20 miles.....	Amer.	8:45:00	E. Von Schoenig.	Pier 1, N. River, to C'ny Is., N.Y.	Aug. 22, '80	Affected by tide.
40 miles.....	Eng.	9:51:00	Capt. Webb.......	Thames River..	July 12, '78	With tide.
Aflo't touching nothing	Eng.	60 con. hrs.	Capt. Webb.......	Scarborough...	June 12, '75	
35 miles.....	Eng.	21:45:00	Capt. M. Webb...	Across Eng. Chl. to Calais, Frce.	Ag. 24-5, '75	Nourishment taken treading water.
109 yards 2 feet 6 inch	Eng.	....	P. Johnson.......	Lambeth B.....	Oct. 11, '82	Longest swim under water in 40 yd. tank
113 yards 1 foot	Eng.	....	J. Finney.........	Black Pool B...	Oct. 20, '82	Longest swim under water in 28 yd. tank
	Eng.	2:57¼	"Lurline"........	Oxf'd Hall Tank, London	Dec. 29, '81	Remained under water.

The condition for making a record is the presence of at least three reputable witnesses having trustworthy stop-watches.

RESUSCITATION FROM DROWNING.

A good swimmer will sometimes have occasion to go into the lake or river or into the ocean surf, to help some one who is sinking. In such cases, when he has brought his man ashore, he may be obliged to employ remedies instantly for his resuscitation, in order to save his life. Every swimmer should know how to act in this emergency.

The following method of treatment was introduced by Dr. Benjamin Howard, of New-York, and is effective.

1. Upon the nearest dry spot expose the patient to a free current of air. Rip the clothing away from the waist and give a stinging slap upon the pit of the stomach. If this fails to arouse the patient, proceed to force and drain away the water which has entered the chest and stomach, according to the following rule:

2. Turn the patient upon his face, the pit of the stomach being raised upon a folded garment above the level of the mouth. For a moment or two make steady pressure upon the back of the stomach and chest and repeat once or twice until fluid ceases to flow from the mouth.

3. Quickly turn the patient upon his back, with the bundle of clothing beneath it, so as to raise the lower part of the breast bone higher than the rest of the body. Kneel beside or astride of the patient, and so place your hands upon either side of the pit of the stomach and the front part of the lower ribs that the fingers fall naturally in the spaces between them and point toward the ground. Now, grasping the waist and using your knees as a pivot, throw your whole weight forward, as if you wished to force the contents of the chest and stomach out of the mouth. Steadily increase the pressure while you count "one, two, three." Then let go suddenly after a final push which springs you to an erect kneeling position. Remain erect upon your knees while you count "one, two"; then throw your

weight forward and proceed as before. Repeat the process at first about five times a minute, increasing gradually to about fifteen times a minute and continue it with the regularity of the natural breathing which you are trying to imitate. If another person be present, let him with the left hand hold the tip of the tongue out of the left side of the mouth with the corner of a pocket-handkerchief, while with the right hand he grasps both wrists and pins them to the ground above the patient's head.

4. When breathing first returns, occasionally dash a little cold water violently into the face. As soon as breathing has been perfectly restored, strip and dry the patient rapidly and completely and wrap him in blankets only. Give hot brandy, a teaspoonful every five minutes, the first half hour; and a tablespoonful every fifteen minutes for an hour after that. If the limbs are cold apply friction. Allow abundance of fresh air and let the patient have perfect rest.

Practical suggestions: Avoid delay. Promptness is of first importance. A moment lost at the start may be a life lost. Do not waste any time trying to give shelter, because shelter oftener harms than helps the patient.

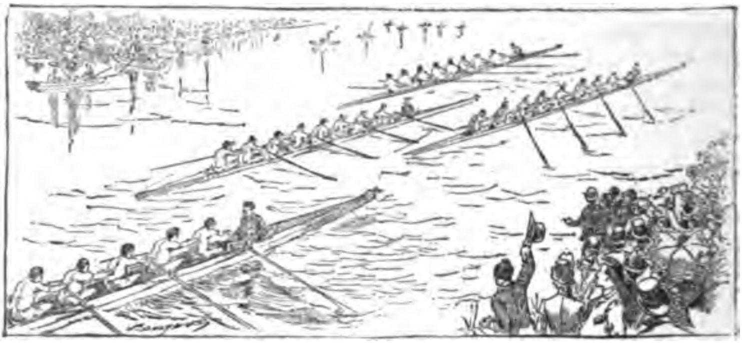
Prevent crowding around the patient. However difficult it may be to enforce this rule, it must be enforced. Friends must not obstruct the circulation of air, nor engage the patient in conversation when rallying.

Take special care to avoid giving stimulants before the patient is well enough to swallow. Injudicious attempts in this direction tend to obstruct respiration and may choke the patient.

Avoid hurried and irregular motions. The excitement of the moment is always great and is likely to agitate an inexperienced man. Just as a flickering candle moved carelessly goes out, so the heart when its beating is imperceptible needs little cross motion or interruption to stop its action. The movements of rule 3 should, therefore, be performed with deliberation and regularity.

Avoid an overheated room. The animal heat which is needed cannot be supplied from without; it must be generated within the system. This is best promoted by a free current of air and internal stimulants. The vital heat resulting is best retained in the patient's body by blankets alone.

Avoid giving up the patient too soon. At any time within one or two hours you may be on the very threshold of success though no sign of it be visible. Several times success has been known to follow half an hour's apparently useless effort. Rest and careful nursing should be continued for a few days after resuscitation, because otherwise various chest troubles might ensue.



ROWING.

BY HORACE TOWNSEND. NEW-YORK.

ROWING began with primitive man. A fallen tree straddled by his muscular shanks was doubtless the first boat; a limb torn from the tree the oar with which he first laboriously impelled himself on his perilous journey across some river. It must have been many years before his descendants learned that a decayed and hollowed log floated better than a solid one, and then reasoned that the best thing they could do was to hollow their logs artificially. The shape of the hand suggested the paddle.

A study of the primitive boat leads one to explore again the wonderland of mythological lore. It reminds one of the famous voyage of the Argonauts in search of the golden fleece; of the venturesome enterprise of the Phœnicians, who with oars circumnavigated the continent of Africa in search of gold and precious treasures; and of that famous expedition of a merchant of Corinth, who in a rowing galley reached the region now known as Spain and loaded his vessel with the silver ornaments and implements of the natives, throwing away his own leaden anchor that he might bring back more of the precious metal to the city of his home. We can peruse again the forgotten tales of a thousand fascinating voyages of the ancient world, and turn to quaint histories of the migrations by water and the sea fights of the original owners of our own great continent. We can paddle with Hiawatha in his shapely birchen bark canoe, or join Cleopatra in her voyage down the Nile in that wondrous barge with silken sails and ebony-hued rowers. The whole history of rowing from the earliest times is quaint and entertaining in the extreme.

The highest development to which the ancients could carry the boat was the galley. It was a long, narrow, round-floored vessel which, though spreading one sail, depended chiefly upon its oarsmen for means of progression. Why it should have been called a galley is uncertain; but "galea" meant first of all a helmet, and it is supposed that the beak-like prow of the boat and its similarity to the peaked Roman and Greek head covering suggested the name. It was under the Byzantine rule that the name was first applied, for before this time the boats were named according to the number of their banks of oars, "biremes" with two banks, "triremes" with three, "quadriremes" with four, and even "quinqueremes" with five banks.

As early as the fifteenth century before Christ, the Egyptians had galleys nearly 120 feet long with over a score of oars on each side arranged in a single bank. Later came the great galleys with more than one bank of oars. According to some old historians there were in the times of Alexander huge galleys with as many as forty banks of oars, though this seems incredible. It is not definitely known (although much study has been given to the subject), how these banks were arranged. It is manifestly impossible that more than three or four banks of oars could be placed directly over each other. It is generally believed that the banks in different parts of the ship were separately counted, thus two might be brought amidships, two forward and two aft, and so on. The masts of the fighting galleys were generally lowered when they went into action. The galley lasted through the Middle Ages with but slight modifications; and indeed it was not until the end of the eighteenth century that it disappeared from Europe. They were used for fighting purposes in America down to and including the Revolution.

It was not until within the last hundred years that rowing was practised by individuals and companies or crews for any except utilitarian purposes. Our great-grandfathers no more thought of deriving pleasure from rowing for rowing's sake than they would have thought of finding relaxation in chopping wood before breakfast. Racing was occasionally indulged in, but was confined, until the present century, to those whose living was made from the water. In England the first impetus is believed to have been given to racing of this order by an actor. In 1715 Thomas Doggett, a well-known comedian of his day, offered to the Thames watermen's apprentices a prize, the perpetuation of which he secured by his will. "Doggett's coat and badge" is to-day contended for by those who know nothing of the days when their forerunners offered the only means of locomotion on the stream now crossed by a dozen bridges and ploughed by a thousand steam craft.

The boat racing of Doggett's day in England and for a hundred years afterward must have been a grim affair. Until sixty years ago the English boats were broad and beamy structures, at least five feet wide amidships, and weighing not far short of 700 and 800 pounds. The oars were large, unwieldly beams, with flat blades such as are used to-day in sea and harbor rowing. The rowlocks were placed on the gunwales. In America, the light, sharp, swift whaleboat was the favorite boat for speed, and many were the races between the crews of rival ships loitering in the ocean ports. But whaleboat races formed no feature of the popular sports of the country.

Rowing did not become a popular amusement in the United States until after the war of 1812. The wilderness having been subdued, and the people having become prosperous, all the gentler arts and sports made progress in the various States, and the youth of the towns adjoining the lakes and streams built or bought canoes, light rowboats, and skiffs, and rowing became an almost universal pastime. A powerful impetus was given to this amusement at two different periods by inventions for improving the speed of the boat. These inventions not only improved the speed but they inspired the builders to reduce the weight and improve the beauty of boats, and thus aided still further to popularize rowing.

The first of the two inventions referred to was that of the outrigger, by Clasper, of Newcastle, in England. He narrowed the beam of the boat, and then, in order to keep the full leverage of the oars, he introduced the outrigger. This admirable device was the first step in the conversion of rowing into a delightful pastime. It is true that the outrigger was applied only to racing boats, but it led to the construction of light and narrow craft, and the experience gained in producing them has naturally reacted advantageously on the construction of all rowing boats. Emmett claimed the actual invention of the outrigger, and it is not disputed that in the year 1830 he was the first to fix outriggers of iron on a boat named the Eagle. It was, nevertheless, Clasper who first brought the outrigger to the Thames and introduced it among racing men. In 1844 he succeeded in winning the prize in the Thames National Regatta at Putney in a narrow streaked mahogany boat with iron outriggers eight inches long. The introduction of the outrigger from that time forward was assured, though even then racing boats were built with keels.

It is within the last thirty years that the second and most important invention in regard to rowing boats has been evolved. This is the sliding seat, which has developed the speed of the outrigged boat almost as much as the outrigger improved the old-fashioned boats which came before it. The originator of this seat was undoubtedly an American, Mr. J. C. Babcock, of the Nassau Boat Club. In the year 1857 he attached to a single-scull boat a movable seat. In 1861 Walter Brown, also an American sculler, used a sliding seat in a single-scull boat, and in 1870 formally took out letters patent and claimed the idea as his own invention. It was in that year that the sliding seat was used for the first time by a racing crew, who by the way were trained under Mr. Babcock. When experimenting as to the proper distance to place the rowlock abaft the fixed thwart, Mr. Babcock had found that a nine-inch stroke (the minimum allowed by racing authorities) was perfect for the catch, while a fifteen-inch stroke, the maximum, gave a perfect finish, although with a correspondingly poor catch. The inevitable conclusion was that, to catch and finish well, the rowlock should be moved at least six inches with every stroke. This, of course, was impossible; and the idea of moving the seat next occurred to him. He thus solved the problem which the oarsmen of the whole world up to that time had practically given up in despair. Not only could a longer stroke be rowed with less difficulty than before, but through the medium of the sliding seat the whole power of the oarsman was brought into play. The sliding stroke was practised before the sliding seat was adopted. Newcastle scullers were in the habit of sliding on their seats by freely greasing the thwart and strapping their rowing trousers at the seat with wash leather. In 1873 sliding seats were first used in the Oxford and Cambridge University boat race. It may be well to quote Dr. Walsh, well known as the editor of "The Field," whose summing up of the advantages of the sliding seat is pithy and complete. After a series of elaborate experiments Dr. Walsh arrived at the following conclusions:

1. That with the seat sliding nine inches, the stroke can be lengthened eighteen inches in the water without at the same time causing the power to be applied so disadvantageously as with the shorter stroke on the fixed seat.

2. That with a sufficiently long stroke the body is not bent either forward or backward nearly as far as without the sliding seat.

3. That as the force exerted by the muscles of the back cannot be applied to advantage when the body is extended either backward or forward to the extreme limits allowed by the human frame, it is a mechanical gain if the most efficient length of stroke can be given without resorting to those extreme limits.

4. By the substitution of the moving force residing in the powerful extensors of the thighs, in lieu of a corresponding power residing in the extensors of the back, a new store of muscular action is brought into play, to the relief of that which was often seriously distressed under the old style.

5. That in practice it is found that the flexion and extension of the knees prevent cramp and afford great relief to the rower.

6. That although the same power as previously existed is now used more advantageously and in addition a new power is brought into play, yet as this is at the expense of velocity, a quicker spurt cannot be obtained by the sliding seat; but a better pace can be kept up for a longer time; and consequently for all ordinary rowing distances the sliding seat must beat the fixed one, other things being equal.

The invention of the sliding seat directed so much attention to the proper placing of thwarts and oars, that, again, the ordinary pleasure boat was benefited by the experience gained. As a result we have today the beautiful cedar boats and canoes, light as cockle shells and propelled at great speed without fatigue, and in all its perfection, the racing shell, light, long, narrow, sharp as a lance, and swift as the wind itself. Heavy framing and planking, and ponderous weight have given way to a marvellous lightness and strength of construction, and rowing has become a practice fit for women as well as men, for the undeveloped youth as well as the trained athlete.

No doubt the popularity of rowing was originally due to the passion for the exercise, which broke out in American colleges about forty years ago. The boys at Yale and Harvard developed great proficiency in rowing, and every college oarsman, on returning home, became a missionary for the introduction of the sport to his native town.

Rowing at Yale College dates from 1845; at Harvard from the following year. The rivalry of the two colleges soon led to an intercollegiate race, and took place on Lake Winnepesaukee on August 3, 1852. On this occasion the Harvard eight-oared barge beat the Yale boat by two lengths. The boats were about 37 feet long by 5 feet wide, and were steered by coxswains. From 1852 until the war of 1861, races were held by the two colleges at varying intervals, the balance of victory inclining steadily toward Harvard. In 1860 Harvard first introduced the fashion of dispensing with a coxswain, the bow oar steering with his feet by means of an ingenious contrivance connected with the rudder. The war stopped the races. In 1864 when racing was resumed, Yale won the day; and again the year following; but for the five years next following Harvard was the continual victor. By 1866 the art of boat building had so far advanced in the United States that the boats then used were 57 feet long and 19 inches wide. In 1869, Harvard rowed against Oxford on the Thames River in England, from Putney to Mortlake, and while unsuccessful, still showed that American boys knew how to row.

From 1864 to 1870, the intercollegiate races took place on Lake Quinsigamond. Other colleges having come into the races, the course was transferred to the Connecticut River, at Springfield, where, in 1873, thirteen crews struggled for the victory. The course was then transferred to Saratoga Lake, to Lake George, and finally to the Thames, at New London, where since 1878 the most important races have been rowed. The main annual contest is now confined to Yale, Harvard and Columbia.

The complete record of the American University races down to 1886 is as follows:

Date of race.	Place of Race.	Length of course in miles.	Crews.	Time.	No. of oars.
Aug. 3, 1852.	Lake Winnepesaukee, Centre Harbor, N. H.	2	Yale	*	8
			Harvard	10:00	8
July 21, 1855.	Springfield, Mass., Conn. River	3 (1½ & ret.)	Yale	23:38	†6
			Yale	24:38	†6
			Harvard	22:00	8
			Harvard	22:03	†4
July 26, 1859.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard (shell)	19:18	6
			Yale (shell)	20:18	6
			Harvard (lapstreak)	21:13	6
			Brown (lapstreak)	24:40	6
July 27, 1859.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Yale	19:14	6
			Harvard	19:16	6
July 24, 1860.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	18:53	6
			Yale	19:05	6
July 29, 1864.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Yale	19:04	6
			Harvard	19:46½	6
July 28, 1865.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Yale	17:42½	6
			Harvard	18:09	6
July 29, 1865.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Yale	19:05½	6
			Harvard	19:20½	6
July 27, 1866.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	18:43	6
			Yale	19:10	6

*Time not given. Harvard won by 2 lengths. † 11 sec. per oar allowed for 6 and 4 oared boats.

Date of Race.	Place of Race.	Length of course in miles.	Crews.	Time.	No. of oars.
July 19, 1867.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	18:13	6
			Yale	19:25½	6
July 24, 1868.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	17:48½	6
			Yale	18:38½	6
July 23, 1869.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	18:02	6
			Yale	18:11	6
July 22, 1870.	Worcester, Mass., Lake Quinsigamond	3 (1½ & ret.)	Harvard	20:30	6
			Yale	Foul cl'm'd	6
July 21, 1871.	Springfield, Mass., on Conn. River, between Ingleside Hotel and Chicopee Bridge	3 straight away.	Mass. (Agricultural)	16:46½	6
			Harvard	17:23½	6
			Brown	17:47½	6
July 24, 1872.	Conn. River, between Agawam Ferry and Long Meadows Station	3 straight away.	Amherst	16:33	6
			Harvard	16:57	6
			Mass. (Agricultural)	17:10	6
			Bowdoin	17:31	6
			Williams	17:59	6
			Yale	18:13	6
July 17, 1873.	Quarter of a mile below course of 1872	3 straight away.	Yale	16:59	6
			Wesleyan	17:09	6
			Harvard	17:36½	6
			Amherst	17:40	6
			Dartmouth	18:07	6
			Columbia	18:16	6
			Mass. (Agricultural)	18:26½	6
			Cornell	18:32	6
			Bowdoin	18:49½	6
			Trinity	19:33	6
			Williams	19:45	6
July 18, 1874.	Saratoga Lake, N. Y.	3 straight away.	Columbia	16.42	6
			Wesleyan	16:50	6
			Harvard	16:54	6
			Williams	17:08	6
			Dartmouth	18:00	6
			Trinity	18:23	6
			Princeton	18:38	6
			Yale	Withdrew.	6
July 14, 1875.	Saratoga Lake, N.Y.	3 straight away.	Cornell	16:53½	6
			Columbia	17:04½	6
			Harvard	17:05	6
			Dartmouth	17:10½	6
			Wesleyan	17:13½	6
			Yale	17:14½	6
			Amherst	17:29½	6
			Brown	17:33½	6
			Williams	17:43½	6
			Bowdoin	17:45½	6
			Hamilton	Not taken.	6
			Union	Not taken.	6
			Princeton	Withdrew.	6
July 19, 1876.	Saratoga Lake, N.Y.	3 straight away.	Cornell	17:01½	6
			Harvard	17:05½	6
			Columbia	17:08¼	6
			Union	17:27½	6
			Wesleyan	17:58½	6
			Princeton	18:10	6
July 19, 1876.	Saratoga Lake, N.Y.	3 straight away.	Cornell	17:23	6
			Harvard	17:38	6
			Columbia	Withdrew.	6
July 30, 1876.	West Springfield, Mass., Conn. River	4	Yale	22:02	8
			Harvard	22;31	8
July 30, 1877.	West Springfield, Mass., Conn. River	4	Harvard	24:36	8
			Yale	24:43	8
June 28, 1878.	New-London, Conn.	4	Harvard	20:45	8
			Yale	21:19	8
June 27, 1879.	New-London, Conn.	4	Yale	23:58	8
			Harvard	22:15	8
July 1, 1880.	New-London, Conn.	4	Yale	24:27	8
			Harvard	25:09	8
July 1, 1881.	New-London, Conn.	4	Yale	22:13	8
			Harvard	22:19	8
June 30, 1882.	New-London, Conn.	4	Harvard	20:47½	8
			Yale	20:52½	8
June 28, 1883.	New-London, Conn.	4	Harvard	24:46½	8
			Yale	25:59	8
June 26, 1884.	New-London, Conn.	4	Yale	20:31	8
			Harvard	20:48	8
June 30, 1885.	New-London, Conn.	4	Harvard	25:15½	8
			Yale	26:30	8
July 2, 1886.	New-London, Conn.	4	Yale	20:21½	8
			Harvard	20:58	8

With the growth of rowing for amusement among the amateurs of the country, rowing contests among professional athletes for sums of money and prizes also came into existence. Certainly many wonderful oarsmen have been developed during the last twenty years, and their various strokes have contributed much to a clear understanding of the science of rowing. Among the earlier names on the roll of individual fame are those of R. J. Clark, John Tyler, jr., Walter Brown and the Ward brothers. In later days the names of Hanlan, Hosmer, Lee, Riley, Courtney and Teemer have become almost household words.

The following is a tabulated record of the best time in which the various distances referred to have been rowed in America:

Distance.	Oars.	Name of Crew or Oarsman.	Place.	Date.	Time.
$1\frac{1}{2}$ miles	Eight	Metropolitan R. C.	Newark, N. J.	Aug. 8, 1883	7:51
	Single	Joseph Laing	Lachine	Aug. 19, 1882	8:36
2 miles	Pair	Riley and Kennedy	Greenwood, N. Y.	Oct. 9, 1876	$12:20\frac{3}{4}$
	Single	J. H. Riley	Saratoga	Aug. 9, 1876	$13:21\frac{1}{2}$
3 miles	Eight	Cornell crew	Owasco	July 17, 1878	$17:34\frac{3}{4}$
	Pair	Faulkner and Reagan	Philadelphia	Sept. 5, 1876	20:28
	Single	J. Teemer	Ponchartrain	May 25, 1885	$20:01\frac{1}{2}$
4 miles	Eight	Harvard crew	New-London	June 28, 1878	$20:44\frac{3}{4}$
	Single	Edward Hanlan	Ogdensburg	July 18, 1883	$27:57\frac{1}{2}$
10 miles	Single	Josh. Ward	Poughkeepsie	Nov. 5, 1860	1:23:00

AMERICAN ROWBOATS.

We pass now to the boats themselves. The variety of rowboats built in America for different purposes is far larger than is generally supposed. To give an idea both of the variety and, by comparison, of the excellence of the beautiful pleasure boats of the present day, the whole list of classes of rowboats built in the United States will be briefly presented. They are as follows:

Lighters.—In Boston they are called "African canoes." They are large, broad-beamed, full-modelled, heavy, regularly framed craft, measuring in Boston 24 feet in length, 6 feet 6 inches beam, and 2 feet 9 inches in depth, with several thwarts. In San Francisco they measure 40 feet in length, 10 feet beam and 6 feet in depth. These heavy boats are used for lightering ashore, in Africa, Mexico and Central America, the cargoes of trading ships. They carry from five to ten tons of goods, and are paddled by rows of men seated along the gunwales.

Seine Boat.—A boat about 34 feet in length by 6 feet 2 inches beam and 2 feet 9 inches in depth, with a sheer of 3 feet, carvel built, with oak frames and cedar or white pine planking; used on the fishing coasts for carrying the seines and fish. These boats are sharp at both ends and carry three tons of cargo. Some are 24 feet long, 6 feet 2 inches on the beam, 2 feet 3 inches in depth. Admirable boats, weatherly and stanch.

Whale Boat.—A keel boat, sharp at both ends, broadest beam forward of the centre, rowed with four to six long sweeps and steered with another, very fast and weatherly, and nowadays provided with a twenty-four-foot pole mast and light sail. Used in harpooning whales. A whaling vessel carries six or eight of these boats, which are 30 feet in length, 6 feet wide on the beam, and 2 feet 6 inches deep, with 16 inches sheer. Though heavy, weighing about 1,000 pounds, they are very fast.

Life Boat.—A non-sinkable, large, heavy, six or eight-oared boat, constructed for the life-saving stations on the ocean coast and great lakes. They vary in size from 18 feet in length, 4 feet 10 inches beam and 22 inches in depth, to 27 feet in length, 7 feet 4 inches beam and 39 inches in depth, with 24 inches sheer. The large boats have iron keels and weigh from 1,000 to 3,600 pounds. The bow and stern are decked and bulkheaded in a way to form air-tanks, and an air-tight floor is laid about sixteen inches above the bottom of the boat, to form an additional air reservoir. They are very full in model. When immersed in the water they immediately come to the surface, and the water on board pours out through scuppers in the sides.

Surf Boat, or Quarter Boat.—A large, full-modelled craft, resembling a seine boat, full on the floor, sharp at both ends, weighing from 650 to 1,000 pounds. It can be launched and landed through the surf. It is generally from 20 to 30 feet in length, with a beam from 5 to 7 feet, and depth from 26 to 30 inches, and a sheer of about 20 inches. In addition to a long boat, every large sailing ship must have two surf boats and a gig. The long boat is a few feet longer, a broader and heavier boat.

Yawl.—A ship and schooner boat, about 22 feet in length, 6 feet 6 inches beam and 30 inches deep, heavy and very full in model, with a V stern. Rowed with two or four oars.

Barge.—A long, narrow, six or eight-oared keel pleasure boat, sharp built, framed with oak or cedar and planked with cedar, handsomely fitted up, and used for pleasure rowing. Also one of the boats of a large man-of-war, used for state occasions. A lighter barge is built for rowing clubs, which is little more than a large and long gig.

Whitehall Boat.—A light clinker built, sharp keel boat, with V stern, oak framed and cedar planked, from 12 to 18 feet long, with one or two pairs of oars mounted on the gunwales, for pleasure rowing in lakes, rivers and harbors.

Dory.—A flat-bottomed, board skiff, with a sheer in both the floor and the gunwale line. The floor is sharp at bow and stern; sides flaring; stem raking forward, and the stern, a narrow V, also raking. Rowed with one or two pairs of oars. Frames of oak, planking of white pine. A light, handy, weatherly fishing boat. The size varies from 14 feet over all, 12 feet on the floor, 3 3-4 feet beam and 22 inches in depth, to 19 1-2 feet over all, 16 feet on the floor, 4 1-2 feet beam and 30 inches in depth. See "Dory" in Yachting.

Sharpy.—A flat-bottomed, broad skiff, long and narrow, sharp at the bow, broad at the stern, with flaring sides and with this peculiarity that the floor rounds up at the stern to the load line. See "Sharpy" in Yachting.

Skiff.—A flat-bottomed board rowing boat, broad and safe, 12 to 15 feet long, used on shallow lakes and rivers for still fishing and hunting. This boat is the clumsy prototype of the dory and sharpy.

Flat Boat.—A plank scow, flat-bottomed, carrying its width clear fore and aft, the floor rounding up or raking sharply at bow and stern.

Used for rough work on rivers and in working through shallow waters while hunting wild fowl.

Bateau.—A long, low, light board boat, flat-bottomed, pointed at both bow and stern, for use by lumbermen in rafting. A bateau 15 feet 6 inches long and 20 inches wide amidships on the floor, is about 22 feet long and 45 inches wide over all. The depth is about 12 inches.

Gig.—First, the small boat of a sailing ship, regularly framed and carvel built, strong and serviceable, used for quick trips to and from shore. About 18 feet long, 4 feet 8 inches beam and 21 inches deep. —Also, a light, low, narrow, open racing boat, with outriggers, built as lightly as possible, weighing from 40 to 75 pounds, usually rowed with one pair of oars but sometimes with four pairs. Sliding seats usually. The favorite boat of athletes and expert oarsmen for knocking around in smooth water for practice.

Working Boat.—A boat used by athletes and oarsmen, both for pleasure and for racing. Beginners in racing take their first lessons in these boats. It is long, low and sharp, constructed like a gig, but without outriggers, the oars resting in square ports in the gunwales. The gunwales are cut away in wave-like curves between the oar ports and also clear forward and aft of the rowers.

Shell.—The racing boat par excellence, the one in the construction of which the daintiest and finest workmanship is lavished. Employed by the college crews, rowing clubs and professional oarsmen.

The beautiful modern racing boat is composed of two parts, the body and the outriggers. The body is usually built of cedar, mahogany or even of paper moulded on a frame and subsequently varnished. The rails are of ash or beech and a long strip of pine runs lengthwise along the inside of the upper edge of the boat, while another forms the inner keel or keelson. Upon this keelson is fastened a large piece of wood, rising in the centre to the level of the seat or thwarts and tapering off fore and aft. The thwarts nowadays are placed low in the boat, for they have to carry the slides which shift backward and forward with the oarsman himself. The slides consist of two brass rods about eighteen inches long by half an inch wide, upon which slide the runners fastened to the under part of the sliding seat. The interior of the boat is divided into three portions by bulkheads, namely, the central cockpit for the rowers, and the decked air chambers forward and aft. Combings run round the sides of the cockpit to the coxswain's thwart. The forward and after portions of the boat are decked over with a well-varnished, tightly stretched linen covering, supported by a long strip running longitudinally down the centre and by cross beams running from this strip to the gunwale. The stretchers against which the rowers' feet are placed are strong pieces of oak arranged so as to be shifted easily to accommodate the varying lengths of the rowers' legs. Leather straps are fitted to the stretchers, into which the oarsmen step their feet. The outriggers are made of four round iron staves, the upper ones being the shortest, all welded in one piece with the rowlock plate. All four staves are fastened through the timbers by means of bolts and nuts. The rowlock consists of the forward thole (the one rowed against), and the stopper or after thole, and the bed or sill of the rowlock on which the oar rests. A piece of leather, twisted string or wire crosses the top of the thole to keep the oar in its place. This is called the "mousing," though its place is sometimes taken by an iron rod hinged and fitted with a latch, thus allowing the oar to be shipped and unshipped more readily. The oars or sculls are made of spruce and consist of handle, loom and blade. The length of oars varies from twelve feet to twelve feet nine inches in four and eight-oared boats. The rudder is of cedar, mahogany or fir. Across the top of the rudder post is a wooden cross piece or yoke, from each end of which a rudder line passes to the coxswain's thwart; if the boat does not carry a coxswain, the yoke lines are carried along the gunwales to the stretcher of the oarsman who steers, being fastened to a traveller which the steerer works with his feet.

Following is a table which presents in tabular form the differences in the measurement of eight, four, and pair-oared racing and sculling shells:

Particulars.	Racing Eight.	Racing Fours.		Pair-oar.	Sculling Shell.
		With Coxswain.	Without Coxswain.		
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Length of boat	58 6	41 0	40 0	34 4	30 0
Width (over all)	2 0	1 9	1 8	1 4⅝	1 4
Depth (amidships)	1 1½	1 0½	1 0	0 10½	0 8½
Depth (stem)	0 8	0 7¼	0 7½	0 4¼	0 3½
Depth (stern)	0 7¼	0 6¾	0 6½	0 3¾	0 2¾
Length of slide	1 4	1 4	1 4	1 5	1 5½
Length of amidship oars	12 6	12 6	12 6	......	......
Buttoned at	3 6	8 5½	3 5½	......	......
Length of bow and stroke oars	12 4	12 4	12 4	12 3	......
Buttoned at	3 4½	3 4½	3 4½	3 4	......
Length of sculls	......	......	......	......	10 0
Buttoned at	......	......	......	......	2 8
Space between coxswain's thwart and stroke's stretcher	1 8	1 8	......	......	......

Few amateurs ever pluck up enough courage to build a boat. Yet, were they to do so, they would find the difficulties they dreaded vanish very quickly.

The tools consist of a jack and smoothing plane, a tenon saw, a rule, square, hammer and nails, brad awl and gimlet with a couple of chisels.

The construction of a board skiff, or of any one of its kindred craft (a flatboat, dory, sharpy, flat-iron boat or bateau); is a simple matter. All the suggestions necessary for the amateur's guidance will be found in the article on "Yachting" under the head of "Sharpies." To build one of the graceful clinker-built keel craft known as Whitehall boats, which constitute the pleasure rowing boats par excellence of the harbors, inland lakes, and rivers of the United States, is more difficult, but entirely within the powers of any young man who is fond of tools.

It is taken for granted that the amateur builder has some acquaintance with the art of designing. No boat, not even the smallest and simplest, can be satisfactorily constructed without having its lines first laid out on paper. The amateur is advised to make a wooden model out of a block of clear white pine. Secure the proper fullness of the floor amidships, and cut away the under water body of the extreme bow and stern, so as to give the model beauty of form and speed. Having made your model (on a scale of half an inch to the foot) saw it across vertically into six pieces of equal length, and apply the after end of each in succession to a piece of drawing paper and mark the outlines of each section on the paper. You now have on the paper a rough body plan of the boat. Fair the lines in the manner explained in "Yachting"; and draw the sheer and half-breadth plans. You can now draw the shape of every frame, timber, and plank in the boat.

The amateur is advised to make his first experiment on a Whitehall boat of about the following dimensions: Length over all, 18 feet; broadest beam, 3 feet 6 inches; depth to top of keel amidships, 15 inches; rise of sheer at stem, 3 inches, and at bow, 5 inches. The lines of the boat, if properly designed, will be full enough to enable the craft to dance safely over the waves of a lake with four people aboard, and fine enough to give speed and ease of rowing. A draft of the lines of a very fair boat is given herewith.

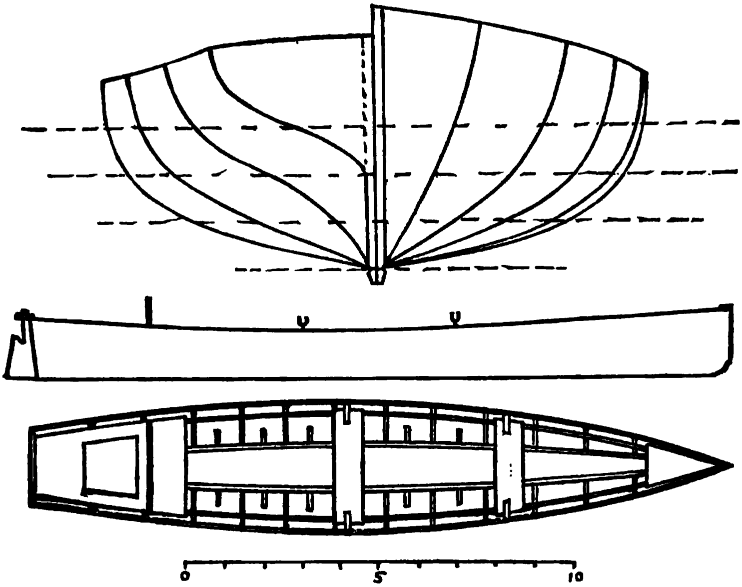
Build the boat with oak keel, stem and stern post; three-eight inch cedar planking; with pine thwarts; oak or cedar frames; oak rail red cedar or hackmatack knees to secure the thwarts; oak stretchers for the feet; and white pine floor boards. Space the frames fifteen or eighteen inches apart. There will be two rowing thwarts, and a seat in the stern and bow. In the working drawings, lay out the forms of all the principal pieces of the boat.

While the keel is the backbone of the boat, the strength of the structure is mainly in the planking, so that the keel may be given no greater depth than one and a half or two inches, and the lower edge may be bevelled off to make it lighter. The upper edges are rabbeted to receive the edges of the garboards. Get out the keel, stem, stern post, and stern board or transom, in accordance with the drawings. The shape of the stem and stern post are shown in the illustrations herewith, together with a sectional plan of the stem, showing the mode of securing thereto the ends of the planking.

Begin the work of construction by stretching the keel upon a plank laid on wooden horses, cleats of wood being nailed to the plank, two feet apart, and the keel wedged tightly between them. The keel must be laid perfectly horizontal. Stem and stern post are now fitted into place, tenoned to the keel, and kneed. Three frame moulds (one of them amidships) made of one inch pine strongly nailed, must then be placed in position, with the middle line of the boat marked on each one. They are brought plumb by means of a string stretched from stem to stern post. The moulds are kept in place by a temporary gunwale streak.

The transom may now be made of three-quarter inch pine (or in a fine boat, mahogany) in one piece. It is secured to the stern post in the manner shown in the cut with wooden knees on the inside as shown in the plan. The stern post is cut away to receive it as shown in the side view.

The boat is now ready to receive the planking, the putting on of



Figures 1, 2 and 3.—Lines of the 18 foot Whitehall rowing boat.

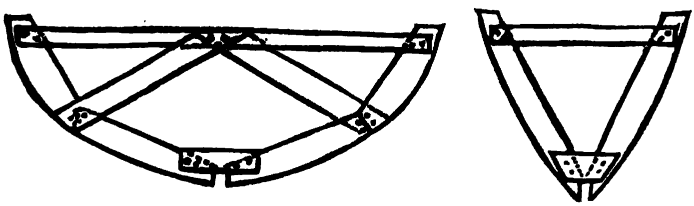


Figure 4.—Frame moulds of white pine firmly nailed together, for use in putting on the planking.

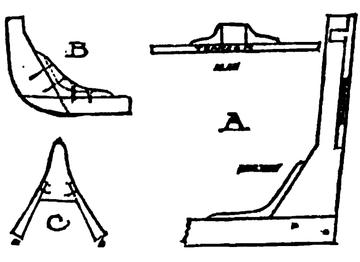


Figure 5.—A side view of stern post of Whitehall boat, showing how post is fastened to keel and how it is cut away for stern board. B, junction of stem and keel, C, sectional view of stem, showing how the outside planking is rabbetted to stem.

Figure 6.—Manner in which the planks are lapped in a clinker-built boat.

Figure 7.—Frame of clinker-built boat.

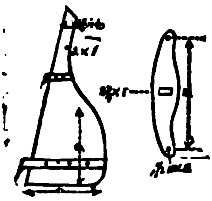
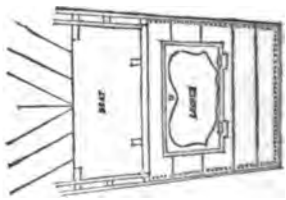


Figure 8.—Rudder and yoke of Whitehall boat.



Stern seat and locker of Whitehall boat.

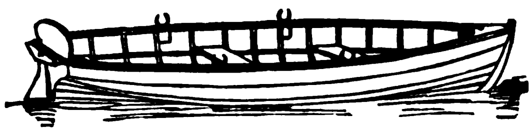


Figure 9.—Twelve foot Whitehall boat.

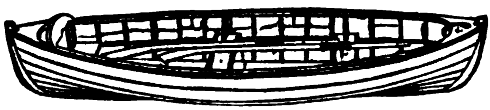


Figure 10.—Clinker-built double-ender.

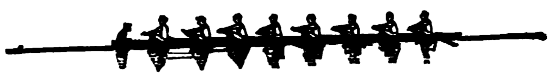


Figure 11.—Eight-oared racing shell.

Figure 12.—Interior of a canvas canoe at bow.

which is the most difficult portion of the work of construction, and generally requires the services of more than one person to make a satisfactory job of it. If possible the planks should be long enough to reach the entire length of the boat from bow to stern. If they require to be joined, this must be effected with a long feather-edged scarf. The scarf joints must be made as long as possible and secured by small copper nails about an inch apart, clinched on the inside, the overlap of the scarf being always in the direction of the stern so that if the joint becomes ragged nothing may catch in it during the progress of the boat through the water. The planks may be of three-eighths inch cedar, though pine may be used. The planks should average four inches in width. Mark off on the midship mould, divisions corresponding with the number of planks to be used, placing the narrower planks at the bilge. On the other moulds mark off an equal number of spaces and also on the stem and stern pieces. It will be found of course that the planks are much smaller toward the bow and stern than amidships. Take a plank about five inches wide, and fit its edge carefully into the rabbet formed in the keel. Nail it to the stem and stern pieces by a temporary cleat. Now mark off on its inside surface at each frame spots corresponding with the top of the first of the planking spaces already indicated on the moulds and stem and stern posts. Remove the plank, draw a line through the spots marked on it and saw off the superfluous wood outside of this line. Bevel off the outside upper edge of the plank as shown in the illustration. Take another plank and fitting it upon the top edge of the garboard plank, mark with the pencil the shape of the curve on the second streak. Now shape the lower edge of the second streak in accordance with this curved line. Fit the two planks to the moulds, securing as before by temporary cleats, and mark off on the second plank the width of the streak as shown on moulds and stem and stern posts in the same manner as described for garboard. Remove the plank, saw the upper edge to the new curve formed by a line drawn through the marked points. Proceed in this manner with each plank in turn, until the gunwale streak is reached. The bevelling of the edges of the plank will have to be conducted with judgment, the greatest bevel being required at the midship frame. Holes for the nails must be bored and each plank fastened with copper nails clinched.

After the planking is on, the ribs may be put in. They are made of three-quarter inch square oak or cedar, and must be bent to the shape of the boat by steaming. The mode of securing the ribs to the planks is shown in the illustration. Their heels are joggled over the keel. The nails are best driven right through both planks as shown at x, but they are more frequently placed as shown at z. Floor frames extending from bilge to bilge are placed either midway between or close to the frames, and in the latter case are fastened to the frames. The floor frames should be joggled so as to fit the planking, and should have a piece cut out half an inch deep to fit over the top of the keel. Two light oak longitudinal stringers are put in lengthwise of the boat, one of them on the bilge, the other at a proper height to support the thwarts. They are nailed to the frames.

Frames, floors, and stringers being now in place, the upper ends of the frames may be carefully sawn off an inch and a quarter below the gunwale line. A light gunwale an inch and a quarter deep is then fitted round inside the rib heads and secured to the top strake, another one being frequently placed outside. The position of the thwarts must then be fixed, the first midship thwart being about five feet from the bow, the next four feet from this and the last one in the stern. Each thwart rests upon the stringer and a brace extended from rib to rib with two cedar or hackmatack knees to secure the seat. The seats will be nine inches wide.

The stretchers may be made of oak or ash. The stern seat may now be put in about three feet from the stern board, the space under it and behind it being made into a locker. The floor boards may be made of three-quarter inch pine cut to fit in place. They must be braced firmly together, securely nailed to a light frame composed of three-quarter inch square strips. They are made in three portions, one to go between the two last seats, one between the middle seats, and one to extend from between the two front seats to the bow of the skiff. Small recesses must be cut in the floors for the frame of the foot board to lie in. An iron band of half inch wide half-round bar iron may be carried down the front of the stem to the keel and screwed firmly about every twelve inches. The rudder pins may now be riveted on and the rowlocks put in, both of these being bought ready made. The rudder and yoke are shown in Fig. 8.

The boat is now ready for painting or varnishing. As a rule nothing except good copal boat varnish should be used, although if the planking is of pine, the boat may be painted. Give the boat two coats of varnish inside and three coats outside.

The oars can be made by the amateur himself, but are better bought ready-made. Should he determine to make them himself, however, they must be ten feet six inches long for a boat of the size described. The blades must be four and one-half inches wide at the ends and three inches at the shoulder, twenty-four inches long and from a quarter to three-eighths of an inch thick. The neck may be oval an inch and a half by an inch and three-quarters. At the handle the oar is two and three-quarter inches in diameter, the grip being six inches long and one and a quarter inches in diameter. Band the end of the blade with a one inch band of thin copper neatly fastened with copper nails, and the boat is ready for service.

Rowing is the art of propelling a boat through the water by means of oars, the rower sitting with his face toward the stern and his back toward the bow of the boat. Primarily the motion consists of grasping the handles of the oar, extending the arms, leaning forward, with the oar in the air, dipping the oar into the water, then throwing the body straight backward, and as the oar passes through the water, pulling home the handles to the chest. The oar in fact is a lever, the water a fulcrum, the boat the weight to be moved and the combined weight and strength of the oarsman the moving power. The action is twofold, being made up of two portions, technically termed the "stroke" and the "feather." The stroke is the pulling of the oar through the water with the blade perpendicular to the surface thereof. The feather is the passage of the blade back through the air and is generally performed with the blade resting with its flat portion nearly in the same plane as the surface of the water. This is performed by turning the hands up and the wrist down, and dropping the hands at the conclusion of the stroke.

To excel in the art of rowing requires a long apprenticeship and one which should be begun at as early an age as possible. No sport is more slowly learned and more difficult of attainment. The beginner should take his first lesson in a heavy, wide and safe skiff, with an instructor who may sit on the coxswain's thwart, the pupil occupying the stroke thwart. It is, perhaps, unnecessary to say that the sliding seat should not be used until after experience in rowing with a fixed seat. Let the pupil seat himself squarely upright on the surface of the thwart, bending his knees a little and opening them about a foot apart. The feet must be pressed firmly against the stretcher, which should be adjusted to the proper length, which is as short as is compatible with the hands clearing the knees. The heels must be placed nearly together, the toes being turned out. The pupil must then take hold of the oar with both hands, with the button just inside the thole pins. He grasps the handle with the inside hand close to the end, the thumb uppermost. The outside hand or that nearest the loom of the oar must be from one and a half to two inches away from its fellow, the wrist bent convexly and the thumb underneath. The outside hand is that by which the power in pulling is conveyed while the inside hand acts more as a guide to the oar. The forearms should be below the level of the handle, while the oar is quiescent, the wrists being dropped and relaxed. The different positions of the two hands and wrists permit of both arms being stretched out perfectly straight, not crooked or bent when getting forward. The body should be inclined forward, the back perfectly straight, the stomach well forward and the chest forward and raised as much as possible. In fact the position of the trunk is that which the pupil would be directed to assume by a drill sergeant. Let him then extend his arms forward as far as he can reach, with back straight, head up, the shoulders square, and, let it once more be noted, with the inside wrist flat, the outside wrist bent convexly. In all the subsequent movements the body must be swung evenly backward and forward on the seat as on a hinge. The back must be kept straight; and though the shoulders, in reaching forward, must necessarily be raised, they should on the return be kept as low as possible. A good oarsman has his shoulders and back as flat as possible, a rounded back or humped shoulders being in his case a sign of weariness or weakness. If one shoulder is raised higher than the other, or if the swing backward and forward is not even, the trim of the boat is lost and it rolls from side to side. The reach forward having been made the oar must be dipped into the water with the front of the blade as it drops inclined slightly toward the surface. The leather button on the oar must be pressed against the thole pins. A short stroke may then be pulled, keeping the blade just buried in the water, and pulling it evenly through by bringing the weight of the body to bear and pressing against the stretcher with the feet. There is no necessity for teaching the pupil to feather at first. Let the pupil continue to make short strokes like this until he can catch the water neatly and firmly, keep himself upright, pull strongly and recover himself after each stroke, bringing the oar squarely out of the water without a jerk.

In the recovery, the hands are shot forward quickly, the body following afterward. If the oarsman on a sliding seat should bring his body forward and his knees up first, his knees would be in the way of his hands. Therefore shoot the hands out quickly in the recovery until the arms are straight, and let the body follow.

The lessons should continue until the pupil has learned what he is to do and how to do it, and has gained command over the oar. At intervals he may rest by changing places with his instructor and watching him handle the oar. Subsequently he may be placed on the bow thwart and taught to use the oar on the other side of the boat This is most important, as no habit is more vicious or more easily formed than that of being able to row on one side of the boat only.

When this point has been reached, and the rower can handle his oar tolerably well, he may be taught to feather. In this motion, by a quick turn of the wrists at the end of the stroke, he brings the oar out of the water with the blade lying over parallel to the surface of the stream. The blade of the oar should be brought as near the surface of the water as possible without actually touching it. A lazy style of feathering once fashionable consisted in keeping the blade so low that as the oar swung back it struck slight spray from the ripples on the water and thus retarded in a measure the passage of the boat.

The next step is to put a good oarsman into the boat to row the stroke oar. The beginner may now be taught, and will easily learn, to keep time with the man in front of him. When he can row in tolerably good form he may be transferred into a pair-oared outrigger and constantly shifted from side to side so as to row well on both sides of the boat.

Finally he may be introduced to the sliding seat. The rules for rowing on a fixed seat apply with equal force to the slide. The pupil must observe what he has been taught as to a firm "catch," or beginning of the stroke, and a strong even "grip" or movement of the oar through the water. Especially must he remember the cardinal rule of putting all the weight of the body into the beginning of the stroke The body must be lifted as it were off the seat without any consciousness of the act of sliding, and when the perpendicular is resumed at the end of the stroke, the slide will seem to go back of itself. The feet should be continually pressed against the stretcher, and the tendency to kick as it were avoided. The slide should not be made too soon or power will be lost instead of gained. The length of slide for a beginner should be three or four inches only. It can be gradually increased until the full extent is reached.

The next thing to learn is backing water. This is the exact reverse of rowing and is accomplished by quickly reversing the oar and pushing instead of pulling. The same principle must be observed of just covering the blade of the oar with water and feathering low

He must also learn to ship and unship his oar quickly if his boat admits of it. In an outrigged boat this manœuvre is not required or indeed possible.

It would seem that in a sport which has been developed into an art, there could be no two opinions as to the proper manner of rowing the "stroke" as it is technically termed. Indeed, among the most skilled oarsmen there are no two opinions as to the constituent parts of a good stroke. The differences in college strokes, about which so much is heard, are due chiefly to the vagaries of professional "coaches." The following points may be borne safely in mind by the oarsman when he has passed the stage of rowing in a stationary seated skiff and has learned to some extent the value of the slide and the outriggers. In reaching forward, the hands should be shot quickly out, without jerking, the body bent slightly forward from the hips, the oar being turned as soon as it passes the knees, so as to bring the blade into its proper position for the catch or commencement of the stroke. The oar must be dipped with force but without splashing, the slide of the seat forward by this time having been taken. The blade of the oar being just covered, the whole power of the man should be put forth to drive the blade through the water, and especially be exerted at the beginning of the stroke, weight and strength being brought into play. The oar is to be pulled through the water with a strong, steady motion and absence of the quivering which often mars a stroke. The oarsman straightens his legs, thus bringing into play the sliding seat. His body comes to the perpendicular, and may even incline slightly backward, and the hands are pulled firmly toward the body. The oar must continue in the water till the hands touch the chest. The stroke is then finished and the feathering begins. The hands are then dropped, the wrists turned, the oar leaving the water cleanly and neatly, and the oarsman returns to his former position and repeats the stroke. The arms must be treated during the first part of the stroke as mere straps connecting the body with the oar. It is of the utmost importance that the whole crew shall swing throughout the stroke in perfect unison

The Yale or "Bob Cook" stroke is a strong catch and hard steady pull through the water. At the finish, the oar is taken out of the water easily; the hands are pushed forward quickly and the arms straighten out for a new stroke. The recovery is a slow slide. The body straightens up for a new stroke after the arms are in position, and the slide has been taken. The prominent characteristics of the Yale stroke are the quick shooting forward of the hands, the slow slide for recovery of position by the body, and the strong even pull of the oar through the water. Modifications of the Bob Cook stroke have been tried by Yale crews during the past six years. John Rogers, Jr., Captain of the Yale University Crew in 1886, says that the stroke in 1880 and 1881 differed from the Bob Cook stroke only in being slower in getting the hands away from the body. The stroke of 1882 was like that of 1881, but shorter oars were used, and this enabled the crew to make a larger number of strokes to the minute.

In the Harvard stroke, the catch is firm but easy. The blade of the oar is pulled through the water easily at first, but with increasing power as the slide is taken, the whole weight and muscle of the crew being put into the middle of the stroke. The force of the stroke gradually relaxes toward the end. The oar is then taken from the water slowly and started forward, body and hands moving forward for recovery together and slowly. Body, arms and oar make recovery in a bunch, whereas in Yale's stroke the hands shoot away for recovery, the arms assuming position at once for a new stroke, the the body following.

When rowing alone in a single gig or shell the amateur will encounter in his early lessons the novel experience of considerable difficulty in maintaining the balance of his boat. Left to itself the narrow little craft will roll over in a twinkling and give him a ducking. This tendency is counteracted, first, by sitting exactly in the middle of the thwart and swinging backward and forward in a perpendicular plane, and secondly, by resting the flat of the oar blades on the water and holding the handles firmly. With these precautions he cannot capsize. In a single shell or gig the oars are so placed in the rowlocks as to allow the handles to overlap. One hand has, therefore, to be placed above the other as the body swings backward and forward. It is purely a matter of taste as to whether the left or the right hand be uppermost. As the boat must be steered by the oars alone, the oarsman's head must at every third stroke or so be turned over the shoulder, and it is perhaps preferable to throw it to the left. The eye catches sight of any impediment in the course, and also of the shadow of objects at a distance. As with the position of the hands, however, the individual preference may be allowed to govern the direction in which the head is turned. It requires some practice to turn the head at all without rocking the boat.

To launch a shell it should be placed sideways in the water from the float of the boathouse, the head pointing up stream. The inside outriggger is then held by an assistant and the oarsman takes his place with the outside oar in his hand. This he places in the rowlock either by passing the handle under the mousing if the latter is fixed, or unlatching it if it is a movable one and dropping the oar in. The assistant then passes the inside oar to the oarsman and by retaining hold of it pushes him out into the stream. In bringing the boat in, the head of the shell ought again to be pointed up stream; and then by holding water with the inside oar and pulling the outside one the boat is easily brought alongside the float.

The rule of the road in rowing upon crowded rivers or lakes is generally allowed to be as follows:

1. A rowboat going up stream or against the tide should take bank or shore and keep inside all boats meeting it.

2. A rowboat going with the stream or tide should keep outside all boats meeting it.

3. A boat overtaking another should keep clear of the boat overtaken.

4. A boat meeting another should keep to the right.

5. A boat with a coxswain should give way to a boat without a coxswain as far as possible.

6. A rowboat must give way to a sailing boat.

7. A pair-oar usually gives way to a four-oar, and a four-oar to an eight-oar.

The question of the good or evil effects of rowing has so often been debated that it seems now too late in the day to do more than refer to it. It has without doubt been satisfactorily decided that provided a man is suffering from no constitutional disease debarring him from physical exertion, he can do much to promote a healthy mind in a healthy body by becoming a constant oarsman. The principal danger in boating is that of over-exertion in racing Against this the oarsman must guard. The man who row in a race should fit himself properly for a contest which will tax his powers and endurance to the utmost, and in the race must stop if his power is giving way. He must go through a course of training before the race. The methods of training have changed somewhat in late years and the system now pursued has gradually become consonant with reason. The training of to-day is a mode of life conducted upon principles of hygiene and common sense. The day has gone by when the unhappy athlete was starved and purged until existence became well nigh unendurable. Rightly thinking that he is training men to row and believing that in any case no exercise is more healthful than rowing, the trainer confines their exercise principally to the oar, varying it with a moderate amount of running and walking to develop their wind or power of increased respiration.

In order to prepare for a race from three to six weeks are necessary. In the first place the general health is improved by confining the crew to regular and early hours. Retiring say at 11 and rising at 7 or half-past, they sleep in rooms well ventilated and with bed covering not too heavy. The cold bath may be taken at once on rising, or a brisk half-hour's walk after a cracker and a glass of water or milk may precede the bath. An hour or so after rising a moderate breakfast may be taken consisting of broiled steak or mutton chops or cold meat, tea and stale bread, or toast and butter. Eggs should be sparingly eaten. Between breakfast and lunch one's ordinary pursuits may be followed. Lunch may consist of a morsel of cold meat and a baked potato and some stale bread. In the afternoon a hard row of five or ten miles must be taken, followed by a run or walk as may be necessary. After this exercise the body must be rubbed down with a coarse towel and a tepid bath taken before putting on dry clothing. Dinner may be eaten between 6 and 7 and consist of good roast meat, either beef or mutton, or steaks, chops or fowls either roasted or boiled. Fish may occasionally be added and a plentiful supply of vegetables. Good bread is essential, and a light pudding of some cooked fruit may end the meal. It is advisable to vary the bill of fare constantly, keeping within these lines. The constant drinking of water should be discouraged. Smoking should be absolutely forbidden save where the loss of it produces persistent insomnia, when a single cigar may be smoked at bedtime. As little intellectual labor as possible should be indulged in, but the mind must be pleasantly and agreeably occupied. Bathing had better be confined to one or two plunges with a short swim. The greatest care must be taken to avoid cold being caught after exercising, and the principal work should be done after midday. No violent exercise ought to be taken after a heavy meal. Physicking is, as a rule, a mistake, though in some cases a little is necessary at the commencement of training. A competent authority has thus summed up the condition in which a man should be after a course of sensible and judicious training: "His strength is gathered up, his fully developed muscles are hard as iron, his wind is sound, his tread elastic, his speed great, his flesh firm, his skin fair and clear, his face hard and healthy, though perhaps fine drawn, his eye bright and sparkling like a diamond,—the white a clear blue,—and his spirits, accompanied by a proper confidence in his ability to go anywhere and do anything, of the very best." These are the essentials of perfect condition and success.

THE CANOE.

The canoe, the boat of the aboriginal inhabitants of North America, has within the last twenty years come into great prominence as a pleasure boat among our young men.

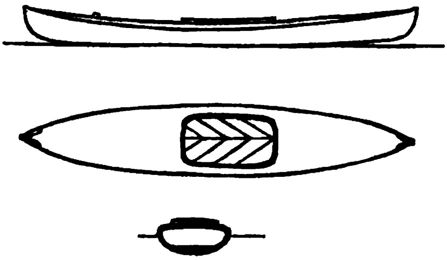
In all its perfection, the canoe existed in every part of America when the first ships of the European approached these shores and dropped anchor in the harbors. On the Northern coast, in Maine and along the great lakes, the canoe was a mere cockleshell of birch bark, ribbed with slender strips of wood and caulked with such rude materials as an

The Bark Canoe.

uncivilized race of men could command. A canoe capable of transporting from six to eight persons across a lake could be carried on the head of one person. South of Cape Cod, the canoe was the solid trunk of a tree, hewn into the semblance of a boat. It was straight in the body, round on the floor and pointed at both ends. All the early voyagers to America record their astonishment at the extraordinary speed with which the Indians propelled these canoes. No crew of sailors, however sturdy, could row one of the small boats of the ship as fast as a fewer number of Indians could propel a log canoe.

The canoe figured extensively in the colonial annals of America, and was made memorable for the part it played in the exploration of the Lakes and in the wars between the French and English. Lakes George, Champlain, and Ontario, and the River St. Lawrence were repeatedly the highways through which passed warlike expeditions, transported in several hundred canoes.

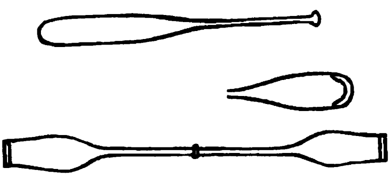
This primitive style of boat is still practically used in various parts of North America. It is the fishing boat of Chesapeake Bay, being there made from pine logs, varying in length from twenty to forty feet. The bark canoe is still popular in the Northern woods for fishing, hunting, and trapping, now at last beginning to give way to light pine boats, regularly framed, modelled exactly in the form of the bark canoe. In Puget's Sound, Alaska, and British America, the Indians invariably use a beautiful cedar log canoe, the finest for speed in America. These unique boats have the quaint feature of a prow, extending forward over the water several feet, in imitation of the pointed head, ears, eyes, and elongated neck of a deer. They are extraordinarily light and fast. The large canoes have grotesque images



The Pleasure Canoe.

painted on the sides. There is one in the Smithsonian Museum at Washington, 59 feet long. 8 feet wide, and 4 feet 8 inches deep. The ordinary size, however, is 30 feet long, 4 feet beam, and 2 feet deep.

Just as the practical canoe, the one unique relic of the ancient aboriginal people of America, whose past is shrouded in darkness complete and profound, was about to pass into the same oblivion which obscures their history, it was rescued therefrom by its adoption by the Americans as a pleasure boat. It is now one of the most valued craft in the country for smooth water sport. The material of which the boat is made has been changed, but the form and the mode of propulsion remain.



Single and Double-Bladed Paddles.

The canoe has two characteristics which distinguish it from the boat, properly so called. It is, in the first place, pointed at both ends, so as to proceed equally well in either direction. In the second it is propelled by a paddle, the boatman looking in the direction in which the canoe is going. It is obvious that this form of travelling must have been a necessity is those ages when man was surrounded on all sides by enemies of one sort or another. Paddling is, however, a natural action, instinctive, even ; rowing is acquired and pertains to a state of civilization where security is more or less assured.

Roughly speaking, the practical canoe may be divided into two great classes; the open, formed either of bark or skins stretched over a frame or consisting simply of a hollowed log; and the decked, likewise formed either of skins or built of wood. These are the original forms of the craft. What may be called the civilized canoe also falls into two classes. It is either covered over, leaving a mere manhole for the occupant to sit in; or it is practically open, as is the birch bark canoe.

It is probably in Maine, the Adirondacks, and Canada, that the rise of modern canoeing for pleasure is to be looked for, although it was not until Macgregor made his famous trip in, and wrote his equally famous book about, the Rob Roy canoe that the art began to take the place it now holds among the sports of the world. It was in 1865 that Macgregor built the Rob Roy and cruised in her upward of a thousand miles. The Rob Roy was a canoe modelled somewhat after the covered kayak of the Esquimaux, but built of wood instead of skins. American canoeing, popular as it may have been before Macgregor's time, was confined to the open canoe of birch bark, propelled by a single-bladed paddle and differing here again from the Rob Roy, whose means of propulsion consists of a double-bladed paddle. As the history of canoeing as we now understand it may fairly be said to have been begun with Mr. Macgregor, it may not be uninteresting to give some short account of the historical voyage above referred to. He says himself:

> "The Rob Roy canoe was built of oak with a deck of cedar. She was 15 feet in length, 28 inches broad, 9 inches deep and weighed 80 pounds. A paddle seven feet long, with a blade at each end, and a lug sail and jib were the means of propulsion. My baggage for three months was in a black bag one foot square and six inches deep.
>
> "The very things which bother the pair oar become cheery excitements to the voyager in the canoe. For now as he sits in his little bark, he looks forward and not backward. He sees all his course and the scenery besides. He can steer within an inch in a narrow place; can work his sail without changing his seat; can shove with his paddle when aground, and can jump out in good time to prevent a bad smash. The canoe is safer than a rowing boat because you sit so low in it and never require to shift your place or lose hold of the paddle; while for comfort during long hours, for days and weeks of hard work, it is evidently the best, because you lean all the time against a swinging back board and when the paddle rests in your lap you are at ease as in an arm chair; so that, while drifting along with the current or the wind you can gaze around, eat or read, or sketch, and yet, in a moment of sudden alarm, the hands are at once on the faithful paddle ready for action."

The impetus which Mr. Macgregor gave to the sport was carried forward by Mr. Baden-Powell, who built, soon after he took to the sport, a canoe of a new type, which he named the Nautilus. As the Rob Roy is the type of the paddling canoe, so the Nautilus has become the type of the canoe adapted more especially to sailing. It has a more decided sheer, and draws more water than the Rob Roy.

Canoeing quickly took a prominent place among the sports of America after Macgregor and Baden-Powell had set the fashion. At first confined to individuals, here and there, the sport soon became popular enough for the formation of amateur canoe clubs, whose members devoted themselves to the use of the paddle. The first of these clubs was that which is still known under the title of the New-York Canoe Club, which came into existence in 1870. The club did good work in its earlier years, and in 1879 built a convenient club house. By the following year the sport was fairly acclimatised, and other clubs had been formed, while the older rowing clubs had admitted the canoe to an honored place in their boat houses. It was in 1880 that some members of the N. Y. C. C. and other canoe clubs sent out a circular to all persons known to be interested in the sport, requesting their attendance at Lake George for the purpose of holding a meeting at which a general association of the various clubs represented should be formed. The result was the birth of the American Canoe Association which has held annually ever since a camp and regatta, always largely attended, and has in many ways advanced the interests of canoeing. The object of the Association, as stated in its constitution, is to unite all amateur canoeists for purposes of pleasure, health or exploration, by means of meetings for business, camping, paddling, sailing and rowing, and by keeping logs of voyages, records of waterways and routes, details, drawing and dimensions of boats and collections of maps, charts and books. A meeting for business, camping and racing is held in August of each year in some convenient locality. The sailing regulations of the Association are interesting in giving the official definition of a canoe, and marking the various classes into which it may fall. They run as follows:

> "A canoe to compete in any race of the A. C. C. must be sharp at both ends with no counter, stern or transom, and must be capable of being effectively paddled by one man."
>
> "Class I. Any canoe.
>
> "Class II. Length not over fifteen feet, beam not under twenty-six inches; depth inside from gunwale to garboard streak at any part of canoe not less than eight inches.
>
> "Class III. Length not over seventeen feet; beam not under twenty-eight inches; depth not under nine inches.
>
> "Class IV. Length not over sixteen feet; beam not under thirty inches; depth not under nine inches."

The above are all for paddling canoes. Sailing canoes are classed as follows:

> "Class A. Length not over sixteen feet; beam not over twenty-eight inches.
>
> "Class B. Length not over seventeen feet, with a limit of twenty-eight and a half inches beam for that length. The beam may be increased one-eighth of an inch for each full inch of length decreased.
>
> "The greatest length of a canoe in classes A and B, at fore

end of well from under side of deck amidships to inner side of garboard next keel, shall not exceed sixteen inches."

There are three types of canoe under which may be grouped all the pleasure boats of this character. There is first the open canoe propelled with a single paddle; secondly, the Rob Roy canoe, decked almost entirely and handled with a double-bladed paddle; and lastly, the Nautilus, adapted either for the paddle or the sail. The sail has altered entirely the character of the pleasure canoe model in the last twenty years. The paddling canoe offers little chance for variation in model The canoe to be used with a sail offers a never ending series of possibilities to the builder.

The materials used in the construction of the canoe are numerous. Skins and bark, canvas and paper, wood and metal have all been used. The ordinary canoe is a lap streak, built of thin planks, generally of cedar, and overlapping at the joints. In Canadian waters the planks are more commonly laid edge to edge, the joints being made secure and water-tight in a variety of methods. These are called smooth skin canoes.

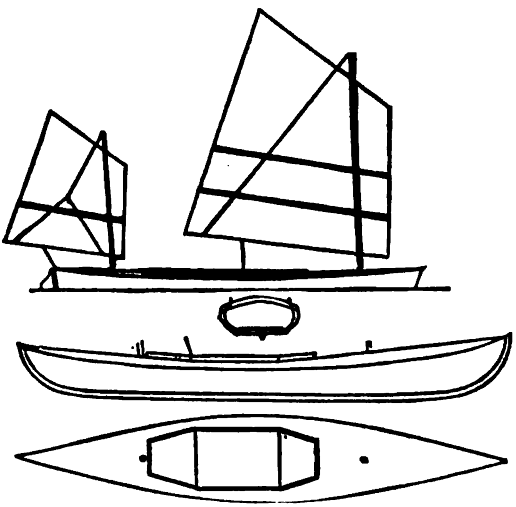
The Rob Roy canoe is usually built of lap streaked white cedar planking. Its average dimensions are 14 feet in length, 26 inches in beam amidships, 9 inches deep in clear inside measurement. The well is usually 4 or 5 feet long and 18 inches wide. The deck is usually built of Spanish cedar. The keel is of oak and projects a trifle below the garboards or streaks which immediately abut upon it. The ribs and combing around the well are also of oak. The stem and stern posts are of hackmatack. Bulkheads are placed between two or three feet from either end and in the compartments so formed are generally placed airtight copper cans. The paddler sits at the after end of the well, resting against a movable backboard. A light bottom board is placed over the bottom of the canoe and on this the seat is placed. The footrest is a movable board so fitted as to be easily adjustable to the varying length of the legs. The paddle is always double-bladed for the Rob Roy form of canoe and varies in length from seven to ten or eleven feet. Paddles are made of pine or spruce, and are so jointed in the centre that the blades when required may be placed at right angles to each other. A paddle is divided into the blade, which varies in shape according to individual ideas; the round or handle; and the ferrule or joint above referred to. There is a form of Rob Roy canoe, about eighteen feet in length, which, holding two comfortably, is known as a tandem canoe. A canoe has also been built as short as ten feet and weighing only twenty-five pounds.

I can now give some advice as to the best method of handling a canoe. In the first place she must be launched either by sliding her into the water on the keel, or by placing her in the water from a float. To enter a canoe is to a novice a matter of some difficulty. The easiest way is to bring the canoe to the side of the float, place one foot on the bottom board at the forward end of the well, place the hands on either side of the combing and quietly but quickly to raise the body and let it drop into the seat. The paddle may now be taken and used to push the canoe out. Once in the well, the canoeist may feel entirely safe, because the centre of gravity is brought low down.

Having now cleared away from the float, the canoeist may begin to paddle, and will find this not nearly so difficult as it would seem to the novice. The motion is diametrically opposed to the act of rowing. The paddle must be grasped with both hands, fingers uppermost and thumbs underneath, the hands wide apart, but the exact distance one of convenience. A reach forward is made on one side. The blade is dipped nearly to the shoulder, and as far ahead as possible. Then with a steady, vigorous movement it is drawn aft; and the other blade being advanced is then in a position to take the next stroke. As a rule, the blades by means of the joint above described are at right angles to each other, so that the one which is in the air will not present its broadside to the wind. A turn of the wrist is therefore necessary to bring the blade into position, and this must be given just as it is ready to be dropped into the water. The paddle must be passed over the deck of the canoe, just high enough to clear it. The shorter the paddle, the more nearly perpendicular must its position be, as the stroke is taken. The nine or ten foot paddles have long blades, and the stroke is taken nearly horizontally. The novice should sit as low in the canoe as possible, as the centre of gravity is thus brought low enough to keep the canoe safe and steady. The seat may be raised by degrees as experience is acquired; what is lost in stability is gained in power of propulsion. For racing purposes the seat is generally level, or nearly so, with the deck. For general cruising a height of four or five inches from the bottom board will be found a happy medium, as this enables the legs to be bent slightly at the knees, a necessary position for comfort, and comfort is of great importance.

It need hardly be pointed out that the first lessons is paddling should be taken in smooth water. Rough water in trying at first even to an expert canoeist. Paddling before the wind in a moderate sea is a comparatively simple matter, though care must be taken to prevent the canoe from broaching to or getting into the trough of the waves. It requires constant practice and an adaptability to circumstances to become a clever canoeist in rough water.

However careful the canoeist may be, he is sure sooner or later to be upset. And this mishap is liable to happen under the most inconvenient circumstances—for instance, when the canoe is a long way from shore. He must, therefore, know how to swim, and learn, as early in his paddling education as possible, what to do under unpleasant conditions. Let him put on the scantiest of clothing, and choosing a warm day and smooth water for the practice, deliberately tumble himself out of his canoe. He will not find this part of the lesson at all difficult. He must then practise getting back into his canoe from the water. As soon as he rises from the surface let him swim to his canoe and right it, should it have been capsized. Should the well be filled with water, he may as best he can bail out as much of the water as possible with one hand, keeping the other on the edge of the canoe. Then he should try to get into his craft. Let him first work along to the stern and spring up astraddle of the deck, keeping his body bent forward as low as possible, and working himself gradually forward with his feet in the water. When the well is reached, he can bail it out more effectually, and then carefully crawl in. As this method of entering the boat, although the easiest, is impossible with a canoe that has a mast set, the budding canoeist must learn to get into the well amidships. Let him throw himself across the well with the head clear over and gradually pull in the legs. Among the races which take place at the meetings of The American Canoe Association, upset races are always included. The contestants must upset their canoes, climb in and begin paddling again; and this has been accomplished in twenty seconds.



The Sailing Canoe.

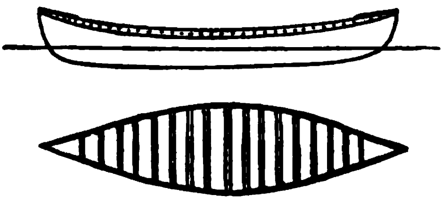
The canoe when intended for sailing (either occasionally or exclusively) must have a keel sufficiently deep to allow of the canoe's holding its course when the wind is forward of the beam. Otherwise the canoe could only sail before the wind. As a usual thing a centreboard is now fitted to a sailing canoe. The chief objection of former years was that the board took up too much room, but this has now been disposed of by the folding centreboard. This is a fan-like apparatus which is opened or closed by a rod moving through a water-tight collar.

The sail which is found most useful in canoeing is some form of the lug-sail, the favorite being perhaps the balance lug. The leg-of-mutton and the lateen sail are also used. The mainmast is placed forward in a canoe at any distance up to three feet from the stem. The dandy mast is placed aft of the well. The masts are usually stepped into a brass tube screwed to the deck. It is found inconvenient to steer a sailing canoe with the paddle, and a rudder is generally used, with rudder lines attached to a yoke and worked with a foot-steering gear. Sometimes a tiller is used. The centreboard is housed when the canoe is running free or before the wind, and dropped when sailing to windward. The yard and boom are round light pieces of wood or reed, generally of bamboo, which combines the greatest strength with the greatest lightness known. The sail is kept stiff by two light slats of wood called battens, of which there are usually two on the mainsail and one on the mizzen. A line fastened to the batten forward of the mast, brought round and fastened again to the batten aft, is called the parrel and serves to prevent the sail from bellying by keeping the batten close to the mast. The sail is hoisted and lowered by a halliard, and its position is regulated by the sheet, which is a line fastened to the boom near its end and with its free end within the canoeist's reach. The halliard runs through a block at the masthead down the mast to another block at the foot and from this to a hook or cleat near the seat, thus enabling the canoeist to raise, lower and handle his sail without moving from his seat. To relieve the sail from the pressure of the wind in an emergency, the sheet is let go; the sail thus released swings edge-on to the wind. In sailing before the wind the sail is kept at right angles to the direction in which the canoe is going, the boom being less than at right angles to the canoe. With the wind abeam, the boom must be at an angle of about 45° with the canoe; and when going down the wind at 90°. When the canoe is brought round, the boom swings across the canoe with a sudden jerk, which is called jibing and is an even more dangerous manœuvre with a canoe than with an ordinary sailing boat. To counteract the suddenness of the jibe, the canoeist must shift his weight at precisely the right moment in order to prevent the canoe capsizing. It is a still more difficult feat to perform when the boom is at more than a right angle to the canoe, and care should be taken never to let the boom get forward to this position. A small sail should be used at first until confidence is gained; the smaller the sail the safer the canoe. To sail a canoe requires nerve and experience, and the first step should be the learning to jibe easily and quickly. Haul in on the sheet when the course is changed, and when the boom swings around let out the sheet with a run. With regular sailing canoes ballast to the extent sometimes of several hundred pounds must be carried in such a form as to be shifted easily. It is usually in the form of twenty or twenty-five pound bags.

The single-blade paddle is usually (in pleasure boats) used only in the birch-bark canoe. In skilled hands it is highly effective. The paddler kneels either in the middle or at one end of the canoe and grasps the paddle firmly with both hands, one about four or five inches from the knob and the other directly upon it. The stroke is taken with the paddle in a nearly perpendicular position and by a peculiar and quite indescribable turn of the wrist at the end of the stroke the canoe is kept on a straight course, instead of trending over to the side opposite to that on which the paddle is worked. In making this turn the blade of the paddle is turned away from the boat, as it were, so that when the end of the stroke is reached it is edge-on to the direction in which the canoe is going. At intervals the paddle is shifted to the other side of the canoe so as to rest the paddler by equalizing the strain on his muscles.

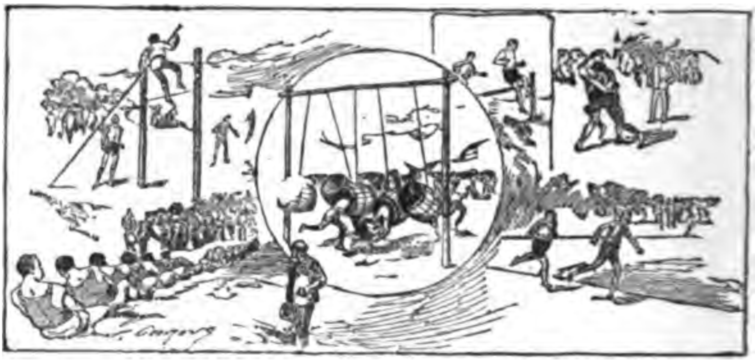
The Puget Sound natives use the single-bladed paddle, and generally put out from shore with two, four or six men in the canoe. Mats or clothing are thrown upon the floor of the canoe, and upon these they half sit, half kneel. Leaning against the gunwale, they ply the paddle with both hands, spearing the water with it close to the canoe, and paddling continuously with astonishing endurance almost a whole day. The gunwales of a Puget Sound canoe flare slightly outward in order that the paddle blades may the more readily be swept back without touching the sides of the canoe.

A good canvas-covered canoe will last a long time if it is carefully looked after. A little patience and ingenuity are all that are requisite for its construction, if the necessary materials and tools are at hand. The bow, stem and keel are of one-inch pine, with an outside keel of half-inch pine. For the stringers and ribs elm three-sixteenths of an inch thick and one inch and three-quarters wide are needed. The crossbars are of pine one by two inches. Copper nails three-eighths of an inch long should fasten the canvas while five-eighths-inch nails fasten the ribs to the stringers; and one and one-quarter inch nails the stringers to the ends. The keel and posts are fastened with inch and a half screws. To make a canoe, moulds must first be made giving the shape of several cross sections. These consist of light frames of half-inch battens cut the shape of the midship bow and stern sections of the canoe. On these the keel, stem and stern posts, cut according to the figures given, must be fixed. The stringers are then put in, temporarily secured to the frames and firmly fastened with clinched nails to the stem and stern posts. Now turn the canoe upside down



The Canvas Canoe.

and tack on the canvas, which should be strong unbleached heavy cloth. Where the canvas does not lie smoothly gather in a pleat and sew from the inside. The tacks must be one inch apart. Then turn the canoe up again, and put in the ribs six inches apart, bending them by main force. Rib from the midship frame, putting in one rib forward and one aft alternately. Nail the ribs to each stringer from the outside. Now tack on over the canvas (having first removed the moulds) a half strip of elm inside and outside to serve as a gunwale streak. If when the moulds are taken out the canvas loosens, temporary cross-bars must be inserted of a width sufficient to draw the canvas taut, or it may be gathered up and an extra stitch put in the seams if it is very loose. When it is properly tight, put on the cross-bars, of which there are five; and then turning the canoe upside down put on the outside keel, first giving the canvas under it two thick coats of paint. Clinch the two keels together with long copper nails, and then give the canoe three good coats of paint inside and outside, finishing it with a coat of copal varnish. The paddles must be single-bladed, the stern paddle being four feet nine inches in extreme length and the bow paddle four feet. The extreme width of blade of the former must be six inches and of the latter five inches. After the canoe is in use it should be painted whenever the grain of the canvas shows through the old paint. No water should be allowed to stay in it over night, as this soon destroys the paint.



GYMNASTICS.

CITY life calls for the formation of athletic clubs, having for their object the physical development, health and entertainment of their members.

It is always possible, if a man is living in his own house, to have a private gymnasium. One room can always be set aside to the few necessary implements and fixtures required for healthful athletic exercises. But if a man is living, as so many thousands do in a large city, in either a hotel, a boarding-house or small apartments, a private gymnasium is out of the question. To hire a suitable room in some other building and furnish it with proper apparatus is too expensive for a single individual. Associated effort is necessary; and a thriving association has a double advantage, because it not only secures a better gymnasium than a man can have in his own house, but it brings into play the competition which lends both to field and gymnasium exercises their greatest charm.

Athletic clubs are now springing into existence in the United States in such profusion as to baffle the effort to enumerate them. Scarce a city can be found, having a population of more than 30,000 inhabitants, in which there is not at least one club of this class. In the large cities, there are from five to twenty-five; sometimes even more. Many societies, founded for social, literary or military objects, have added gymnasiums to their other resources for the entertainment of their members. In New-York City there are twenty-one clubs founded primarily to promote an interest in gymnastics and general field exercises, besides numerous German Turner societies; and there are in addition a great number of riding, boat, bicycle, ball-playing, archery, bowling and yachting associations for fostering special forms of athletic sports. Every college is now supplied with an excellent gymnasium.

If the credit of awakening a wide-spread interest in gymnastics belongs to any city in the United States more than to any other, the palm must be awarded to New-York. There had always been a few athletic societies in that city, but in 1868 one was organized under the name of the New-York Athletic Club, whose energy has awakened the spirit of our youth and led to the formation of an immense number of other similar clubs. The moving spirit of this club was William B. Curtis, for many years the champion heavy-weight athlete of the United States. The untiring efforts of this enthusiast built up the club rapidly and brought into its membership a great many young men from the very best families, some of whom afterward became the amateur champions in their special lines of effort. The club has now a membership of 2,000, a club-house in the city four stories high with bowling alley and natatorium in the basement; sparring-room, restaurant and parlor in the middle stories, and gymnasium with racetrack at the top of the building; the largest and best gymnasium by the way, in the United States; three boat-houses on the Harlem River, containing more boats than are owned by any other club in the world, except one in London; and large grounds in the upper part of the city for field exercises. This club has a yearly income, from membership dues, of $80,000. With such large funds at its disposal it is enabled to foster all the various forms of gymnastic exercises proper in an admirable manner. The membership now includes some of the best men in the city.

Among other excellent, enterprising and successful athletic clubs of New-York are the Manhattan, Olympic, Seventh Regiment, American, West Side, Harlem and Eagle, and the Y. M. C. A. Club.

In Brooklyn the Nassau, Brooklyn and Crescent Clubs are especially large and thriving, and there are various German and other gymnasiums. Staten Island and Jersey City have other athletic clubs.

In Boston the gymnasiums are generally owned by clubs having for their especial object either bicycling or boating. The Massachusetts Bicycle Club, organized March 8, 1879, and now having an active membership of 232, occupy a club-house built expressly for them on Newburg-st. This building contains a well-appointed gymnasium. The Boston Bicycle Club, organized in 1878 and now having a membership of 225, also have a club-house. The Union Boat Club have a gymnasium attached to the boat-house at the foot of Charles-st.

In Providence, R. I., there are six gymnasiums, which belong respectively to the Narragansett Boat Club, Brown University Athletic Club, Brown University Ball Club, the Y. M. C. A. Athletic Club, Providence Athletic Club and High School Athletic Club. Total membership, 445

Philadelphia is provided with a Fencing, Athletic and Sparring Club, the only one of its kind in the city. It is very exclusive and is composed of the richest society young men. They have elegant quarters in what was known as Concert Hall, an imposing structure, adjoining the Chestnut Street Theatre. There is a pedestrian track and every known appliance for muscular development. A trainer in all these branches is permanently employed. The membership is probably 100. The most complete gymnasium in the city finds its home at Turner Hall—a German organization on Sixth-st. above Noble. The hall was erected in 1884 and is one of the handsomest in Philadelphia. The membership is unlimited and at present there are more than 1,800 names on the rolls. There is also a gymnasium attached to the Y. M. C. A. Hall at Fifteenth and Chestnut sts., which is well equipped and largely patronized. A gymnasium is attached to the Natatorium, on Broad-st. below Walnut, which is patronized by a select class of pupils, the number not restricted. At the corner of Ninth and Arch sts. is a public gymnasium, well equipped and having a large membership.

Baltimore is now well equipped with the plant for athletic exercises. Since 1884 there has been a great revival of athletic sports in that city. There are now a dozen fine gymnasiums there. The clubs are: The Baltimore Athletic, the oldest in the city, about 200 members, owning a large gymnasium. The Y. M. C. A., with about 600 members, who have the best equipped gymnasium in the city, Professor F. S. Schultz, instructor. The North Baltimore Athletic Association, 140 members, with a good hall and gymnasium. The Fifth Maryland Regiment Athletic Club, over 500 members, first-class gymnasium. The Caledonian Club, 200 members. The German Turner Association, 150 members. The Baltimore Turn Verein, 160 members, and the Vorwaerts Verein, 150 members, each with a hall and gymnasium. And the Baltimore Crib Club, a new organization, which pays more attention to the art of boxing than to any other athletic exercise. Professor McGraw also has a large gymnasium with many pupils in boxing. The Johns Hopkins University has a fine gymnasium in a large hall specially built for the purpose. Two other gymnasiums belong to the Maryland and Baltimore Bicycle Clubs respectively.

In Pittsburg the large gymnasium is conducted by an irregular athletic association connected with the Young Men's Christian Association. In the building of that organization is to be found the best appointed gymnasium in the western part of Pennsylvania. It has over 1,200 members, who pay annually $5 each to sustain it. Men of most all grades and positions in life belong to it. The East End Gymnastic Club is also an active organization, its members being residents of that section of the city exclusively. A club-house with gymnasium has been established on Shady Lane.

Cincinnati has one of the great gymnasiums of the country. The institution is managed by the Cincinnati Gymnasium Association, a large, popular and powerful club, having at the present time 1,402 members. The quarters are in the Opera House Building and are very complete. The Turner Society has a large house with gymnasium in the western part of the city. Plain in its exterior, it is elegantly furnished within, and the gymnasium has every equipment. A new athletic club has been recently formed on Walnut Hill.

Cleveland pays more attention to bicycling, pedestrianism and running than to other athletic sports. Nevertheless there are four excellent gymnasiums in the city. The Cleveland Athletic Club, with a membership of seventy, has a well equipped house, with running-track, baths and the general paraphernalia for athletic exercises. A second gymnasium is owned by the Y. M. C. A.; two more by individuals for public use. An athletic park is owned by a stock company; there are tracks for running and bicycling and the usual stands and club-houses. Cleveland also has three prosperous Turner societies with well-equipped quarters.

In Chicago, the preference among young men is for special forms of exercise, such as rowing, bicycling and ball-playing. In that city, however, as elsewhere, the purely athletic exercises are not neglected. The Pullman Athletic Club, which has a club-house on an island in the Calumet Lake, is the only distinctively athletic organization which Chicago may be said to possess. It has about 500 members. The club has a good track and a fine boat-house, with eight shells, four gigs, two two-oared gigs and one eight-oared barge. The club crews comprise a good senior four, a good junior four and a pair of double sculls. The Wanderers Athletic Club has grounds and a modest club-house, corner of Indiana-ave. and Thirty-fifth-st., with a membership of about fifty. The sports of the club include cricket, lacrosse, football and lawn tennis. The St. George's Athletic Club is a similar organization, having grounds in Lincoln Park, but possessing no club-house. It has a membership of thirty. There are six Turner societies in the city, composed mainly of German-Americans, with a total membership of 1,500. These are the Vorwaerts, Aurora, Chicago, Lincoln, Germania, and South Side Turn Gemeinde. The societies all own or control halls with gymnasiums. The principal society is the Chicago, with a membership of 600 which owns the North Side Turner Hall on North Clark-st, with a remarkably well equipped gymnasium. These clubs have given a strong incentive to young men to indulge in all the ordinary work of the gymnasiums, and have latterly included in their membership many Americans. There are six bowling clubs in the city, owning halls for their own use, with a total membership of about 200. The Young Men's Christian Association and the Chicago Athenæum on Madison and Dearborn sts., respectively, maintain large and splendidly equipped gymnasiums, with a membership of nearly 600.

St. Louis has a large number of Turner societies, all with good halls and outfits. The leading athletic club of the city is the Missouri Gymnasium, with an active membrship of 800, and an honorary membership of nearly as many more. The club has a well-appointed house on St. Charles-st., and every branch of athletics is developed and taught there. The Missouri Amateur Athletic Association is another strong club with a membership approximating 400. The most prominent amateur athletes of the State are members of this organization. The exhibitions and games of the association are one of the features of the summer season. This club makes a specialty of sprinting, vaulting and jumping, and boasts of some of the best amateurs in these lines in the United States. The association leases a large club-house in the West End, and has made arrangements to purchase the establishment outright. The Athletic Parade Association has a membership of 904 and is popularly known as The Flambeau Club. It is organized as a battalion, with a full complement of officers. The men are divided into companies, known as Flambeau, Pike, Mortar, Rifle, etc. They have fine uniforms and give a brilliant pyrotechnic exhibition. This club uses the Elks Club rooms for rendezvous purposes.

There are several boxing clubs in St. Louis with a membership ranging from twenty to seventy-five.

There are seven athletic clubs in San Francisco, of which two have buildings of their own. Several of the others lease finely appointed floors in large buildings. The Verein Eintracht, with a membership of 1,100, is a musical and benevolent society with a large gymnastic section; the club owns its own house. The Olympic Club has rooms and a gymnasium in the Alcazar Building, O'Farrell-st.; the membership is upward of 750. The California Athletic Club has a hall and gymnasium at 216 Grant-ave; membership, 487. The Turn Verein Vorwaerts occupies a club-house and gymnasium at 310 O'Farrell-st.; membership, 150. The Irish-American Athletic Club is devoted to pugilism and wrestling, and has an active membership of 200. In addition to these are the Mission Athletic Club, with a membership of 158, and The Pacific Athletic Association, with hall, rooms and gymnasium at 190 Stevenson-st; membership, 240.

It would be impracticable to enumerate the athletic clubs of the smaller cities of the United States. Nearly every Caledonian, St. George's and German society of the country is, to a certain extent, an athletic club. Nearly every college and academy has its own athletic association. The total number is several thousand. Special mention may be made, however, of The Intercollegiate Athletic Association, which comprises clubs from Columbia, Harvard, Yale, Lafayette, University of the City of New-York, University of Pennsylvania, Lehigh University, University of Michigan, St. John's College, Amherst, Cornell, Hobart, Rutgers, Trinity, Union, Stevens Institute and The University of Vermont. In The New-York State Intercollegiate Athletic Association are included most of the college clubs in New-York State. There are several other minor associations in existence which embrace in their membership clubs of certain localities or States.

The controlling organization to which all amateur athletic clubs owe allegiance, directly or indirectly, is The National Association of Amateur Athletes of Americca. This association assumes to control the contests for the amateur championships of America. It dictates the rules governing athletic meetings and has jurisdiction over running, walking, jumping, pole leaping, putting the shot, throwing the hammer, throwing the weights and tugs of war.

The general laws governing athletic meetings as promulgated by The National Association are:

> The officers of an athletic meeting shall be one referee, three judges at the finish, three measurers, three time-keepers, one judge of walking with assistants if necessary, one starter, one clerk of the course with assistants if necessary, and one scorer with assistants if necessary.
>
> The clerk of the course shall record the name of each competitor who shall report to him; shall give him his number for each game in which he is entered, and notify him before the start

of every event in which he is engaged. The assistants shall do such portions of his work as he may assign to them.

The starter shall have entire control of competitors at their marks and shall be the sole judge of the fact as to whether or no any man has gone over his mark. His decision in such cases shall be final and without appeal.

The scorer shall record the laps made by each competitor, and call them aloud, when tallied, for the information of the contestants. He shall record the order of finishing and the times of the competitors in walking and running races. The assistants shall do such portions of his work as he may assign to them.

Each of the three time-keepers shall time every event; and in case two watches agree, and the third disagree, the time marked by the two shall be the official time; if all three watches disagree, the time marked by the watch giving the middle time shall be the official time; if there should be but two time-keeprs, and their watches do not agree, the time marked by the slowest watch shall be the official time. Time shall be taken from the flash of the pistol.

Two of the judges at the finish shall stand at one end of the tape, and the third at the other. One shall take the winner, another the second man, and the other the third man; they shall also note the distances between the first three as they finish. In case of disagreement the majority shall decide. Their decision as to the order in which the men finish shall be final and without appeal.

The measurers shall measure, judge and record each trial of each competitor in all games whose record is one of distance or height. Their decision as to the performance of each man shall be final and without appeal. In case of disagreement the majority shall decide.

The referee shall, when appealed to, decide all questions whose settlement is not otherwise provided for in these rules. His decision shall be final and without appeal.

Immediately on arriving at the grounds, each competitor shall report to the clerk of the course, and obtain his number for the game in which he is entered. He shall inform himself of the times at which he must compete, and will report promptly at the start, without waiting to be notified. No competitor shall be allowed to start without his proper number.

Verbal protests can be made at or before any athletic meeting, against a competitor or team, by any competitor or club competing; but such protest must be subsequently, and before action thereon, made in writing and duly presented to the club under whose auspices the meeting is held.

No persons whatever shall be allowed inside the track, except the officials and properly accredited representatives of the press. Authorized persons shall wear a badge. Competitors not engaged in the game actually taking place shall not be allowed inside or upon the track.

The measurement of tracks shall be eighteen inches from the inner edge, which edge shall be a solid curb raised three inches above the level of the track.

No attendants shall accompany competitors on the scratch or on the track.

Few amateurs arrive at any degree of eminence in athletic games without being subjected to the suspicion of having overstepped the bounds of amateurdom by committing some act discountenanced by the stringent rule defining an amateur. Many of them, on the principle that they might as well have the "game as the name," join the professional ranks. Saportas, Armstrong, Mott, Duffy, Gifford, Myers, Fredericks and Clark have all been graduated from the ranks of the amateurs, on account of their marvellous abilities. Recently, Ford, the great jumper, has been added to the list.

In the constitution of The National Association of Amateur Athletes an amateur is defined as "any person who has never competed in an open competition, or for money, or under a false name; or with a professional for a prize, or where gate money is charged; nor has ever at any time taught, pursued or assisted at athletic exercises for money or for any valuable consideration. But nothing in this definition shall be construed to prohibit the competition between amateurs for medals cups or other prizes than money."

Under this definition an athlete forfeits his rank as an amateur if he competes in a contest open to all, amateurs and professionals, whether for a prize or not; if he competes for money, or under a false name, or knowingly with a professional, or in a place where gate money is charged; or if he has ever taught or pursued as a means of livelihood athletic exercises, or directly or indirectly received remuneration for engaging in or teaching athletic exercises; or if he has received payment for services rendered as referee, judge, umpire, scorer, manager, direct or in any other capacity at any professional exhibition or contest of any athletic exercises whatsoever; or if he runs, manages or directs for prospective profit any professional exhibition or contest.

The only means which is left to amateurs for obtaining money through their connection with athletic sports is by selling their medals. It is a sufficient commentary on the spirit which actuates many men who remain in the amateur ranks to say that they take advantage of this loophole in the definition to derive profit from their success. An athlete may, without losing his standing as an amateur, receive compensation for services rendered as ticket seller or taker at any contest or exhibition of amateur athletics, or as secretary, treasurer, manager or superintendent of any amateur athletic club, or as editor, correspondent, reporter or manager of any paper or periodical. He may also receive from the club of which he is a member the amount of his expenses necessarily incurred in travelling to and from the place of any amateur contest.

The competition for the general amateur athletic championship of America for 1886 was held at the New-York Athletic Club's grounds on September 18. The contestants were: Alfred Jug and J. J. Van Houten, of the West Side Athletic Club; M. W. Ford and J. P.

Thornton, of the New-York Athletic Club, and A. A. Jordan, of the Manhattan Athletic Club, all of New-York City; and J. K. Shell, of the University of Pennsylvania. Ford was the winner. His records at the various games were: 100 yards run, 10 2-5 seconds; throwing 56-pound weight, 19 1-2 feet; running high jump, 5 feet 5 7-8 inches; quarter-mile run, 54 1-5 seconds; putting the shot, 36 feet 7 3-4 inches; pole vaulting, 9 feet 3 inches; 120-yards hurdle race, 17 4-5 seconds, throwing the hammer, 76 feet 4 inches; running broad jump, 20 feet 10 inches. Ford's jumping is a beautiful exhibition.

THE GYMNASIUM AND ITS VALUE.

BY GEORGE GOLDIE, DIRECTOR OF ATHLETICS, N. Y. A. C.

Americans as a rule are mentally the most alert, and, in business pursuits, the most active and energetic people in the world, but in physical exercises they are not.

That they are behind in physical matters is without doubt owing in some degree to the climate, too hot as it often is to exercise in summer without considerable discomfort, and in winter so cold as to require too much clothing to make exercise agreeable out of doors, and in some degree to the many labor and time-saving appliances that their ingenuity has devised. While these may be a partial cause for our neglect to take exercise, I think the main reason is the haste to get rich and to consider everything as trivial, even health and strength, unless it tends toward that one great end, "the almighty dollar."

There was at one time, not so very long ago, a popular idea, which is not yet entirely eradicated, that the cultivation of bodily strength was detrimental to the highest development of the intellect. We have so many living examples of the union of magnificent physique with superb intellect that it seems almost unnecessary to contradict the popular error. I do not deny that the cultivation of the body to the exclusion of the mind is detrimental to the individual and the nation. But, on the other hand, so is the exclusive cultivation of the mind. In reply to the assertion that athletics retard the development of the intellect, it may be said that the same fluid which carries off waste and supplies new material to the body, also performs the same service for the brain. If, therefore, the blood from any cause is diseased or impoverished, the brain must suffer as well as the body.

It is as impossible to maintain the body in perfect health and strength and to develop it systematically, without systematic exercise, as it is to reach the highest stages of mental cultivation without careful and well-directed study. This is so well understood and recognized in our colleges that none are now considered complete without a well-equipped gymnasium. A number of colleges make physical development a part of their curriculum to the extent of requiring the students to take regular exercise under competent teachers. This is a wise regulation which, though it may be irksome at first to some and even unnecessary for others, is the only way to reach a large number of men who would never otherwise take sufficient exercise. In colleges which compel their students to exercise there is a continuous and marked improvement in the health of all the students from the time of entering until their graduation. From a moral point of view, gymnastics and athletics play a most important part in college government and discipline. They are the natural outlets and safety valves for the escape of the surplus vitality and superabundance of animal spirits with which all strong, healthy young men are endowed, and which, if not expended in athletic exercises would probably prove a curse, by being expended in ways harmful to themselves and detrimental to the college. Dissipation has decreased, a higher moral tone has come to prevail, and the manly character of students has improved during the last few years, owing mainly if not entirely to the increased interest taken in gymnastic and athletic exercises. The fact that the educational standard of colleges is higher now than it ever was before proves that bodily exercise does not detract from the mental powers, but rather acts as a stimulus to them. I know of no better safeguard from temptation for a young man than to get him actively interested in athletic sports and to be proud of his physical strength. He knows well that the best results are incompatible with a vicious mode of life.

The most ordinary observer must have noticed that the muscles increase in size and strength by use, and yet how few have given a thought to the physiological cause. Exercise briefly defined is the movement of the bones, put in action by the voluntary contraction of the muscles, the play of muscle and bone guided by the brain through the nervous system. The muscles move the bones by contraction only. If one muscle or group of muscles acts to bend a member, there must necessarily be an antagonistic set to extend the same. Besides the voluntary muscles, i. e., those which are put in motion by the action of the will, we have another set called the involuntary muscles, over which by a wise provision of nature we have no direct control. These perform their functions from birth to death entirely uninfluenced by the will. Notwithstanding the fact that they are not controlled by the will, we have the power to improve, stimulate and increase their capacity. The exercise of the voluntary muscles causes a corresponding increase of activity in the involuntary.

Health can only be maintained, growth fostered and strength increased through the medium of exercise. The question that naturally arises from this assertion is, How does exercise bring about this result? Every motion of the muscular system, every thought that passes through the brain, causes a waste of tissue proportionate to the energy of the effort put forth. This motion causes a corresponding and simultaneous increase in the action of the heart and the contractile power of the arteries; and these in turn stimulate the flow of blood to the part which is being exercised, where a new supply of tissue is deposited exceeding in amount that which has been consumed. The blood then takes up and carries away, aided by the pressure of the muscles on the veins, the waste material of the muscle or the brain, and delivers it to those organs whose function is to rid the system of it. If this motion is continued from day to day it follows that the part or parts exercised will increase in size as well as strength. The relative strength, therefore, is in proportion to the size and vitality of the tissue, until the limit which is determined from birth is reached. The blood from the organs exercised on its return through the veins laden with the waste tissue, passes into another compartment of the heart and thence to the lungs, whose function it is to cast out by expiration the impurities in the form of vapor, and re-vitalize the blood with oxygen by inspiration. The blood then returns to the heart in a purified state, again to go through its ceaseless round. Exercise quickens the action of the heart and improves the circulation; it accelerates the breathing and at each inspiration a larger amount of air is inhaled in proportion to the energy expended. The secretory and excretory organs are stimulated to a more vigorous and perfect performance of all their functions. Perspiration is more profuse. The stomach requires more food, which it assimilates more readily, to supply the increased demand. It will readily be seen from this that the perfect and harmonious working of all our organs depends mainly on the exercise of the voluntary muscles.

Health should be the primary motive of all exercise. Muscular strength though the first palpable result, should be a secondary consideration. Abnormal muscular strength may exist for a time with weak vital power. So may perfect health exist without great strength. Perfect health may be defined as the perfect working of all our organs, each performing perfectly the proper function assigned to it by nature and almost without our knowledge.

Gymnastic exercise, if faithfully and intelligently carried out, will not only increase the strength of the muscles and the general health of body and mind, but it will also increase our powers of endurance and add tone and vigor to the nervous system, thereby increasing the length, and enjoyment of our lives. This is true with reference to women as well as men. Nervous diseases are a standard class of ailments among our people, especially among women, whose exotic mode of life renders them peculiarly liable to diseases of this class. For this reason women and girls require exercise as much as men and boys, if not more than they. Through the nature of their business, pursuits and sports, men get at least some exercise; while the women (except those who are obliged to work for a living) rarely take any exercise worthy of the name. And yet they have the same muscles, the same vital organs, the same nervous system; and they are subject to the same hygienic laws for the maintenance of health as men. The health of future generations depends on the health and mode of life of the present population. It is a law of nature which should never be forgotten that "like begets like." Children inherit the infirmities as well as the perfections of their parents.

Healthy children if left to themslves without the restraints of modern civilization will take sufficient exercise. Motion is natural to them. Like the young animals of every species, they will play until tired and rest till they recover. They rarely exhaust themselves. As soon, however, as the cultivation of the mind begins the youth must not be left to himself. It is the duty of parents and teachers to see that the child does not neglect his body for the mind. The brains of children, like their bodies, are in an immature state. If both are gently stimulated by exercise suited to their age and condition, the development of the child will be symmetrical. If, from any cause, one is exercised to the entire or partial neglect of the other, the one so exercised will be developed at the expense of the other. What a tumult of public indignation would be raised, and justly, if children were required to do manual labor beyond their strength for four or five hours each day? Yet this would be no worse than what we too often require them to do with their brains. Is it any wonder that our children are growing up with precocious minds and puny bodies? The wonder rather is that so many of them live to manhood and womanhood under such treatment. Children under twelve years of age after every hour of study should have at least ten minutes recreation. Once every day they should be required to take light gymnastic exercise for half an hour, led by the teacher, who would find equal benefit from it. Muscular exercise is the best and quickest mode of giving the brain its needed rest.

Exercise to be valuable should be suited to the wants of the individual. It should be energetc enough to quicken the circulation and increase the respiratory powers. It should be general in its nature. It should be local only when a local result is required. It should be taken regularly and systematically, increasing only as the powers increase It should never be too violent or carried to the verge of exhaustion Spasmodic exercise is of little value. It may even be productive of injury. Health is what is wanted more than great bodily strength.

Insomnia with its many attendant evils, indigestion, gout, depression of spirits (commonly called the blues), obesity and numerous other glandular and nervous diseases, are the effects of a sluggish circulation, caused by lack of muscular exercise and injudicious eating and drinking. Their prevention and cure, to both of which the cause points, rest with ourselves.

Muscular exercise is a necessity for all who follow sedentary occupations. The excuse which is often advanced, "We have not the time," is absurd. The busiest among us can surely devote half an hour each day to a purpose upon which so much depends. In going to and from and in attending to business, if the locomotive powers of the legs were used instead of the street-cars and carriages, little if any time would be lost, while the beneficial result would be considerable.

Walking is valuable in proportion to the speed. Sauntering, like standing, tires without stimulating. Running is one of the most valuable of all exercises. Filling the lungs slowly to their utmost capacity with air by inspiration and as slowly expelling it again by expiration will if persisted in daily from six to twelve times increase the power and capacity of the lungs, the internal and external diameter of the chest, and strengthen the involuntary muscles on which so much depends. An ordinary cane, such as is used in walking, makes a most efficient piece of gymnastic apparatus if used as directed in the following series of exercises:

1. Head erect, chest forward, grasp firmly with both hands fifteen to eighteen inches apart, palms toward the body, arms

down at full length. Raise over the head without bending the elbows.

2. Same position as above, raise to upper part of chest by bending the elbows outward.

3. From upper part of chest extend the arms horizontally forward.

4. Position as in No. 3, extend the arms perpendicularly, bring to position behind the head resting on the shoulders.

5. Grasp at extreme ends, arms hanging at full length in front without bending the elbows, bring to same position behind the back.

6. Combine Nos. 2, 3 and 4. Finish each motion by returning to original position.

These motions exercise the muscles of the arms and chest, neck, shoulders and upper back.

Second Series. 1. Arms extended above the head, body and head bent backward, bend forward and touch the floor or as near as possible without bending the knees and return.

2. Same position, move sidewise from right to left and left to right in a circle by bending sidewise at the waist only.

3. Right arm extended down and behind the back, the left hand close to and in front of right shoulder, swing over the head to same position on opposite side by rotating muscles of the waist, and return.

4. Right arm extended above the head, left hand close to and in front of right shoulder, swing down forward as low as possible without bending the knees; come up to starting position on left side.

5. Both arms extended above the head, twist right hand back left hand forward, and reverse; keep the arms perpendicular.

6. Arms extended horizontally forward, swing in a horizontal from right to left and left to right. In doing the above motions don't move the feet.

These motions exercise the abdominal muscles, the small of the back, and in fact, all the muscles of the loins.

Third Series. 1. Rest the end of the cane on the floor, body erect, place both hands on the top to assist in balancing raise the heels as high as possible from the ground, drop to natural position.

2. Position as in No. 1, 3d series; resting on the toes, squat down until the back muscles of the thighs rest on the calves, raise to full height, keeping heels clear of the floor.

3. Grasp the cane, hands eighteen inches apart, palms toward the body, touch the floor with the hands, rise to full height and extend the arms fully above the head. (No. 1 developes the calf, No. 2 both extensor muscles of thigh and calf, and by No. 3 the whole body is exercised)

4. Discard the cane, stand on one leg, raise the other to a horizontal position in front without bending the knee.

5. Horizontal position sidewise.

6. Raise the leg backward bending the knee slightly. No. 4 exercises the lower abdominal and the extensor muscles of the thigh; No. 5 the abductors of leg; No. 6 the hips and back muscles of the thigh.

Ten motions of each will be sufficient to begin with, gradually increasing to twenty-five. These exercises are valuable in proportion to the rapidity with which they are performed. If no other time is available, divide them up by doing half in the morning before dressing; the other half fifteen or twenty minutes before going to bed. The breathing exercise can be taken with advantage almost any time. It makes little difference, with certain limitations, at what time exercise is taken; convenience must be consulted in that matter; the hours between 3 and 5 p. m. are considered the best. Avoid any severe strain, either mental or physical, before breakfast, or within an hour and a half after eating a hearty meal. Exercise retards digestion in its first stages, by using for mechanical purposes the blood which the digestive organs require in the discharge of their functions. Rest at least half an hour after exercising. The blood should be in its normal state of circulation while eating. The appetite and digestion will both suffer if these rules are neglected.

Every family that can possibly afford it should set apart a light, well-ventilated room for the purpose of exercise, and furnish it with a few simple and inexpensive gymnastic appliances. It need not be a large room; one which is ten or twelve feet square will do for any ordinary family. Parents should see to it that their children make use of it properly, and should set them the example. Apparatus for such a room should consist of two pairs of wooden and three pairs of iron dumbbells, weighing respectively four, six and ten pounds per pair; two pairs of wooden clubs, four and six pounds per pair; two or three wands; two pairs of wooden rings; one horizontal bar, fastened between door jambs; one or two sets of combination pulley weights (these are the most useful of all gymnastic appliances); one rowing pulley weight with sliding seat; one pulley weight with handles hanging above the head; and a small mattress. The cost of all will be from $30 to $50, according to quality and finish. As good results can be obtained from these as from the most costly and elaborately fitted up gymnasium in the country

It would take too much time and space to describe the numerous exercises which can be obtained from these appliances in a home gymnasium. A few general rules will be sufficient to guide any intelligent person.

All motions that extend the arm develop the muscles of the back of the upper arm; those that bend the arm at the elbow develop the front muscles of the arm. Bending the hand backward developes the back of the fore arm; bending it forward the front fore arm. Extending the arms forward developes the muscles of the chest; pulling them back the muscles of the back Pulling a weight from above down, or lifting the body up, or pushing from above down, whether the body or a weight, developes the muscles of the chest and arms. Lifting from below up toward the shoulders or pushing from the shoulders up, developes the muscles of the shoulders, neck and arms. Bending the body forward brings the muscles of the abdomen into action. Bending backward or lifting from a bent position forward to a perpendicular strengthens the small of the back, hips and back of the thigh. Bending sidewise developes both back and abdominal muscles. Extending the leg developes the front muscles of the thighs; extending the foot the muscles of the calf; bending the leg back at the knee, the back muscles of the thigh; lifting the leg up and back from the hip joint, the muscles of the small of the back and hips; flexing the foot forward the front muscles of the lower leg. Motion in which power is applied to overcome resistance is much better than motion without resistance as a developing medium.

If it be inconvenient or impossible to set aside one room as a gymnasium, then part of any room will do in which a space of seven feet square can be spared. The apparatus can be reduced to one pair of chest weights and a pair of dumbbells. These, with the almost unlimited calisthenic movements which can be practised in that space, will really bring about results that will seem wonderful to those who are not aware how much gymnastic exercise will develop the muscles.

Where it is possible the ordinary clothing should be replaced for the purposes of exercise by a light, loose-fitting suit of flannels. After exercise it is advisable to sponge the body with water at a temperature of 75 to 85 degrees, and dry it with a soft Turkish towel in a warm room. If it is inconvenient to bathe, a dry rubbing with a towel will be found very beneficial. This helps to remove the loose scarf skin and stimulates the capillary circulation.

Many private schools have regular gymnasiums, or at any rate classes in calisthenics, with teachers to give instructions in that branch of education. Those that have not will sooner or later adopt them, as their patrons see the necessity for and advantage of gymnastic exercise. Self-interest is a wonderful incentive, and they may therefore be safely left to themselves.

But the public schools will never be complete until each and every one has a gymnasium; until every gymnasium has a competent instructor, and until every child is required to take daily exercise suited to his or her age and physical condition.

Science is continually searching for remedies to cure the ailments of the human body, and it seems to expend almost half of its energy on the care of troubles which are exclusively due to a lack of exercise. It is continually improving the ventilation and sanitary appliances of our houses. It is strangely indifferent, however, to the most important as well as the most inexpensive factor in the preservation of health, namely, physical exercise for both men and women.

One of the most gratifying signs of the present time is the great increase of interest in amateur athletics. For the naturally strong and active young man, nothing more is required to bring him to a high state of physical health than the training which is necessary to insure him even a chance of success in competitive games. But it is not for the exceptionally strong that amateur athletics are principally beneficial. The greatest general benefit is that which they bestow on the average man who has neither the time, the taste, nor perhaps the especial conformation, which are requisite to insure success in competitive sports, yet who recognizes the need of exercise for the maint.nance of good health. It is of the average men that our athletic clubs are principally composed; and there can be no doubt that the multiplication of these clubs, or at any rate the formation of at least one of them in every city in the United States is of importance to the welfare of this country.

To illustrate the facilities which a good amateur athletic organization can place within the reach of its members, I may cite the example of The New-York Athletic Club. Of the 2,000 members of this organization, the great majority are men of sedentary occupations, and the Club places before them all the contrivances and opportunities that human ingenuity can suggest for the development of their physiques by healthful, varied, and interesting exercises and sports. Upon the magnificent club-house at Fifty-fifth-st. and Sixth-ave., money has been lavished without stint, and the interior is a marvel of convenience, solidity, good taste, and completeness. A brief description of this house will afford the reader a good general idea of what an athletic club can do for its members.

The basem:nt contains six bowling alleys, an electric plant for lighting the building, and the steam boilers which supply power and heat. In the first story are to be found the office, Russian and Turkish baths, barber's shop and a swimming bath. The latter is 66 feet long, 20 feet wide, 7 feet deep at one end, and shallowing to 5 feet at the other, and is kept at a uniform temperature of 70 degrees. The pool and the room that contains it are lined throughout with white encaustic tiles; while the floor is marble inlaid with tiles. In this natatorium a plunge can be taken at any time of year, and competent instructors are constantly in attendance to teach the members how to swim.

The second story contains a cafe, reading room, parlor, two billiard rooms, and restaurant.

The third story contains the dressing floor; the main room of which is fitted up with over a thousand lockers, in which the members hang their ordinary clothes and dress in flannel costumes before going to the gymnasium. On this floor also are a sparring room, lavatory, douche-room and reception room.

The gymnasium occupies the entire fourth floor. It is 90 feet long, 70 feet wide and 22 feet high, and is lighted by a double row of windows on all four sides, and by a skylight 40 feet long and 20 feet broad. It is without doubt the most perfectly lighted and ventilated gymnasium in the world, as well as the most thoroughly equipped. Everything that money could procure or science devise in the form of gymnastic apparatus can be found here. The weakest man or youth can here find exercise exactly suited to his weakness, and the strongest man can find practice adapted to his strength. In the centre of the hall every gymnastic appliance which the most expert and enthusiastic gymnast could desire has a place. Horizontal, parallel, vaulting and upright bars; single, double, flying and balancing trapezes; platform and batute spring boards; l'eschelle, inclined, horizontal and perpendicular ladders; flying rings, travelling rings pendant ropes, poles and ladders; dumbbells of every weight; Indian clubs of every size; and 580 square feet of mattrasses upon the floor. For oarsmen an eight-oared rowing machine and a single scull machine are provided. Twelve feet above the floor is the suspended running track, the only one of the kind in the country. The floor of the track is covered with felt, with an over-covering of corrugated rubber, which makes it springy and reduces the danger of slipping to a minimum Twenty-one circuits make a mile. At almost any hour of the afternoon or evening some one will be found using this track, and the runner is as likely to be the man of sixty as the youth of sixteen.

Every inch of the walls on the main floor of the gymnasium is occupied with developing apparatus; and almost each and every muscle in the body has a separate machine designed for its peculiar wants. Here the novice can exercise with perfect safety, no matter what his age or physical condition. If he has any local weakness he has only to ask the Director for suggestions and he is instructed what appliances to use and how to use them. Every developing weight glides perpendicularly on steel rods in felt bushings. The rope which lifts it runs over a pulley and every pulley works on a swivel, the steel pinions set into wood bearings. Every weight can be graduated to suit any degree of strength or weakness, and every one works smoothly and noiselessly. Are your fingers weak? Here is a machine to strengthen them. As a weak grip usually denotes lack of strength in the wrist and forearm, next to it is the necessary apparatus to continue the work thus first began. Perhaps your grip is all right, but you find the twisting power of your arm is not what it should be; try the next machine, you will find it just what you want.

Your attention will probably be attracted by a football with the upper side fastened in a solid wooden frame about five feet from the floor. What is that for? Bend your knees and place your head under it; now straighten the legs and the whole framework (which is loaded) slides up. The ball forms an air cushion which perfectly adjusts itself to the head, and you find that all the muscles of the neck are set to withstand the strain. Bend and straighten the knees a few times and you will feel the front muscles of the thigh begin to tire, keep the legs straight and rise on the toes, and the work is transferred to the calf.

Perhaps the back muscles of the neck are weak and allow the head to drop forward. We cross the hall, and find a number of stalls divided by an iron framework. This pulley weight with the small semicircular net attached to the end of the rope is what we want. Place the net on the back of the head and the hands on the upright bars; move the head backward and forward and the muscles at the back of the neck are alternately contracted and extended. Place the net on the forehead and the muscles in the front of the neck have to do the work. Change it to the side, and you bring the side muscles of the neck into action.

In the next stall lying on the floor is what appears to be the remains of a leather slipper, nothing being left of it but the sole and counter. There is a rope attached to the toe. Face the wall, place the foot in the slipper, lift the foot up and back and every muscle in the back of leg and hip must be contracted. In another stall is apparently a leather bath slipper with a rope fastened to the heel; place the toe in this and use the leg as in kicking and all the muscles in the front of the leg and the lower abdomen will come into play.

Perhaps you are fond of horseback riding, but you find the gripping power of your knees not what you would like. Put this loop over your foot and move it across to the opposite side in front; do this a few times every day and you will soon acquire the necessary strength to press the horse with your legs like a vise.

If you are a canoeist, here is something that will interest you. This pole with a weight attached is called the paddle machine. Grasp it as you would a paddle and use in the same way, and you have precisely the same exercise which you get in a canoe. Are you a bicyclist, there is a stationary bicycle for your use.

It is surprising how few can climb a rope hand over hand, and how futile and discouraging are the first attempts of the novice to accomplish this feat. In the old-fashioned gymnasium, the only way to cultivate the necessary strength to perform this feat was by continued and persistent attempts in the exercise itself, at the risk of straining the muscles. Here we reverse the order of work by pulling a rope down which runs over a pulley and has attached to its end a weight, graduating the weight to the strength until the muscles of the arms, chest and back acquire the requisite strength. The same method is used with the parallel bars, a weight attached to sliding bars being first used. The exercises with the rings and trapeze are all preceded and duplicated by exercises with weights. Thirty sets of chest weights, some high, some low, and some adjustable, occupy both sides of the gymnasium.

On the end facing Sixth-ave. are the abdominal seat and table, the names denoting their use. The wrestling machine is a rod four feet long, pivoted in the centre and fastened to a weight by a rope running over a pulley. Its province is to exercise the muscles of the sides and loins by a peculiar wrenching motion.

For developing the extensors of the legs we have the inclined plane, in which the body rests on the plane and is pushed up and down the incline by the extension and contraction of the legs. The treadle is for the same purpose. In this the operator sits in a chair and raises and lowers a pair of weights, either alternately or together, by the same motion. The quarter circle is a peculiar-looking machine designed to keep the shoulders and head back while the chest, back, arms and abdominal muscles are being exercised. In an alcove off the gallery are placed the machines for strengthening the ankle, the rotating muscles of the leg, the muscles of the foot and the front of the lower leg.

There are many other appliances both for special and general development. Enough has been said to show how complete the gymnasium is, and how perfectly it meets the wants of the average man as well as the expert gymnast or athlete.

The Director's office is on the gallery floor. Here are dynamometers for testing the muscular strength; spirometers for measuring the capacity of the lungs; scales for weighing; standards for measuring height; calipers for diameters; tape lines for circumference, and parallel rules for widths. Every member has the right to have a thorough physical examination made by the Director, which is recorded for future reference, and from the data thus obtained the proper exercise to suit individual wants is prescribed. The Director personally superintends all exercise in the gymnasium and gives practical instruction in the use of all apparatus, He is assisted by the coach, a skilled oarsman who transfers his operations in winter from the Harlem River to the gymnasium.

Upon the river itself there are three boathouses completely equipped; and near by a field for competitive contests. Such is a brief summary of what the New-York Athletic Club is doing to promote physical culture and spread a knowledge of the necessity for and advantages of gymnastic exercise.

FIELD EXERCISES.

BY M. G. RICE, NEW-YORK.

So far as health alone is concerned, there is no doubt that walking must be classed among the very good athletic exercises, for man or woman. The exertion is moderate; it is suitable for every age, sex and condition in life; it can always be had without expense; and it invariably improves the health and expels from the system ennui, nervousness and indigestion. The growing beauty of the women in New-York and other large cities, and the famous clearness of complexion and excellence of form of the farm girls of the United States, are undoubtedly due in part to the amount of walking they take. The vigorous man of business very frequently obtains the fresh color of his face, his exhilaration of spirits and good appetite and digestion from the same source.

In walking both the athlete and the men and women who walk for health and enjoyment only, need to exercise moderation, keeping well within their strength. They should always be systematic in the exercise. To walk either not at all or a short distance only, during a week, and then to tramp ten miles on one day, will entail fatigue and stiffness of the muscles. Bear in mind, too, that a man whose muscles are soft should not attempt great speed over long distances in walking. One is liable to strain some special muscle and bring on lameness for several days by so doing.

It is asserted by many athletes that success in rapid long distance walking is attainable only through the adoption of a certain style of walk. Each trainer, however, has a style of his own, and it is extremely doubtful if any one of them has discovered the motion that will prove especially helpful to the walker. The most sensible plan and one that is most generally pursued, is to walk in the most natural manner, shoulders back, head up and body moving easily, the ball of the foot pressing the ground strongly as the body is propelled forward. One form of walking which should studiously be avoided is what may be appropriately termed the stiff-legged style, in which the pedestrian appears to be utterly oblivious of the fact that his knee-joints are capable of flexion. Many beginners contract the habit of carrying their legs along stiffly with the motions of their hands, giving to the hip-joint and contiguous muscles an undue proportion of the work and forcing their heels so heavily against the ground as to jar their whole frame at every stride. Rapid walking for long distances is a vigorous exercise, and that man is the best able to endure it who distributes the work as equitably as possible to all the muscles and joints.

At one time contests in walking were in great favor among the athletic clubs. The exercise was encouraged as legitimate and useful. Competitive walking has, however, begun to decline. Many of the clubs have eliminated walking from their annual list of contests entirely. In the competition for the general athletic championship of America on September 18, 1886, the contestants were not called upon to walk.

One of the chief arguments urged against rapid competitive walking, or walking against time, is that it is ungraceful. Assuming that one of the aims of amateur athletics is to acquire suppleness and grace of movement, as well as robust health, this argument is well founded. Certainly there is no sight more displeasing than that of a rapid short distance walker, or more distressing than that of an exhausted long distance walker in the last part of a match. There is no objection, however, to walking long distances in a single day in a leisurely manner. Journeymen mechanics formerly walked from town to town, making without difficulty from twenty to sixty miles per day. Horace Greeley frequently walked from forty to fifty miles between the rising and the setting of the sun. Informal walking clubs are now popular in New-York, the members of which think nothing of twenty or thirty miles. But this style of walking is leisurely and very different from the forced marching of a competitive walking match, in which the object of every competitor is to travel the longest distance in a given time or a given distance in the shortest time. The strain of the walking match is severe, and it is doubtful if any benefits are derived from such violent exercise. There are walkers who make rapid progress seemingly without great exertion; but they are few. The six-day walking matches and "go-as-you-please" matches, so prevalent from 1877 to 1882, did much to inculcate among amateurs a desire to excel in walking. During those years the lists of entries in amateur walking contests were very large. When the stamp of popular disapproval was put upon the professional six-day races, amateur walking was discouraged.

The recognized amateur championship distances for walking are one, three, and seven miles. Records, however, have been made by amateurs at almost every conceivable distance from 50 yards to 250 miles. The difference between fair and unfair walking is so slight that it is often very difficult to distinguish between them. Many records have undoubtedly been made by men who have practically run a great part of the distance covered. This is another of the objections raised against walking matches. In fair heel-and-toe walking the pedestrian must have the heel of the forward foot upon the track at the moment that the toe of the rear foot leaves the track. But in fast walking this rule is not always observed.

The rules of the National Association of Amateur Athletes provide that the judge of walking, who shall be one of the officers of an athletic meeting, "shall have entire control of competitors during the race, and his decision as to unfair walking shall be final and without appeal. The judge shall caution for any unfair walking, and the third caution shall disqualify the offender. On the last eighth of the last mile an unfair walker shall be disqualified without previous caution." The same rules as to starting and fouling apply as in running races.

The American amateur champion walkers from 1876 to 1886, with their club and time, are as given below:

ONE MILE.

		m.	s.
1876	D. M. Stearn, N. Y. A. C.	7	31
1877	E. C. Holske, H. A. C.	7	$11\frac{4}{5}$
1879	W. H. Purdy, Gr. A. C.	6	$48\frac{3}{4}$
1880	E. E. Merrill, S. A. A. C.	7	04
1881	E. E. Merrill, U. A. C.	7	$02\frac{3}{4}$
1882	W. H. Parry, Williamsburg A. C.	7	$10\frac{3}{5}$
1883	F. P. Murray, Williamsburg A. C.	6	46
1884	F. P. Murray, Williamsburg A. C.	6	46
1885	G. D. Baird, Olympic A. C.	6	42
1886	E. D. Lange, M. A. C.	6	49

THREE MILES.

		m.	s.
1876	D. M. Stearn, N. Y. A. C.	25	12
1877	E. C. Holske, H. A. C.	23	$09\frac{2}{5}$
1878	T. H. Armstrong, H. A. C.	23	$12\frac{1}{2}$
1879	W. H. Purdy, Gr. A. C.	22	$58\frac{3}{4}$
1880	E. E. Merrill, S. A. A. C.	22	$28\frac{4}{5}$
1881	E. E. Merrill, U. A. C.	23	$55\frac{4}{5}$
1882	F. G. Trunkett, Williamsburg A. C.	24	19
1883	G. D. Baird, A. A. C.	22	$08\frac{2}{5}$
1884	F. P. Murray, Williamsburg A. C.	23	$00\frac{2}{5}$
1885	E. D. Lange, M. A. C.	25	$00\frac{3}{5}$
1886	F. P. Murray, Brooklyn A. A.	23	$15\frac{2}{5}$

SEVEN MILES.

		m.	s.
1876	Charles Connor, S. A. A. C.	58	$32\frac{1}{2}$
1877	T. H. Armstrong, H. A. C.	55	$59\frac{2}{5}$
1879	E. E. Merrill, U. A. C.	56	04
1880	James B. Clark, E. C. A. C.	54	$47\frac{3}{5}$
1881	William H. Purdy, M. A. C.	58	43
1882	F. P. Murray, Williamsburg A. C.	57	$18\frac{1}{2}$
1883	W. H. Meek, W. S. A. C.	56	$48\frac{2}{5}$
1884	E. F. McDonald, W. S. A C.	56	28

The best walking performances on record, so far as mere speed is concerned, are:

One-quarter mile.—F. P. Murray, amateur, 1 min. 26 1-4 sec., in New-York, October 27, 1883.

One-half mile.—3 min. 22-5 sec., by an amateur at New-York.

Three-quarter mile.—T. H. Armstrong, jr., amateur, 4 min. 40 1-2 sec., at New-York, October 26, 1877.

One mile.—The remarkable record of 6 min. 23 sec., made at this distance by William Perkins (professional), in London, England, on June 1, 1874, has never been equalled. Many pedestrians have claimed better time, but investigation has usually proved that the track measurement was irregular or the timing unreliable. W. A. Hoagland, of Auburn, N. Y., a professional, was credited with having covered a mile in 6 min. 21 sec. on a tan-bark track laid in a rink in Auburn in the winter of 1885, but a measurement of the track developed the fact that the distance was something over 150 yards short. The best amateur time at this distance is 6 min. 29 3-5 sec., made by F. P. Murray in New-York, October 27, 1883.

Two miles.—J. W. Raby, a professional, London, England, 13 min. 14 sec., August 20, 1883. F. P. Murray, amateur, Williamsburg, N. Y., 13 min. 48 3-5 sec., May 30, 1884.

Three miles.—J. W. Raby, London, 20 min. 21 1-2 sec., August 20, 1883. F. P. Murray, New-York, 21 min. 9 1-5 sec., November 6, 1883.

Four miles.—J. W. Raby, London, 27 min. 38 sec., August 20, 1883. John Meagher, professional, New-York, November 29, 1882.

Five miles.—J. W. Raby, London, 35 min. 10 sec., August 20, 1883. John Meagher, New-York, 36 min. 8 sec., November 29, 1882. W. H. Purdy, amateur, New-York, 38 min. 5-8 sec., May 22, 1884.

Six miles.—J. W. Raby, London, 43 min. 1 sec., August 20, 1883. John Meagher, New-York, 43 min. 41 sec., November 29, 1882. E. E. Merrill, amateur, Boston, Mass., 45 min. 28 sec., October 5, 1880.

Seven miles.—J. W. Raby, London, 51 min. 4 sec., August 20, 1883. John Meagher, New-York, 51 min. 11 1-2 sec., November 29, 1882. E. E. Merrill, amateur, Boston, Mass., 54 min. 7 sec., October 5, 1880.

Eight miles.—John Meagher, New-York, 58 min. 36 sec., November 29, 1882. J. Hibberd, London, 58 min. 44 sec., April 16, 1883. J. B. Clark, New-York, 1 h. 2 min. 8 1-2 sec., September 8, 1880.

Nine miles.—J. W. Raby, London, 1 h. 7 min. 14 sec., December 3, 1883. D. A. Driscoll, professional, New-York, 1 h. 9 min. 31 1-2 sec., February 1, 1881. E. E. Merrill, Boston, 1 h. 10 min. 8 sec., October 5, 1880.

Ten miles.—J. W. Raby, London, 1 h. 14 min. 45 sec., December 3, 1883. E. E. Merrill, amateur, Boston, 1 h. 17 min. 40 3-4 sec., October 5, 1880.

Fifteen miles.—J. W. Raby, London, 1 h. 55 min. 56 sec., December 3, 1883. D. A. Driscoll, New-York, 2 h. 1 min. 20 sec., February 1, 1881. C. W. V. Clarke, amateur, London, 2 h. 10 min. 13 sec., December 26, 1885. W. O'Keefe, amateur, Williamsburg, N. Y., 2 h. 14 min. 44 sec., December 31, 1880.

Twenty miles.—W. Perkins, professional, London, 2 h. 39 min. 57 sec., July 16, 1877. D. A. Driscoll, professional, Lynn, Mass., 2 h. 50 min. 5 sec., April 6, 1882. J. B. Clark, amateur, New-York City, 3 h. 8 min. 10 sec., December 5, 1879.

Twenty-five miles.—W. Franks, professional, London, 3 h. 35 min. 14 sec., August 28, 1882. D. A. Driscoll, professional, Lynn, Mass., 3 h. 37 min. 7 sec., April 6, 1882. W. E. N.

Coston, amateur, London, 3 h. 53 min. 35 sec., December 27, 1880. J. B. Clark, amateur, New-York City, 4 h. 3 min. 35 sec., December 5, 1879.

Thirty miles.—W. Howes, professional, London, 4 h. 34 min. 54 sec., March 30, 1878. W. E. N. Coston, amateur, London, 4 h. 46 min. 52 sec., December 27, 1880. F. S. Mott, amateur, New-York, 5 h. 22 min. 19 sec., October 7, 1878.

Forty miles.—W. Howes, London, 6 h. 16 min. 50 sec., March 30, 1878. John Meagher, Boston, 6 h. 26 min. 8 sec., April 21, 1882. A. W. Sinclair, amateur, London, 6 h. 38 min. 3 sec., November 14, 1879. T. H. Armstrong, Jr., amateur, New-York, 7 h. 39 min, 33 sec., October 7, 1878.

Fifty miles.—W. Howes, London, 7 h. 57 min. 44 sec., March 30, 1878. John Meagher, Boston, 8 h. 10 min. 54 sec., April 21, 1882. A. W. Sinclair, amateur, London, 8 h. 25 min. 25 1-2 sec., November 14, 1879. G. Bruce Gillie, amateur, New-York, 9 h. 29 min. 22 sec., May 11, 1878.

One Hundred miles.—W. Howes, London, 18 h. 8 min. 15 sec. May 15, 1880. Daniel O'Leary, professional, Chicago, Ill., 18 h. 53 min. 40 sec., October 17, 1875. A. W. Sinclair, amateur, London, 19 h. 41 min. 50 sec., August 27, 1881. G. Bruce Gillie, amateur, New-York, 21 h. 42 sec., May 11, 1878.

The greatest distance ever walked in twenty-four hours was 127 miles 1,210 yards, which was accomplished by William Howes in London, England, on February 23, 1878.

C. A. Harriman walked 121 miles 385 yards without rest at Truckee, California, April 6, 1883. This is said to be the greatest feat of the kind on record.

The best six-day record for heel-and-toe walking is 531 miles, which was covered by George Littlewood at Sheffield, England, in 138 h. 49 min. 8 sec., March 7 to 11, 1882.

C. A. Harriman made the best American six-day record at Chicago, May 9 to 14, 1881, when he walked 530 miles in 140 h. 47 min.

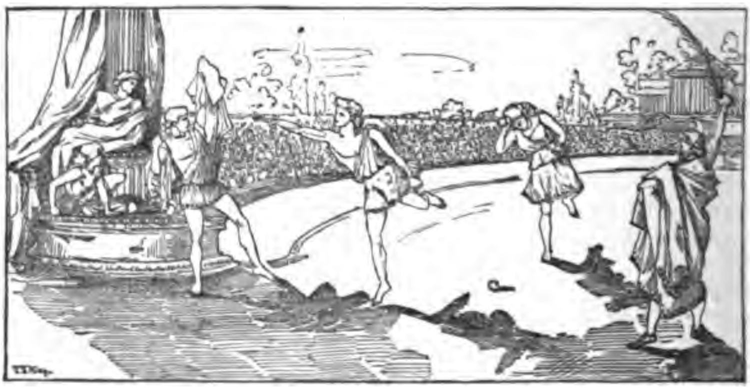
RUNNING.

Running ranks as an excellent field sport. In the ordinary routine of daily duties, the citizen seldom has occasion to move at a greater velocity than an ordinary walk. Running is therefore properly an athletic exercise. No field sport of this class is half so popular as short distance running, or sprinting, as it is called. To the spectators it is certainly the most exciting of the contests in the programme of an athletic field meeting.

To arrive at any degree of expertness in any branch of athletics one must work patiently and unceasingly; and this remark is especially applicable to any one who is ambitious to rank among the swift sprinters of the United States. A veteran director of one of New-York's best known clubs asserts that "the real athlete is born, not made." This may be true in a certain sense; yet no one of the fast runners of the country has been able to place his name on the "best" or championship lists without arduous labor.

A systematic course of exercise with care and regularity in the diet is maintained by all really successful runners during the season for out-door sports. For a week or so before starting in a race they go through a course of training which may be summed up as comprising more exercise and a more careful diet. In training, there must be moderation. It is not uncommon for runners, anxious to bring themselves to the "pink of condition," to overtrain, with the result that they are either totally unfitted to run a race or at the end of one are thoroughly exhausted, and sometimes nauseated. Overexertion must be guarded against. The laws of common sense should rule.

A man desirous of figuring as a sprinter should begin at the shortest distances, and should run at his best speed only as far as he can do so without feeling exhausted. Begin with a thirty yards run the first day and repeat that exercise, with intervals for rest a half-dozen or perhaps a dozen times. If a man can cover the thirty yards in less than 3 3-5 seconds, his chances of success as a sprinter are good. On



the second day run forty yards a few times at a 4 4-5 seconds gait; and increase the distance day by day until you can cover 100 yards in 12 seconds. Twelve seconds is about the speed of the average runner at the shortest championship distance; but a competitor must be able to run in fully a second and a half quicker time if he is to start from the scratch line in open contests. The same moderation in exercising should be observed by those training to run medium and long distances.

Much depends on the start in sprint races. No one of the several styles of starting adopted by successful runners recommends itself, however, as being more advantageous than the others. Among six men placed at the scratch waiting for the flash of the pistol that is to send them off on a hundred yards' spin, it is seldom that two of them assume the same position. One in a crouching posture will have his left foot planted flatly at the scratch, his right leg thrown well behind him, his right arm held out before him, and his left parallel with his right leg. Another's arms and legs will be in the reverse position. A third will stand steadily at the mark with both heels together and jump forward at the word. A fourth will spring uneasily up and down; a fifth will stand with his side toward the track and swing around for the start; and a sixth will start a few feet back and by watching the starter calculate so as to cross the scratch on a full run at the moment that the other competitors see the pistol flash. The runner must adopt his own style, dictated by his own conformation.

The costumes worn by runners on the track are light, and are made so as not to interfere with perfect freedom of action. The dress usually consists of a low-necked and short-sleeved balbriggan shirt or jersey; knickerbockers; socks and rubber-soled canvas slippers. Contestants with a proper regard for their health usually have thick coats (or sweaters) handy at the finish line, and are vigorously rubbed with crash towels immediately after a race.

English writers have maintained that the man who can run 100 yards in ten seconds does not live, never has lived, and never will live; and yet, nine amateur sprinters in England and five in America are on record as having accomplished that feat. In each instance the time is vouched for by indisputable authority. During 1886, there were two amateurs who covered 100 yards in ten seconds. At the Stamford Bridge Grounds, London, England, A. Wharton, a West Indian mulatto, attending Darlington College, equalled the best time in two successive heats; and at Beacon Park, Boston, on July 1, Wendell Baker added his name to the list of ten-second men. One time-keeper claimed nine and four-fifths seconds as the time for the latter performance, and it was pretty generally believed by those present that the time was a shade better than ten seconds. Wharton's two-heat record was once equalled by F. W. Stone, a professional, at Pittsburg, on August 18, 1884. On September 17, 1883, F. T. Ritchie ran 100 yards in nine and four-fifths seconds at Aston Lower Grounds, Birmingham, England, but the track sloped considerably, and the performance does not constitute a record. Tradition has it that George Seward, an American professional, ran 100 yards in nine and a quarter seconds, on a turnpike road at Hammersmith, England, September 30, 1864, but considerable doubt is cast upon the performance, and it is not now generally admitted as a record.

On the same day that Wendell Baker reached the best 100-yard time, he also broke the 220-yards and quarter-mile amateur records. At 220 yards his own record of 22 2-5 seconds had stood since May 24, 1884; at the Beacon Park meeting he lowered it to the even figure. The best American record at the quarter-mile, had been 48 3-4 seconds made by L. E. Myers, at Stenton, Penn., October 15, 1881. Baker lowered this a full second.

The fifty-yard record of 5 1-2 seconds made by L. E. Myers, New-York City, December 12, 1884, was lowered by F. N. Bonine at the spring games of the University of Michigan, on May 22, 1886. Bonine's time was 5 2-5 seconds. It has been claimed that J. F. Baker, of the Manhattan Athletic Club, ran fifty yards in 5 1-4 seconds on a board floor at the Armory of the 23d Regiment, Brooklyn, N. Y., on October 27, 1883; but it was not accepted as a record because the time-keeping was thought to be unreliable.

The secret of success at sprint running is to make a good start, It is not infrequent that a novice at sprinting is left at the scratch by his more adept competitors, who were off with the flash of the pistol. To run any distance from fifty to 220 yards in good time, the sprinter must have reached the top of his speed within three yards of the starting line. To do this seems to call for a peculiar knack which many really swift runners never acquire.

The rules of the National Association of Amateur Athletes of America in regard to running races provide:

> All races, except time handicaps, shall be started by report of a pistol—the pistol to be fired so that its flash may be visible to the time-keepers. A snap cap shall be no start. There shall be no recall after the pistol is fired. Time handicaps shall be started by the word "go."
>
> When the starter receives a signal from the judges at the finish that everything is in readiness, he shall direct the competitors to get on their marks. Any competitor starting before the signal shall be put back one yard, for the second offence another yard, and for the third shall be disqualified. He shall be held to have started when any portion of his body touches the ground in front of his mark. Stations count from the inside.
>
> In all races on a straight track each competitor shall keep his own position on the course from start to finish. In all races on other than a straight track, a competitor may change toward the inside whenever he is two strides ahead of the man whose path he crosses.
>
> Any competitor may be disqualified by the referee for jostling, running across or in any way impeding another.
>
> A thread shall be stretched across the track at the finish, four feet above the ground. It shall not be held by the judges, but fastened to the finish posts, on either side, so that it may always be at right angles to the course and parallel to the ground. The finish line is not this thread, but the line on the ground drawn across the track from post to post, and the thread is intended merely to assist the judges in their decision. The men shall be placed in the order in which they cross the finish line.

The American Amateur Champions at the recognized championship running distances since 1876 have been:

ONE HUNDRED YARDS.

		seconds.
1876	Fred C. Saportas, H. A. C	10½
1877	Charles C. McIvor, Montreal, Can	10½
1878	W. C. Wilmer, S. H. A. C	10
1879	B. R. Value, Elizabeth A. C	10¾
1880	L. E. Myers, M. A. C	10⅖
1881	L. E. Myers, M. A. C	10¼
1882	A. Waldron, M. A. C	not taken
1883	A. Waldron, M. A. C	10¼
1884	M. W. Ford, N. Y. A. C	10⅘
1885	M. W. Ford, N. Y. A. C	10⅖
1886	M. W. Ford, N. Y. A. C	10⅖

TWO HUNDRED AND TWENTY YARDS.

		seconds.
1877	Ed. Merritt, N. Y. A. C.	24
1878	W. C. Wilmer, S. H. A. C.	$22\frac{7}{8}$
1879	L. E. Myers, M. A. C.	$23\frac{3}{5}$
1880	L. E. Myers, M. A. C.	$23\frac{3}{5}$
1881	L. E. Myers, M. A. C.	$23\frac{1}{2}$
1882	H. S. Brooks, Jr., Yale U. A. A.	$22\frac{3}{5}$
1883	H. S. Brooks, Jr., Yale.	$22\frac{4}{5}$
1884	L. E. Myers, M. A. C.	$24\frac{1}{5}$
1885	M. W. Ford, N. Y. A. C.	$25\frac{1}{5}$
1886	M. W. Ford, N. Y. A. C.	$23\frac{1}{5}$

QUARTER MILE.

		seconds.
1876	Ed. Merritt, N. Y. A. C.	$54\frac{1}{2}$
1877	Ed. Merritt, N. Y. A. C.	$55\frac{1}{4}$
1878	F. W. Brown, Glenwood A. C.	$54\frac{3}{8}$
1879	L. E. Myers, M. A. C.	$52\frac{2}{5}$
1880	L. E. Myers, M. A. C.	52
1881	L. E. Myers, M. A. C.	$49\frac{2}{5}$
1882	L. E. Myers, M. A. C.	$51\frac{3}{5}$
1883	L. E. Myers, M. A. C.	$52\frac{1}{2}$
1884	L. E. Myers, M. A. C.	$54\frac{1}{5}$
1885	H. M. Raborg, N. Y. A. C.	$54\frac{1}{5}$
1886	J. S. Robertson, Montreal A. A.	$53\frac{2}{5}$

HALF MILE.

		m.	s.
1876	Herold Lambe, Argonaut R. C.	2	10
1877	R. R. Colgate, N. Y. A. C.	2	$05\frac{3}{4}$
1878	Ed. Merritt, N. Y. A. C.	2	$05\frac{1}{4}$
1879	L. E. Myers, M. A. C.	2	$01\frac{2}{5}$
1880	L. E. Myers, M. A. C.	2	$04\frac{3}{5}$
1881	Walter Smith, Williamsburg A. C.	2	04
1882	W. H. Goodwin, Jr., N. Y. A. C.	1	$56\frac{7}{8}$
1883	Thomas J. Murphy, M. A. C.	2	$04\frac{2}{5}$
1884	L. E. Myers, M. A. C.	2	$09\frac{4}{5}$
1885	H. L. Mitchell, Yale College	2	$02\frac{3}{5}$
1886	C. M. Smith, N. Y. A. C.	2	04

ONE MILE.

		m.	s.
1876	Herold Lambe, Argonaut R. C.	4	$51\frac{1}{2}$
1877	Richard Morgan, H. A. C.	4	$49\frac{3}{4}$
1878	T. H. Smith, M. A. C.	4	$51\frac{1}{4}$
1879	H. M. Pellatt, T. L. C.	4	$43\frac{2}{5}$
1880	H. Fredricks, M. A. C.	4	$39\frac{3}{5}$
1881	H. Fredricks, M. A. C.	4	$32\frac{3}{5}$
1882	H. Fredricks, M. A. C.	4	$36\frac{1}{5}$
1883	H. Fredricks, M. A. C.	4	$36\frac{4}{5}$
1884	P. C. Madiera, Phila. F. & S. C.	4	$36\frac{4}{5}$
1885	G. Y. Gilbert, M. A. C.	4	$44\frac{1}{5}$
1886	E. C. Carter, N. Y. A. C.	4	$33\frac{2}{5}$

FIVE MILES.

		m.	s.
1880	J. H. Gifford, I. A. A. C.	27	$51\frac{1}{5}$
1881	W. C. Davies, Williamsburg A. C.	27	$43\frac{4}{5}$
1882	T. F. Delaney, Gramercy A. C.	27	$34\frac{2}{5}$
1883	T. F. Delaney, Williamsburg A. C.	26	$47\frac{2}{5}$
1884	G. Stonebridge, W. S. A. C.	27	45
1885	P. D. Skillman, M. A. C.	27	$13\frac{2}{5}$
1886	E. C. Carter, N. Y. A. C.	28	04

The "best-on-record" running performances in America and England at the most popular distances are:

Fifty yards.—Professional: America, 5 1-4 sec., H. M. Johnson, New-York City, November 22, 1884. Amateur: America, 5 2-5 sec., F. N. Bonine, Ann Arbor, Mich., May 22, 1886.

Seventy-five yards.—Professional: America, 7 2-5 sec., H. M. Johnson, Brooklyn, N. Y., August 13, 1884. Amateur: America, 7 3-4 sec., F. G. Saportas, New-York City, January 5, 1878; A. Ing, New-York City, September 14 and November 28, 1878; L. E. Myers, New-York City, January 31, 1881; J. B. White, New-York City, March 16, 1883.

One hundred yards.—Professional: America, 10 sec., F. W.

Stone, two heats, Pittsburg, Penn., August 18, 1884; H. M. Johnson, Brooklyn, N. Y., September 6, 1884. Amateur: 10 sec., R. L. La Montagne, New-York City, June 29, 1878; W. C. Wilmer, New-York City, October 12, 1878; L. E. Myers, New-York City, September 18, 1880; E. J. Wendell, Cambridge, Mass., May 24, 1881; Wendell Baker, Boston, Mass., July 1, 1886: England, 10 sec., J. P. Tennent, London, April 3, 1868; W. M. Tennent, London, June 19, 1868; J. G. Wilson, London, March, 1869; A. Baker, London, April, 1871; J. G. Wilson, London, June, 1870; M. R. Portal, Oxford, March 15, 1871; E. L. Lucas, Cambridge, March 10, 1880; F. G. L. Lucas, Cambridge, November 16, 1880; A. Wharton, London, 1886, two heats.

One hundred and twenty-five yards.—Professional: America, 12 1-2 sec., John W. Cozad, Long Island, November 23, 1868; M. K. Kittleman, Pittsburg, Penn., August 18, 1884. Amateur: America, 13 1-5 sec., L. P. Smith, Williamsburg, August 13, 1884.

One hundred and fifty yards.—Professional: England, 15 sec., C. Westhall, Manchester, February 4, 1851; America, 15 sec., George Forbes, Providence, R. I, December 20, 1869; H. M. Johnson, Titusville, Penn., October 18, 1883. Amateur: England, 15 sec., W. P. Phillips, London, May 22, 1880, and C. H. Lowe, Cambridge, March 19, 1884; America, 15 1-8 sec., H. S. Brooks, jr., New-York City, May 24, 1884.

Two hundred yards.—Professional: England, 19 1-2 sec., George Seward, London, March 22, 1847. Amateur: America, 20 1-8 sec., L. E. Myers, New-York City, September 15, 1881; England, 20 2-5 sec., J. Shearman, London, June 2, 1877.

Two hundred and twenty yards.—Professional: England, 21 4-5 sec., H. Hutchens, London, May 11, 1885. Amateur: America, 22 sec., Wendell Baker, Boston, Mass., July 1, 1886; England, 22 2-5 sec., W. P. Phillips, London, September 28, 1878.

One-quarter mile.—Professional: England, 48 1-4 sec., R. Buttery, Newcastle, October 4, 1873. Amateur: America, 47 3-4 sec., Wendell Baker, Boston, Mass., July 1, 1886; England, 48 3-5, L. E. Myers, Birmingham, July 16, 1881.

One-half mile.—Professional: 1 min., 53 1-2 sec. Frank Hewitt, Lyttleton, N. Z., September 21, 1871; England, 1 min. 55 3-4 sec., J. Nuttall, Manchester, August 31, 1867. Amateur: England, 1 min. 55 2-5 sec., L. E. Myers, Birmingham, July 7, 1884; America, 1 min. 55 2-5 sec., L. E. Myers, New-York City, October 3, 1885.

One mile.—Professional: England, 4 min. 16 1-5 sec., William Cummings, Preston, May 14, 1881; America, 4 min. 28 1-2 sec., John Raine, Ottawa, Canada, May 24, 1881. Amateur: England, 4 min. 18 2-5 sec., W. G. George, Birmingham, June 21, 1884; America, 4 min. 21 2-5 sec, W. G. George, New-York City, November 11, 1882.

Three miles.—Professional: England, 14 min. 36 sec., J. White, London, May 11, 1863; America, 14 min. 53 1-5 sec., J. Grant, Brooklyn, N. Y., September 11, 1886. Amateur: England, 14 min. 39 sec., W. G. George, London, May 17, 1884; America, 15 min. 19 2-5 sec., E. C. Carter, New-York City, October 2, 1886.

Five miles.—Professional: England, 19 min. 36 sec., J. White, London, May 11, 1863; America, 20 min. 30 1-2 sec., George Hazael, New-York City, July 30, 1881. Amateur: England, 25 min. 7 4-5 sec., W. G. George, London, July 28, 1884; America, 26 min. 31 sec., T. F. Delaney, Williamsburg, L. I., May 30, 1884.

Ten miles.—Professional: England, 51 min. 6 3-5 sec., William Cummings, London, September 18, 1885; America, 52 min. 40 1-2 sec., William Steele, New-York City, May 19, 1883. Amateur: England, 51 min. 20 sec., W. G. George, London, April 7, 1884; America, 56 min. 9 2-5 sec., T. F. Delaney, New-York City, December 12, 1882.

Twenty-five miles.—Professional: England, 2 h. 36 min. 34 sec., G. Mason, London, March 14, 1881; America, 2 h. 49 min. 27 sec., D. Donovan, Providence, R. I., August 6, 1880. Amateur: 2 h. 33 min. 44 sec., G. A. Dunning, London, December 26, 1881; America, 2 h. 52 min. 24 sec., J. Gassman, Williamsburg, L. I., February 22, 1884.

Fifty miles.—Professional: England, 6 h. 8 min., G. Littlewood, London, November 24, 1884; America, 6 h. 19 min., Dennis Donovan, Providence, R. I., August 6, 1880. Amateur: England, 6 h. 18 min. 26 1-5 sec., J. E. Dixon, London, April 11, 1885; America, 7 h. 29 min. 47 sec., P. Golden, Williamsburg, L. I., February 22, 1883.

The longest recorded distance run in a race by an amateur in America is 120 miles 275 yards by J. Saunders, in 22 hours 49 minutes, in New-York City, February 22, 1882.

The greatest distance ever travelled in a go-as-you-please race in twelve hours was 89 miles 880 yards by G. Littlewood, in London, England, November 24, 1884. At Buffalo, N. Y., in the same length of time John Dobler travelled 78 miles 1,280 yards on August 9, 1880.

HURDLE RACING.

Two American records were broken at hurdling during the season of 1886, both at the Manhattan Athletic Club games in New-York on June 19. A. A. Jordan then ran 120 yards, clearing 10 hurdles 3 feet 6 inches high, in 16 1-5 seconds, overcoming the record made by J. T. Tivey in New-York on June 10, 1882.

On the same day A. F. Copeland covered 220 yards over 10 hurdles 2 feet six inches in height in 27 1-5 seconds. The best previous American record at this distance under similar conditions was 27 2-5 seconds, made by S. A. Safford in New-York on July 1, 1882.

The rule of the National Association of Amateur Athletes governing hurdling is: "A 120 yards hurdle race shall be over ten hurdles, each

3 feet 6 inches high. The first hurdle shall be ten yards from the scratch, and there shall be ten yards between each hurdle. Hurdle races of different distances and with different number and height of hurdles may be given. No record shall be made in a hurdle race unless each of the hurdles, at the time the competitor jumps the same, is standing."

In the 120 yards races, the hurdles being exactly the same distance apart, practised hurdlers run in what is known as the three-step style, always springing from the same foot, alighting on the other foot and taking just three steps between each hurdle. It is estimated that a good hurdler (that is a man who can cover the 120 yards in 17 1-2 seconds or less) is delayed about two-fifths of a second by each hurdle.

The holders of the American amateur championship emblems for 120 yards hurdle races since 1876 have been:

		seconds.
1876	George Hitchcock, New-York	19
1877	H. E. Ficken, N. Y. A. C	18 1/4
1878	H. E. Ficken, N. Y. A. C	17 1/4
1879	J. E. Haigh, S. A. A. C	19
1880	H. H. Moritz, S. A. A. C	19 1/5
1881	James T. Tivey, Williamsburg A. C	17 1/5
1882	James T. Tivey, Williamsburg A. C	16 4/5
1883	S. A. Safford, Am. A. C	19 2/5
1884	S. A. Safford, Am. A. C	19 2/5
1885	A. A. Jordan, M. A. C	17 2/5
1886	A. A. Jordan, M. A. C	16 1/5

The best amateur records at the most popular hurdling distances are:

One hundred and twenty yards, 10 hurdles, 3 feet 6 inches high.—England, 16 sec., C. N. Jackson, Oxford, November 14, 1865, and also S. Palmer, London, April 15, 1878. At Aston Lower Grounds, Birmingham, England, G. P. C. Lawrence ran a trial heat in 16 sec., but as the track slopes considerably the performance is not considered equal to those of Jackson and Palmer. America, 16 1-5 sec., A. A. Jordan, New-York City, June 19, 1886.

Two hundred and twenty yards, 10 hurdles, 2 feet 6 inches high.—America, 27 1-5 sec., A. F. Copeland, New-York City, June 19, 1886.

Two hundred and twenty yards, 10 hurdles, 3 feet high America, 31 sec., M. W. Ford, St. Louis, Mo., November 29, 1884.

Two hundred and twenty yards, 10 hurdles, 3 feet 6 inches high.—America, 34 1-2 sec., J. Lafon, Hackensack, N. J., October 19, 1878.

One-quarter mile, 10 hurdles, 2 feet 6 inches high.—America, 1 min. 1 5-8 sec., L. E. Myers, New-York City, November 1, 1880.

One-quarter mile, 10 hurdles, 3 feet 6 inches high.—America, 1 min. 8 1-4 sec., R. S. Summerhayes, Montreal, P. Q., October 6, 1877.

One-quarter mile, 20 hurdles, 2 feet 6 inches high.—America, 1 min. 11 2-5 sec., S. A. Safford, New-York City, February 16, 1884.

JUMPING.

There is a tradition to the effect that any one who can run well can jump well. This is true in the running broad jump just so far as it relates to the running part of the feat; but when the runner has reached the mark from which he is to take off for the jump the serviceability of his good running qualities is at an end. Then it is that he recognizes the distinction between a runner and a jumper.

The secret of flying through space is not contained so much in the velocity gained by the run as in the manner in which the spring is made from the ground. There is a peculiar knack in taking the spring, which is indescribable in a book. It can be learned only by observation of others and by practice. The only word of caution to the jumper need be that in practising the high jump he should from the beginning aim to make a clean, graceful, straightforward jump, with an elastic spring of the knees and good balance of the body, drawing up his feet and straightening his legs forward as he passes over the bar, and maintaining his poise as he descends. The style of Malcolm W. Ford, one of the finest amateur jumpers America has ever seen, is of this clear-cut, classic order. The twisting of the body and legs so as to clear the bar in part by squirming is unworthy of a jumper. A good preparatory exercise for jumping is springing up from the toes continuously for several minutes at a time. In high jumping and pole leaping, alertness, suppleness and self-confidence are essential.

Of the fifteen recorded varieties of jumping or leaping, only three are recognized in amateur championship games. They are the running high jump, and the running broad jump (both without weights), and pole leaping for height. In nearly all club games, however, there are added to these the standing high jump and standing broad jump, with and without weights.

In the standing long jump the competitors toe a mark and jump without any preliminary hitch or spring. The measurement is made from the mark to the nearest break in the ground made by any part of the jumper's person. Each competitor is allowed three trials and is credited with the best of all his jumps. Where the entries are numerous, the three men making the best jumps are allowed three more trials. These rules relating to trials govern all the varieties of jumping contests. When weights are used there is no restriction as to size, shape and material.

In the running long, or broad, jump a joist five inches wide sunk into the earth serves as a scratch. The turf or earth about the joist is removed to the depth of three inches and a width of six inches. Competitors are allowed an unlimited run but must take off from or behind the scratch. It matters not how far behind the scratch the jumper springs; the measurement is made from the scratch forward to the nearest heel impression. This rule has proved so irksome to jumpers that it may be changed so that measurement may be taken from toe to heel, giving the jumper the privilege of springing from any point most convenient to him.

Competitors are allowed to stand as they please in the standing high jump, but must leap from the first spring. In the running high jump a line is drawn, three feet in front of and parallel with the bar, and stepping over this line in an attempt counts as a "try." In pole leaping, a similar balk line is drawn six feet in front of the bar.

The American amateur champions at jumping and their records since 1876 have been:

RUNNING LONG JUMP.

		ft.	in.
1876	Isaiah Frazier, Yonkers Lyceum	17	4
1877	W. T. Livingston, H. A. C	18	9½
1878	W. C. Wilmer, S. H. A. C	18	9
1879	F. J. Kilpatrick, N. Y. A. C	19	6¾
1880	J. S. Voorhees, M. A. C	21	4
1881	J. S. Voorhees, M. A. C	21	4¾
1882	F. J. Jenkins, Jr., N. Y. A. C	21	5¾
1883	M. W. Ford, N. Y. A. C	21	7½
1884	M. W. Ford, N. Y. A. C	20	1½
1885	M. W. Ford, N. Y. A. C	21	6
1886	M. W. Ford, N. Y. A. C	22	¾

RUNNING HIGH JUMP.

		ft.	in.
1876	H. E. Ficken, N. Y. A. C	5	5
1877	H. E. Ficken, N. Y. A. C	5	4
1878	H. E. Ficken, N. Y. A. C	5	5
1879	W. Wunder, O. A. C	5	7
1880	A. L. Carroll, S. I. A. C	5	5
1881	C. W. Durand, S. I. A. C	5	8
1882	A. L. Carroll, S. I. A. C	5	7
1883	M. W. Ford, N. Y. A. C	5	8½
1884	J. T. Rineheart, Am. A. C	5	8
1885	W. B. Page, Phila. F. & S. C	5	9½
1886	W. B. Page, University of Penn	5	9

POLE LEAPING.

		ft.	in.
1877	G. McNichol, S. A. A. C	9	7
1878	Alfred Ing, S. A. A. C	9	4
1879	W. J. Van Houten, S. A. A. C	10	4¾
1880	W. J. Van Houten, S. A. A. C	10	11
1881	W. J. Van Houten, S. A. A. C	10	6
1882	B. F. Richardson, S. A. A. C	10	
1883	H. H. Baxter, N. Y. A. C	11	½
1884	H. H. Baxter, N. Y. A. C	10	6
1885	H. H. Baxter, N. Y. A. C	10	8
1886	H. H. Baxter, N. Y. A. C	10	1½

The best-known jumping performances are:

Standing long jump, without weights.—Professional: America, 10 ft. 10 1-2 in., M. H. Johnson, New-York City, September 4, 1984. Amateur: America, 10 ft. 9 3-4 in., M. W. Ford, New-York City, April 23, 1885; England, 10 ft. 5 in., J. J. Tickle, Leigh, Manchester, September 2, 1871.

Standing long jump, with weights.—Professional: America, 14 ft. 5 1-2 in., G. W. Hamilton, Romeo, Mich., October 3, 1879; England, 13 ft. 7 in., J. Greaves, Manchester, September 18, 1875. Amateur: America, 12 ft. 9 1-2 in., L. Hellwig, Williamsburg, L. I., November 20, 1884; England, 11 ft., J. Duckworth, Bradford, July 24, 1869.

Three standing long jumps, without weights.—Professional: America, 33 ft. 4 1-2 in., D. M. Sullivan, St. Catharines, Canada, August 17, 1885. Amateur: America, 34 ft. 4 1-2 in., M. W. Ford, Brooklyn, N. Y., April 10, 1885.

Three standing long jumps, with weights.—Professional: America, 39 ft. 3 in., D. M. Sullivan, St. Catharines, Canada, August 17, 1885; England, 39 ft. 1 in., George W. Hamilton, St. Helens, November 27, 1880. Amateur: America, 35 ft. 9 in., W. S. Lawton, San Francisco, Cal., May 13, 1876.

Standing hop, step and jump, without weights.—Professional: 31 ft. 10 in., Gavin Tait, Glasgow, Scotland, 1862; America, 31 ft. 7 1-2 in., D. M. Sullivan, St. Catharines, Ont., August 17, 1885. Amateur: America, 29 ft. 2 1-2 in., New-York City, March 19, 1884.

Standing high jump.—Professional: America, 5 ft. 4 in., D. M. Sullivan, St. Catharines, Canada, August 17, 1885; Great Britain, 4 ft. 11 in., H. Andrews, Dalkeith, Scotland, 1875. Amateur: America, 5 ft. 1 1-4 in., W. Soren, New-York City, May 29, 1880; England, F. Hargreaves and E. Moore, Pendlebury, August 5, 1871.

Running long jump, without weights.—Professional: 21 ft. 6 1-2 in., E. W. Johnston, Guelph, Canada, October 13, 1879. Amateur: Ireland, 23 ft. 2 in., P. Davin, Portarlington, September 13, 1883; England, 23 ft. 1-4 in., J. W. Parsons, London, June 30, 1883; America, 22 ft. 11 1-4 in., M. W. Ford, Brooklyn, N. Y., August 14, 1886.

Running high jump, without weights.—Professional: England, 5 ft. 11 in., E. Vardy, Haydon, August 27, 1859; America, 5 ft. 11 in., E. W. Johnston, Belleville, Ontario, July 1, 1879, and John West, Brooklyn, N. Y., July 23, 1881. Amateur: Ireland, 6 ft. 2 3-4 in., P. Davin, Carrick-on-Suir, July 5, 1880; England, 6 ft. 2 1-2 in. M. J. Brooks, London, April 7, 1876; America, 6 ft. 1-2 in., W. B. Page, West Philadelphia, Penn., May 22, 1886.

Running hitch-and-kick.—The rules of this contest require that the contestant shall spring, kick a suspended object, alight and hop twice—all on the same foot. Amateur: America, 8 ft. 11 in., F. B. Fogg, Cambridge, Mass., March 28, 1885.

Running high kick.—In this game the contestant is free to spring, kick and alight with either or both feet. Amateur: America, 9 ft. 2 3-4 in., F. B. Fogg, Cambridge, Mass., March 28, 1885.

Pole leaping for distance.—Amateur: America, 24 ft. 5 in., A. F. Remsen, Brooklyn, N. Y., October 16, 1886.

Pole leaping for height.—Professional: England, 10 ft. 10 1-2 in., G. Musgrove, Cockermouth sports, 1866, Amateur: England, 11 ft. 5 1-4 in., T. Ray, Whitehaven, August 13, 1886; America, 11 ft. 1-2 in., H. H. Baxter, New-York City, June 2, 1883.

PUTTING THE SHOT.

This exercise is one in which the athlete should exercise great caution. It is useful to a certain extent, for the reason that it shows the amount of dynamic force which can be generated in the muscles of the human arm and body. For the general purposes of healthful development the violent exertion required for throwing a solid cannon shot through the air must be ranked as having little or no value. The man who wishes to live to ninety years of age, free from bodily ailments and in full possession of his faculties, would do well to avoid much exercise of this class.

A strong man, however, delights in the display of his strength, and the athletic clubs include "putting the shot" among the other field sports for which they offer prizes.

The American championship rules prescribe that the shot used in this game shall be a solid metal sphere weighing sixteen pounds. In general athletic games, however, balls ranging in weight from nine to fifty-six pounds are frequently used.

Under laws adopted by the Executive Committee of the National Association on October 6, 1886, the putter stands in a circle seven feet in diameter, two feet of the circumference of which is a toe board four inches in height. He forces the sphere out from the shoulder with one hand without passing it behind or below the shoulder. Foul puts, which are not measured but count as puts, consist of letting go of the shot in an attempt; touching the ground outside the circle with any portion of the body while the shot is in the hand, and touching the ground in front of the forward half of the circle with any portion of the body before the put is measured. The measurement is made from the nearest edge of the break in the ground made by the shot to the point in the circumference of the circle nearest such mark.

The American amateur champions at putting the 16-pound shot since 1876 have been:

		ft.	in.
1876	H. E. Buermeyer, N. Y. A. C.	34	5
1877	H. E. Buermeyer, N. Y. A. C.	37	2
1878	H. E. Buermeyer, N. Y. A. C.	37	4
1879	A. W. Adams, S. A. A. C.	36	3 1/2
1880	A. W. Adams, S. A. A. C.	36	4 7/8
1881	F. L. Lambrecht, M. A. C.	37	5 1/2
1882	F. L. Lambrecht, M. A. C.	39	9 7/8
1883	F. L. Lambrecht, M. A. C.	43	
1884	F. L. Lambrecht, M. A. C.	39	10 1/2
1885	F. L. Lambrecht, M. A. C.	42	2 3/4
1886	C. A. J. Queckberner, N. Y. A. C.	42	1 1/2

The best records in throwing the shot are largely American, some of them by amateurs. They are as follows:

Fourteen-pound shot.—C. A. J. Queckberner, amateur, Brooklyn, N. Y., 45 ft. 6 1-4 in., September 11, 1886.

Sixteen-pound shot.—Duncan C. Ross, professional, New-York, 42 ft. 6 1-2 in. The best amateur record has been made by an American, F. Lambrecht, 43 feet.

Twenty-one-pound shot.—C. A. J. Queckberner, Brooklyn, 35 ft. 10 in., September 11, 1886.

Twenty-two-pound shot.—L. M. Snyder, amateur, Columbus, O., 24 ft. 4 in., May 31, 1884, beating the best foreign records by 11 ft. 6 1-2 in.

Fifty-six-pound shot, with follow.—J. Maxwell, amateur, Macroom, Ireland, 21 ft. 9 in., October 4, 1883.

Fifty-six-pound shot, without follow.—W. J. M. Barrow, Mallow, Ireland, 19 ft. 3 1-2 in., May 14, 1885.

THROWING THE HAMMER.

The latest American rules require that the hammer head shall be a metal sphere weighing sixteen pounds, the handle shall be of wood and the combined length of the head and handle shall be four feet. Hitherto the length over all has been fixed at three feet six inches.

The hammers used in England weigh sixteen pounds including the handle.

The hammer is thrown from a circle seven feet in diameter, and the measurement is made from the nearest edge of the mark made by the head of the hammer to the point of the circumference of the circle nearest such mark. Letting go of the hammer in an attempt, lifting from the ground the foot nearest the circumference of the circle while the hammer is in hand, touching the ground outside of the circle with any portion of the body while the hammer is in hand and touching the ground forward of the front half of the circle with any portion of the body before the throw is measured, constitute fouls, and the accompanying performances are not measured but count as throws.

The hammer is usually swung around the head two or three times before delivering, to gain impetus, although some successful throwers merely swing it at their side. One or two hands may be used at the pleasure of the competitor. Not a few find that they can handle the hammer better with one hand, especially when its weight is not over twelve pounds. It is especially stipulated sometimes that the thrower may make a complete turn of his body, or may run a distance of seven feet to the scratch line before delivery.

The American amateur champion hammer-throwers (sixteen pounds standing) since 1876 have been:

		ft.	in.
1876	W. B. Curtis, N. Y. A. C.	76	4
1877	George D. Parmly, Princeton	84	
1878	W. B. Curtis, N. Y. A. C.	80	2
1879	J. McDermott, S. A. A. C.	86	$11\frac{1}{8}$
1880	W. B. Curtis, N. Y. A. C.	87	$4\frac{1}{4}$
1881	F. L. Lambrecht, Pastime A. C.	89	8
1882	F. L. Lambrecht, Pastime A. C.	93	$\frac{1}{2}$
1883	W. L. Coudon, Baltimore A. C.	93	11
1884	F. L. Lambrecht, M. A. C.	92	5
1885	F. L. Lambrecht, M. A. C.	96	10
1886	W. L. Coudon, Baltimore A. C.	95	8

The best recorded performances with sixteen-pound hammers are:

Sixteen-pound hammer, head and handle, 7 ft. run.—W. J. M. Barry, amateur, New-York, 119 feet, October 9, 1885.

Sixteen-pound hammer, head and handle, with one hand, unlimited run.—M. Davin, amateur, Dublin, 123 ft. 2 in., June 10, 1878.

Sixteen-pound hammer, with one hand.—W. B. Curtis, Riverdale, Ill., 76 ft. 11 in., September 23, 1877.

Sixteen-pound hammer.—F. L. Lambrecht, amateur, New-York, 96 ft. 10 in., June 13, 1885.

Sixteen-pound hammer, with one turn.—A. W. Sullivan, amateur, Riverdale, Ill., 91 ft. 5 in., October 22, 1877.

THROWING 56-POUND WEIGHT.

Weight-throwing, an old-time Irish sport, is now, under new rules and restrictions, rapidly gaining in popularity among the heavy-weight athletes of the United States.

Prior to 1884 almost any object of convenient size, weighing 56 pounds or thereabouts, and having a handle, was used in the contests.

In that year a clause was inserted in the American laws of athletics stipulating that the weight should be round in shape, and measure, with the handle, sixteen inches in height.

The contestant stands in a seven foot circle, as in putting the shot and throwing the hammer, facing as he pleases. Grasping the weight by the handle he throws it with one hand. The foot nearest the circumference of the circle must remain on the ground from the commencement of the swing until the weight leaves the hands.

The first competition at throwing the 56-pound weight for height in this country occurred at the games of the Brooklyn Athletic Club on July 10, 1886. C. A. J. Queckberner then made a record of 12 ft. 11 in. At the games of the New-York Athletic Club on October 2, 1886, in a similar contest, M. O'Sullivan, of the Pastime Athletic Club, threw the weight to a height of 13 ft. 9 in.

The American Amateur Champions since 1878 have been:

		ft.	in.
1878	W. B. Curtis, N. Y. A. C.	21	
1879	J. McDermott, S. A. A. C.	22	11
1880	J. McDermott, S. A. A. C.	24	4
1881	John Britton, S. A. A. C.	24	
1882	H. W. West, Boston Y. M. C. A.	24	10¼
1883	F. L. Lambrecht, P. A. C.	25	1¾
1884	C. A. J. Queckberner, N. Y. A. C.	26	3¼
1885	C. A. J. Queckberner, N. Y. A. C.	26	3
1886	C. A. J. Queckberner, N. Y. A. C.	25	1

The best records at throwing the 56-pound weight are:

Thrown from between the legs, without follow—W. J. M. Barry, amateur, Mallow, 27 feet, May 14, 1885.

Thrown from between the legs, with follow—W. J. M. Barry, Cork, 28 feet 4 inches, April 18, 1885.

Thrown from the side without follow.—C. A. J. Queckberner, amateur, Brooklyn, N. Y., 26 feet 3¼ inches, September 27, 1884. The only throw of this kind which beats this cord is that of a professional at New-York, 25 feet 3½ inches, November 4, 1882.

Thrown from the side with unlimited run.—M. Davin, amateur, Dublin, 30 feet 2 inches, July 21, 1877.

Thrown for height.—M. O'Sullivan, amateur, New-York, 13 feet 9 inches, October 2, 1886.

TUG OF WAR.

When first introduced the tug of war was readily accepted by athletes as a novelty of great interest. For a time no programme was complete without such an event. Its popularity is now on the wane and for good reasons. The strain has been found to be so severe as thoroughly to exhaust the competitors. There have been many instances of injuries which have incapacitated the person affected from taking ordinary physical exercise for the rest of his life.

The rules governing tugs of war are:

> The ground shall be loosened to the width of three feet, and to a depth of not less than six inches. The side crease shall be twelve feet from the centre. The mark on the rope must be over the centre crease when the signal is given, and the team hauling that mark over the crease on its own side shall win. No footing holes shall be made before start. The contestants shall not wear spikes. The rope shall be 1 1-2 inches in diameter.
>
> Immediately before the contest, the captains of all the con-

testing teams shall draw their numbers. Not less than five minutes shall be allowed each team between heats. Captains shall toss for choice of sides before each pull; but if the same two teams pull more than once during any meeting, they shall change ends at each successive pull. Competitors shall not be allowed to use any belt other than one to protect the body, and no ring, chain or fastening of any kind, shall be allowed.

With two teams they shall pull best two in three. With three teams, one and two shall pull, then two and three, and three and one. With four teams—one and two shall pull, then three and four, and the winners pull the final. With five teams—first round, one and two, three and four, five has a bye; second round, winner of first heat pulls with five, and the winner of this heat pulls the final with the winner of second heat of first round. With six teams—first round, one and two, three and four, five and six; second round, winner of first and second heats. Winner of this heat pulls the final with winner of third heat, first round. Where more than six teams are entered, the arrangement of trials shall be on the same principle as in the above example. No man shall be substituted for another who has already pulled in one trial, nor shall any man be allowed to pull with more than one team, in any of the trials for the same prize. A time limit may be made.

The weights in tugs of war shall be: Feather weight, 125 pounds and under; middle weight, 175 pounds and under; heavy weights, over 175 pounds. All weights shall be stripped,

CAMPING OUT.

BY YALE BEACH, NEW-YORK.

CAMPING OUT as a recreation seems to have begun on the sandy beaches of the ocean coast of New England, forty years ago. It extended thence to the lovely inland lakes of the United States and became a passion, not only with the school boys of the adjacent cities and villages, but with grown men and to a certain extent with matrons and maids. Camping appeals powerfully to the imaginations of the young. There is a freedom from restraint in its experiences, and there is much else about it that is marvellous and romantic. When night closes down upon the lake, the whole landscape changes. The dark bulk of the woods and hills is reflected in the water and the shore line disappears, or rather there seems to be a new shore, formed by the reflected tops of the hills and woods, and the camper imagines himself in a strange and unknown region. Who that has ever had the experience will forget his first camp on some romantic lake in Central New-York, the big moon of August lending magical beauty to the scene at night, the points and capes of the lake as far as the eye could reach illuminated with blazing camp fires, the big dark hills rising behind them, the water dark and smooth as a mirror, and the notes of guitar, flute, and cornet and the songs and voices of the campers stealing musically over the lake? Or who that has camped upon the big plains of the West will forget the solemn stillness of the night, broken only by the distant barking of the coyote and the chirping of the night hawks, and the whirr with which they swoop down to the ground, while millions of stars twinkle over him that were invisible from the lowlands of the East, the poetry of the night broken only by his own prosaic efforts to make his shoulder blades fit between the bunches of buffalo grass so as to obtain a comfortable repose?

Vacation camping on the inland lakes extended rapidly after it had first begun, until it led to the establishment of permanent cottages, covered with woodbine and ivy, wherein whole families could be lodged for a summer's rest. It then spread to the woodlands and mountains; and finally led to the building of the permanent summer hotels on beach, lake and mountain, which constitute so marked a feature of American summer life at the present day. In New-York State alone, now, there are more than 3,000 of these summer homes; and there is scarce a State in the Union in which there are not several hundred of them.

Camping out, not as a recreation but as a practical necessity, has always been the resource of the red man; and after the discovery of gold in California, when the rush to that region set in, it was a regular feature of the every-day life of the white man in the far West. The climax of camping out was seen in the United States in the four years from 1861 to 1865, when the stern reality was experienced of a million of men lodging in tents or upon the ground in the open field. May America never again see such a camping out as that.

To the schoolboy tired of the drill and constraint of the term, to the man of affairs worn with the care and competition of life, and even to the idler weary of an unending round of formal pleasures, the very thought of flying to the lake, the woods or the ocean beach, with his tent, his old clothes and a freedom from restraint is one of enchantment. Vacation comes. Tent, camp kettles, blankets, fishing lines, gun, hatchet and provisions are loaded into the good boat or a wagon. The city is left behind; and the congenial spirits of the camping party find themselves in the solitude to which they have been looking forward impatiently for many weeks.

Concerning tents, the party have considerable liberty of choice. If they are on the plains, or on the march, the wagons may be placed side by side, if there are two of them, and a tarpaulin stretched over them, and the party can sleep either in the wagons, wrapped in buffalo robes or blankets, or upon the ground. Or, if they have no wagon, a shelter tent may be stretched to keep off the dew, wind or rain. A shelter tent is merely a square of canvas, with buttons and button-holes at the edges, so that two or more of them can be joined together. Two poles are planted upright, to hold the upper two corners, and the canvas slopes thence to the ground, being held in position by pegs. For ordinary vacation camping the party should have a regular tent. The common A tent, with sloping sides, is about seven feet high in the centre, eight and one-third feet wide on the ground, and six and a half to seven feet long from front to rear. In the army, each tent is intended to shelter six men. For the general purposes of camping a wall tent is best. The side walls are three and a half feet high; the ridge of the roof eight and a half feet; the spread on the ground is nine feet, and the depth from front to rear is nine feet. It will actually shelter eight or ten men, but a pleasure party will not put within it more than five or six. The Sibley tent is a conical one, like an Indian's wigwam, having an opening at the top. It is the only tent within which an open fire can be built, the smoke making its exit from the peak of the tent. About twelve men can sleep inside, all having their feet toward the centre where the fire is burning. The Sibley tent is a picturesque structure, but after all the wall tent is the best general all-round shelter for the camping party.

To pitch a wall tent properly, twelve large and eighteen small pegs are required, and there must be a ridge pole and two uprights to support the same. Spread the tent upon the ground, the ridge pole in position. Lay the two uprights at right angles to, their centres touching the ends of, the ridge pole. From each end of the uprights take one long step, and to the front and rear of that point another long step. This will fix the places for driving the four large corner pegs. Drive the pegs and fasten the cords to them; plant the uprights perpendicular, raising the ridge pole with the tent at the same time. Two men are required for this purpose. Tie the door of the tent shut, and then drive all the pegs and fasten to them the guy ropes. There are eyelets in the tent for these ropes. Two stay ropes may be run from the top of the rear upright pole toward the front of the tent and fastened on the side near the guy rope fastenings; two more may be run from the front upright and fastened on the sides at the rear. These ropes give stability to the upright poles. An extra piece of canvas should be stretched over the tent roof, projecting beyond the eaves and covering the full length of the tent, for protection against rain. It is usually easy to improvise a floor from the scattered pieces of wood within reach. A trench must be dug around the tent to carry off the surface water in case of rain.

Where shall the tent be pitched? This is always the first question upon arriving, and it is perhaps the most important. In the army, or among the emigrants on the plains, the considerations that govern are the purely practical ones of water, wood, health and safety from attack. With a pleasure party the position of the tent is governed by health, comfort, wood, water and the landscape. On the ocean beach there is little choice. On lake or stream or in the woods there is an opportunity for judgment. The amateur camper will often find the problem of where to locate his tent a perplexing one. Do not be in a hurry in deciding upon a camp ground. Look around a little. Nearness to wood and water and safety from the wash of a rainstorm are important. The soil on which the tent is pitched should be dry. A little rise of ground makes a good location. See that the surrounding trees are strong and healthy, and not liable to fall or to throw down dead branches in a gale of wind. Any one who has ever seen a tree in the woods on a calm day totter and fall by its own weight, from sheer old age, crushing the underbrush and itself snapping into a hundred fragments, will instinctively look at the trees around him before the tent is pitched. If possible locate the camp so as to command a beautiful landscape, and so as also to be within hearing of the soft plash of the waves at night. If the ground is sloping and the camper intends to sleep upon the ground, his feet should be lower than his head. The great desideratum is to find a place which is perfectly dry and healthy, free from danger, sheltered from the wind, and thoroughly comfortable in every respect. The campers will spend their days in rowing, gunning and tramping; and a comfortable retreat at night, where they can have sound and wholesome sleep, is of the very highest importance.

In the Adirondacks the guides construct for their companions ingenious shelters of bark and boughs. It requires great skill as an axeman and a knowledge of woodcraft to make a good shelter of this kind. Saplings with their branches lopped off are planted for the corner posts; straight sticks are laid, a foot or two apart, resting on the projecting crotches of the uprights, to form the walls; and then the whole structure is covered with bark, or it is roofed with bark and thatched with pine branches down the sides. The inexperienced amateur will do better to provide himself with the secure shelter of a waterproof tent.

With regard to beds, it is best, as a rule, to avoid sleeping on the ground. It is true that if the ground is dry, as it is on the sandy plains of the West, the adventurer may roll himself in buffalo robe or blanket and sleep safely there. But the city boy or man is apt to lack the vigorous constitution which from long exposure to an open-air life can defy many of the rules of health; and he will do well to avoid the colds and rheumatism that may come to him if he sleeps upon the ground. A good couch can be made with a pile of twigs of pine and hemlock, sacks of leaves or balsam, or even with a rustic framework of branches, covered with the fragrant boughs. A regular mattress savors too strongly of the city which the camper has left behind. A buffalo robe is the best mattress for one who is roughing it, and blankets will constitute the bedding.

While in camp bathe frequently and rub the whole body vigorously.

Do not swing a hammock between the tent poles.

Keep all the precincts of the camp free from whatever will attract a swarm of flies. The scraps of food which are to be thrown away should be put under ground.

Half the charm of camp life is the roaring fire at night, with its column of darting sparks, the flames casting flickering shadows, and the bed of glowing embers dispelling the chill of the cool night air. The campers should remember that while no one grudges them the joy of a camp fire, on the other hand every one expects them to regard the rights of others. It is cruel to allow the fire to spread to the forest itself, and care should be taken to avoid the danger of a puff of wind carrying live coals, either by day or by night, into the underbrush. Upon abandoning the camp for the return to the city, there is only one course proper to pursue toward the smouldering embers of the camp fire; put them out.

Of course, if the party are to have a camp fire a goodly heap of dry branches and drift wood must be collected, and the labor of this proceeding suggests a matter which deserves the attention of every camper. The enjoyment of the camp requires that water shall be brought, heaps of wood collected, meals shall be cooked, and perhaps milk and vegetables scouted for at the farmhouses which are sometimes a mile away. Make up your company of campers of good, hearty, willing fellows, every one of whom in camp will take the lean with the fat, the homely duties with the fun, without a murmur. Leave behind you always the selfish pampered boy who, however delightful a companion he may be at home, will in camp prove an unmitigated bore by neglecting to do his full share of the hard work. One experience in camp with a companion of that description will never be forgotten. If it is the lazy comrade's turn to get up in the morning and light the camp fire and make the breakfast coffee, and he wants to pull straws to see if some one else won't do it, and then if luck goes against him will want to pull straws again, what can you do with such a comrade? The best way is to leave all such people at home. Make up your mind in camp to take your regular turn at all the homely duties, and be hearty and cheerful in the performance of them.

The culinary department of a camp is of great importance. Upon its proper management hang the good-nature and the general enjoyment of the party. If you have money to spend, and can afford the services of a guide, this department can be left wholly to his control. But this lordly style of camping out is not recommended. Do your own cooking. Two crotched sticks planted in the ground, a cross bar of green wood at the top, and a kettle hanging therefrom, with a frying pan and coffee pot added, are the only real essentials of cooking in camp. Still, if the party are ambitious, they can provide themselves with a patent camp stove; or they can bring along the top of an old kitchen stove, and set it up on top of an impromptu fireplace in a bank of earth, with a flat stone for a blower. They can even construct a stove out of stones. Roughing it implies leaving behind most of the paraphernalia of civilization; nevertheless, a camper must have a hatchet, plenty of cheap knives, spoons and forks, tin cups and plates, a lantern, pail, ball of twine, needles, thread, soap, candles and perhaps a barrel to sink into the earth for a refrigerator. The locality of the camp may suggest other articles in the outfit. On the provision list should be salt pork, self-raising flour, Indian meal, eggs, salt fish, dried beef, crackers, canned fruits and vegetables, sugar, pepper, salt, molasses, beans, butter, tea, coffee, baking soda, rice, ginger, spices, mustard and potatoes. The variety and quantity depend, of course, upon the length of time the party expect to dwell in the wilderness. A camping party always expects to obtain a part of its food in the form of wild game. A few suggestions will now be made relative to cooking:

For broiling pick the feathers off, draw the bird, clean thoroughly in water, split it down the back, broiling it over a good fire of clean coals for ten or fifteen minutes. Pepper, salt and butter will season it.

Roast birds are drawn and cleaned and the legs are tied. Sprinkle with flour and roast in a pan for twenty to thirty minutes. To roast birds in their feathers draw them with the feathers on, wrap the bird in wet clay and bury it in hot coals. When taken from the coals in three-quarters of an hour the feathers and skin will come off readily.

In stewing, several birds are placed in a small kettle, seasoned with salt, pepper, half a spoonful of cloves, a little mace and flour. Cold water covers the birds. A tight cover is placed on the kettle and the whole mass simmers two hours. Several spoonfuls of flour and catsup are then added. After simmering another hour, serve.

Fish chowder is made by removing the bones and cutting the fish into small bits. Slice five large potatoes and one or two onions thin. Roll the pieces of fish in salt and pepper and flour. Place a layer of potato in the kettle, then a layer of fish; putting in alternate layers until the material is used up. The head of the fish should be boiled in two quarts of water for twenty-five minutes, and this water is poured over the fish and vegetables through a strainer, cold water being added if the boiled water does not cover the mixture. Boil the chowder gently for half an hour in the tightly-covered kettle. Half a dozen crackers may be added during the operation.

For clam chowder put the clams into boiling water for ten minutes. The shells open readily. Remove the clams from the shells, cut off their black heads and place in a clean dish, straining the water in which the clams were scalded into the chowder kettle. Allow six pints of water to one peck of shell clams. When the water comes to a boil thicken it with half a teacup of flour mixed with water, using pepper and salt for a seasoning. Stir in a tablespoonful of butter, boiling the whole for ten minutes. Place several broken crackers in the kettle a few minutes before serving.

To boil clams wash them in several waters to remove the sand; fill the kettle in which they are to be boiled and add enough hot water to produce a good steam, allowing the bivalves to boil until the shells open.

Clam fritters are made with one egg beaten lightly, a pint of self-raising flour, three gills of milk. Mix the milk and flour and egg; then remove the black heads of the clams and mix with the other ingredients and fry in hot fat.

For a clam bake for a dozen guests, build an oven of flat stones about three feet square. Around the edge of the oven place stones making a bin. In the oven place kindlings with larger wood placed crosswise on top. Upon this upper layer place stones about six or eight inches square. The kindlings are lighted and when the wood has burned away the hot stones form a bottom for the oven. Cinders should be removed with a stick or poker to prevent smoke from injuring the food. Cover the stones with fresh seaweed for a depth of two inches and on it lay a bushel of clams which have been washed in fresh water. The fish, which are split down the back, cleaned and seasoned with salt and white pepper, are wrapped in cloth. The onions are peeled, potatoes washed and the ends cut off. In husking the corn leave on the inner layer of the husk to keep it clean. The clams are spread so that the vegetables may be placed on them. The onions are first put on, then the potatoes followed by the corn and the fish. A lobster is a very desirable addition. The food must be put in quickly else the oven will cool. Cover the pile with cloth and over all heap seaweed to confine the steam. In thirty or forty minutes remove the covering from one corner in order to keep the bulk of the food warm. The party then help themselves. Drawn butter with pepper and salt forms a nice sauce for the clams.

Broiling and frying are the easiest methods of cooking fish in camp. In broiling, if the fish is not too large for the gridiron, split it down the back and clean, removing any skin or scales which may be objectionable. Over the hot coals broil one side to a nice brown and then allow the other side to brown. The skin side of the fish is cooked last as it is the most tender and requires the least heat. Butter, pepper and salt will season this dish. In broiling a large fish a thick square may be cut from the side and cooked.

In frying fish put a few slices of salt pork in the frying pan. When it browns place the fish in the pan and cook until they are browned well on both sides. Sometimes a little lard is added. Small or medium sized fish, like trout, are split and cleaned in the usual way, rolled in flour or meal if desired and fried. Eels are skinned and allowed to stand in boiling water a few minutes. They are cut into three or four inch lengths and then fried.

When boiling lobsters, crabs and the like, be sure they are alive before cooking them. Otherwise throw them away. The lobster or crab should be boiled in a kettle of water for about thirty minutes, or until the shell turns red.

In frying salt pork, cut it into quarter-inch slices, remove the rind and fry both sides brown. Ham for frying is cut in thin slices and placed in the pan coated with drippings. In ten minutes the meat is cooked. Cook bacon as you do ham. Before frying sausages treat them to a bath of boiling water for two minutes, first puncturing the sausage case so that the steam will not burst it. In a pan with drippings fry the succulent meat links for fifteen or twenty minutes. Venison, beefsteak and similar meats may be fried in salt pork fat and seasoned with salt and pepper. A little dry flour and boiling water when added to the fat remaining in the pan and stirred until until the lumps disappear, makes excellent gravy.

Ham for broiling is cut in thin slices, the rind removed and the meat is broiled over clear coals for ten minutes. Beefsteak or venison should be cut from one-half to an inch thick for broiling. Ten minutes' cooking will answer if you want it rare; fifteen to twenty minutes will render it well done. Broil chops fifteen minutes. Veal is broiled in thin slices for fifteen to twenty minutes.

Potatoes for boiling should stand in cold water for a few hours.

Wash them clean and boil for thirty minutes. For baking, clean the skin and let them cook in a moderate oven for an hour. For frying, slice raw potatoes thinly and let the slices remain in cold water for an hour or two. The slices are usually cut lengthwise of the potato. Drop the slices into a basin of boiling drippings and let them fry to a light brown. Boiled potatoes may be cut into slices and fried in a pan with fat enough in to prevent the slices from sticking. Sweet potatoes may be boiled and baked like white potatoes.

Baked beans are a woodsman's dish. Take a quart of small beans, pick them over, placing them in five or six quarts of water to soak over night. Wash them in the morning and set them on the fire in six quarts of water with a pound of salt pork. They will cook in half to three-quarters of an hour. Gash the pork, after draining the beans, add a tablespoonful of molasses and fill the bean-pot, covering the beans with boiling water. Let them bake nearly half a day, say ten hours. You must construct an oven of stones or clay for the purpose. String beans are prepared by removing the ends and cutting the vegetable into inch lengths. Boil for one hour. Green peas are boiled for twenty to thirty minutes. The length of time depends upon their age. Rice is picked over, all specks being removed. It is boiled first in a deep kettle for half an hour. Tender green corn should be husked and boiled for half an hour.

Corn bread is made of three cups of Indian meal, a spoonful of salt, a tablespoonful of sugar and the same amount of butter. Use boiling water to wet this mixture and beat in one egg. Pour the batter into thin tins with buttered surfaces to the depth of half an inch and bake brown in a hot oven. Biscuits are made with a pint of milk, a quart of prepared flour mixed and dropped by spoonfuls into greased pans and bake in a quick oven. The baking is accomplished in less than a quarter of an hour.

To make tea, the solace of the camper at supper, put into the teapot a teaspoonful for each person. Over it pour half a cup of boiling water and let it steep for ten minutes. It should not boil. Add boiling water sufficient for the company and serve. Prepare coffee the same way, using a tablespoonful for each person if you desire good strength. An egg shell helps to clarify the liquid. In buying coffee, three-fourths Java and a fourth Mocha make a good mixture.

SHOTGUN AND RIFLE.

OCTOBER and crisp November are the sportsman's months. The blue skies of autumn, the changing garb of the hillsides, and the inspiration that is in the air itself, invite to the woodcock haunts and grouse covers. The allurement is not to be resisted by one who has proved the pleasures of a tramp with dog and gun, or a hunt with hounds and rifle. Each succeeding year now sees an ever-growing number of those who hear and heed the invitation to the fields in autumn.

Enjoyed in moderation, gunning is a sport of the most salutary character. It sends the gunner out into the fields, stoutly clad, for an invigorating tramp, lasting perhaps all day, and entertains him while there with a series of exciting adventures which rouse and refresh him without at the same time overpowering him with excessive fatigue. Moderation in gunning is essential for an important reason. The sport is so attractive that it tempts its votaries to spend too much time in its practice. The main business of life is work. Character and ability suffer with too great devotion to amusement. Recreation is of course essential now and then; but the man who spends too much time in the fields, while his industrious brothers are toiling in the shop, on the farm, or in the office, is certain to be left behind in the race for all the valued prizes of life.

Public policy requires that the young men of the United States be encouraged in the proper use of arms. Every young man should know how to handle both the rifle and the shotgun properly. So important is the right to bear arms, that the Constitution guaranteed it to the people, and the object is a good one, because the country is secure in its liberties so long as it possesses a hardy population skilled in the use of weapons.

It is for the practical guidance of beginners with the shotgun and rifle that the data and suggestions of these pages have been prepared.

CHOICE AND HANDLING OF SHOTGUNS.

BY CHARLES B. REYNOLDS, OF "FOREST AND STREAM."

The gun should be a breech-loader. The muzzle-loader is a weapon of yesterday. Within the last ten years the breech-loader has been brought to a state of high perfection, so far as simplicity and ease of manipulation are concerned; and its cost has been so reduced that there is no good reason why the beginner, even though of limited means, should not have an arm that is safe, durable and convenient. Good shooting can be done with a muzzle-loader, but safe and rapid shooting cannot be.

For a boy the gun may be one with a single twist barrel, costing $15. An older person should choose a double-barrelled gun, which may be bought for $35, though it is wiser to select one costing at least $50, if of American make. An excellent English arm, imported, may be bought for $55. These prices are for guns thoroughly well made and safe. The purchaser should always go to a responsible dealer. Buy from no others. With reference to makers, there are a score of manufacturers who have reputations to sustain and who do sustain them by turning out good work. The name of such a maker on a gun is a sufficient warrant of its merit. Never buy a gun which has a fictitious trade-mark or the name of an imaginary maker. Honest goods bear honest labels. Never buy cheap guns advertised as worth five or six times the prices asked for them; they are likely to be either old army muskets altered into clumsy nondescripts, or else highly dangerous imported shams.

The several patterns of guns produced by reputable makers differ chiefly in the "action" (the mechanism which opens or "breaks" the gun), or the lock (the mechanism for firing it). For each pattern special merits are claimed; but the choice between them is very much a matter of individual fancy. Every sportsman is apt to consider as best the particular style of gun used by himself and which he understands. This is perhaps sufficient evidence that all are good.

The prices quoted above will not, of course, pay for the finest grades of goods. The higher priced ones will be superior in finish and beauty, will balance better and will wear better. A costly gun is a beautiful specimen of handicraft, in the possession of which one naturally takes great pride and pleasure.

For good shooting it is essential that the gun should fit the shooter. The length and bend of the stock should be such that when brought into position the weapon may be held easily and sighted quickly.

As a rule the straighter the stock one can use the better his shooting. A long-armed man requires a long stock; a long-necked man a crooked stock. Dealers furnish diagrams and directions for obtaining these dimensions.

The barrel is either cylinder-bored, that is having the same diameter throughout from breech to muzzle; or choke-bored, that is being choked or constricted at a point near the muzzle. A cylinder gun scatters the shot; a choked gun concentrates them and shoots closer and harder, on the familiar principle of the nozzle of a fire hose. For general shooting, many sportsmen prefer a combination of the two, having one barrel (the one usually first fired) a cylinder, and the other choked. A boy's first gun should be cylinder-bored.

The gauges or bores of guns range from the big and heavy 4-bore, for long-distance duck-shooting, to the little 20-gauge, used for small game. The tendency of the time is toward the adoption of the smaller bores. The two gauges in general use are 12 and 10, and one of these may be recommended. If the shooting be mostly at upland game, woodcock, quail, ruffed grouse (partridge), pinnated grouse (prairie chicken), rabbits, squirrels, etc., with an occasional duck, the 12 bore is the proper choice. If the gun is to be used principally for ducks, choose a 10 bore. In general, the larger bore will carry the larger and heavier charge and cover a wider range. A 12 bore should weigh from seven to eight pounds; a 10 bore from nine to ten pounds. The physique of the shooter governs the weight somewhat, because every extra pound or two counts when carried in the field.

Many of the guns now made are hammerless, that is they have no external hammers, and these arms are growing in favor. They are cocked by the operation of opening the gun.

It is desirable but not absolutely necessary to have a gun-case, in which to keep the gun and carry it when travelling. Leather cases cost $2 50; leather-bound canvas cases $1 50.

Ammunition may now be considered. The charge of a breech-loader is contained in a cartridge, which, when the gun is opened (or broken), is slipped into the chamber. The gun, being closed, is then ready for firing. Any number of cartridges may be loaded in advance. To break the gun, to extract the empty cartridge-case, slip in a fresh cartridge and close the gun will consume only a small fraction of a minute. This is a much simpler and more expeditious operation than the old-time process of "ramming home" the charge of a muzzle-loader. The cartridge consists of the case or shell, primer or cap, powder, shot and wads. The shells are of metal and paper. Metal shells are generally conceded to shoot a little stronger; and they may be used over and over again indefinitely. On the other hand, they are heavier than paper shells. In the end the cost of each is about the same. Many sportsmen prefer to use paper shells, and when fired throw them away, although those of the best quality can be reloaded two or three times. Fifty brass shells cost $3 and will last a lifetime. Paper shells cost $6 50 per thousand. Shells, whether of metal or paper, should fit the chamber of the gun exactly, both in diameter and length. Primers cost $1 60 per thousand. The best grades of black powder should be used; it is poor economy to choose any others. Pay for it from 75 cents to $1 50 per pound. Wads to go over the powder, known as pink-edge wads, cost $1 40 per thousand for a 12 bore, a little more for a 10 bore. Cardboard wads, to go over the shot, cost 40 cents per 1,000. In brass shells use wads two sizes larger than bore of gun; in paper shells, same size wad. Shot costs $1 75 per bag of twenty-five pounds.

For good shooting the best grades of ammunition must be used. Loaded cartridges may be bought at the gun stores; but if the saving of work is of such great importance, you can also hire someone to kill the game. Most sportsmen find pleasure in loading the shells themselves the day before a hunt; this is part of the fun of going shooting. A very complete and handy set of reloading tools for metal shells can be had for 50 cents. This includes also an extractor, for pulling out an exploded shell when it sticks in the gun chamber after firing, and a powder and shot measure. The reloading tools proper are: a decapper for punching out the used primer; a recapper for putting in a new primer; a funnel a wad-seater; and a block for holding the shell in while loading. The block has a hole bored in the centre over which the primer rests safely; caution should always be observed to prevent anything coming in contact with the primer which will explode it. Never fail to recap the shell the first thing; fingers and hands have been lost in attempts to recap loaded shells. Reloading tools for paper shells include a creaser or crimper, for creasing the shell or crimping the end back upon the charge to hold it securely.

Shooting appurtenances designed to add to the comfort and convenience of the sportsman are numerous. If a man desires to fit out cheaply he need buy nothing beyond the articles already named. A game bag is a nuisance in the bush, and anywhere else except in pictures. Shooting coats and entire suits of water-proofed fabrics are not costly; but old clothes may be pressed into service. A waistcoat may have loops for carrying cartridges, or the cartridges may be stowed in the coat pockets, which should also be capacious enough to hold the game. Leggings are a convenience in the briers; they may be had at the shops, or be home-made from an old pair of high rubber boots.

A cleaning rod costs $1; one may be whittled out cheaper. Some sportsmen never clean their guns, and the guns appear to shoot just as well; but a better plan is after using the weapon to clean the barrels out thoroughly with hot (not warm) water, dry it perfectly, and oil all the metal parts, interiors of barrels included, with vaseline, good machine oil, or some of the special preparations sold at the shops. After that the gun can be put away in a warm dry place, where it will be safe from moisture.

The proper charge for a gun is a theme which creates much discussion. In the first place, no two guns, though they be of exactly the same dimensions, and as nearly similar as it is possible to make them, will shoot just alike. The charge best suited to one may not be the best for the other. Again, something depends upon the shooter, because a heavily built man can stand a larger charge and more recoil than one of slight physique. It is a capital plan to experiment with a gun. Test it at a circle thirty inches in diameter at forty yards, beginning with three drams of powder and one ounce of shot. Vary both powder and shot until the load is found which will give the best results and which can be shot with comfort.

A gun ought not to recoil so hard that the shooter will flinch at the discharge. Hold the gun firmly to the shoulder, so that the recoil will be a shove instead of a blow; and then modify the charge until the kick is reduced and there is no longer any disposition to flinch from it.

Some persons are constitutionally "gun shy." They can sometimes overcome this tendency by a patient practice, beginning with the repeated snapping of empty shells; then by firing shells loaded with light charges of powder; then using light charges of shot, and so going on as each feat is successfully performed, until a proper charge for game can be used.

The following table of loads is compiled from the catalogue of an ammunition company which loads tens of thousands of cartridges. The proportions are presumably such as are expected to find most favor among sportsmen:

Game.	For 12 bore gun.		For 10 bore gun.	
	Powder.	Shot.	Powder.	Shot.
Woodcock	$3\frac{1}{4}$ drams	1 ounce No. 10	4 drams	$1\frac{1}{8}$ ounce No. 10
Snipe	$3\frac{1}{4}$ drams	$1\frac{1}{8}$ ounce No. 9	4 drams	$1\frac{1}{8}$ ounce No. 9
Quail	$3\frac{1}{4}$ drams	1 ounce No. 8	4 drams	$1\frac{1}{8}$ ounce No. 8
Pinnated Grouse	$3\frac{1}{2}$ drams	$1\frac{1}{8}$ ounce No. 8	$4\frac{1}{4}$ drams	$1\frac{1}{4}$ ounce No. 8
Ruffed Grouse	$3\frac{1}{2}$ drams	$1\frac{1}{8}$ ounce No. 7	$4\frac{1}{4}$ drams	$1\frac{1}{4}$ ounce No. 7
Teal duck	$3\frac{1}{2}$ drams	$1\frac{1}{8}$ ounce No. 7	$4\frac{1}{4}$ drams	$1\frac{1}{8}$ ounce No. 7
Pintail duck	$3\frac{1}{2}$ drams	$1\frac{1}{8}$ ounce No. 6	$4\frac{1}{2}$ drams	$1\frac{1}{4}$ ounce No. 6
Mallard duck	$3\frac{3}{4}$ drams	$1\frac{1}{8}$ ounce No. 5	$4\frac{1}{2}$ drams	$1\frac{1}{4}$ ounce No. 5
Redhead duck	$3\frac{3}{4}$ drams	$1\frac{1}{8}$ ounce No. 4	$4\frac{1}{2}$ drams	$1\frac{1}{4}$ ounce No. 4
Canvasback duck	$3\frac{3}{4}$ drams	$1\frac{1}{8}$ ounce No. 3	$4\frac{1}{2}$ drams	$1\frac{1}{4}$ ounce No. 3
Brant			5 drams	$1\frac{1}{4}$ ounce No. BB.
Squirrel	$3\frac{1}{4}$ drams	$1\frac{1}{8}$ ounce No. 6	$4\frac{1}{4}$ drams	$1\frac{1}{8}$ ounce No. 6

These charges are heavier than those used successfully by some sportsmen. A well-known shooter, who has a deserved reputation as a crack shot, uses in his 12-gauge gun these loads: Right barrel, three drams powder, five-eighths ounce No. 10 shot: left barrel, three drams powder, scant ounce No. 8 shot. This is for quail, grouse, woodcock and all upland shooting. The proportions for a 10-gauge gun would call for a half dram more powder, and a slight increase of shot. Two pink-edge wads are put over the powder, one card wad over the shot.

Buckshot may be used in choke-bores, if chambered properly: i. e., arranged in the shell in layers that will fit the choke. Deer are often hunted with a shotgun, but a rifle is the only proper weapon.

The only way to learn to shoot is to shoot. The art cannot be taught by printed instructions. The following hints are designed to start the novice on the right course: There is everything in a good beginning. Put up a target, the size of a dinner plate, thirty yards distant. Fixing both eyes on the mark, bring the gun (unloaded and uncocked) into position, forefinger of right hand on the trigger, left hand supporting barrel at the most natural and easy point beyond the trigger-guard. See how nearly the bead near the muzzle is brought into the line of the eyes and the target. Repeat this process until the gun comes into correct aim as a matter of course. Then, the next day, after rehearsing this, shut both eyes, bring the gun up, and the moment the butt touches the shoulder open your eyes and see how nearly correct the aim is. When this has been faithfully practised, advance to within twenty steps of the target, the gun being loaded, look at the mark, shut your eyes, bring the gun up and shoot immediately, the eyes being kept shut until the gun is discharged. Repeat this until reasonably sure of hitting the mark with your eyes shut. Now, always shooting with both eyes open, practise firing at flying targets, apples, potatoes, tin cans, stones thrown into the air. If a companion standing behind a barn or some other shelter, throws these targets out into the air without warning to the shooter, so much the better.

Being now thoroughly accustomed to the gun and having acquired

the knack of using it upon moving objects, the gunner may try his hand on game in the field. He is likely to experience some nervousness at the rise of his first bird; but perseverance will bring its reward in time. The amateur who has had the patience to come thus far may safely be trusted to perfect for himself his skill in this branch of the gentle science of woodcraft.

In the field carry the gun with barrels over the shoulder pointing upward; or resting in the left arm; or aimed at the ground immediately in front. If the locks be rebounding, let the hammers be down, cocking the gun when the game rises; if the gun does not have rebounding locks, keep the hammers at half-cock.

Never, under any circumstances, point your gun, whether loaded or unloaded, at yourself or anybody else. Always treat it as if it were loaded. Cultivate that custom. Never pull a gun by the muzzle through a fence or out of a wagon or boat. As you value your life, do not go shooting with companions whose guns are a constant menace to you. Good sportsmen will never hunt with *you*, if you violate these rules. Remember that.

Leave the liquor flask at home. Ninety-nine out of every hundred gunning accidents reported in *The Tribune* may be traced either to the inexcusable carelessness of the sober gunners, or the freaks of drunken ones.

Do not use a gun for a club or cane. Mud, snow, a wad, or some other insignificant obstruction in the muzzle is liable to burst the arm when fired.

Regard the rights of land owners. If a notice is posted upon a tree saying "No Shooting on these premises," respect the notice and thus maintain your own self-respect. Do not trample down crops, or break fences, or leave the bars down. Shooting is a manly recreation; those who follow it should be more manly for participating in it. If you show yourself to be a gentleman, you will be permitted in time to shoot on grounds where lawless gunners would not be tolerated.

Never kill game out of the proper season. Game laws are for the good of the community. They are made in your own interest as well as for the benefit of others. Be hearty and scrupulous in your observance of these laws. Never shoot a game bird sitting on the ground or perched in a tree. Once you have tested the pleasures of wing shooting, ground shots and "pot-hunting" practices will have lost their charm.

A well-trained dog, pointer or setter, adds a hundred fold to the enjoyment of field shooting. The dog will often warn you of the proximity of game before you espy it yourself, and he will bring to you the bird you have shot, without your own weary legs being put to that labor.

THE RIFLE, TRAP AND TARGET.

BY HENRY HALL.

The Americans have long been known as a nation of riflemen. The phrase is as true to-day as it was several generations ago.

Our forefathers obtained their skill in the use of the gun from their life in a wilderness. Surrounded by savage tribes of Indians, obliged to understand the gun for their own protection, and using the weapon constantly either in the defence of their lives or in the pursuit of game, they were indeed a race of unerring marksmen. In the Revolution they were better shooters than the regular soldiers opposed to them.

At the present day, the original circumstances no longer exist which made every man a marksman and led to and maintained the old proficiency. Nevertheless, there are other circumstances which encourage the use of the bullet carrying gun, and this country still produces the best and the largest number of riflemen in the world. It is to be hoped that civilization and luxury will never lessen the reputation of our countrymen in this respect. A Republic of riflemen will always be safe politically; and the sports which a mastery of the rifle opens to the individual are of the utmost value for their training in self-control and the gifts of health and strength bestowed by them

In learning the use of the rifle, practice and experience are more important to the marksman than the lessons of any book. Leather-Stocking won his marvellous skill in the school of the forest, not in the drill room of an armory, or from the perusal of a manual. Nevertheless, the experience of the practical masters of gunnery will in these days help every individual to acquire proficiency in marksmanship more rapidly than if left to his own unaided resources; and a few suggestions are here presented derived from the best American authorities, as well as from some personal experience and observation of the shooting at Creedmoor.

The old-fashioned hunting rifle was a long, heavy, small bored weapon, loading at the muzzle. The piece often weighed from thirty to forty pounds. At first smooth bored, it was afterward grooved (or rifled). The bullet was placed over a patch of greased cloth, and was forced into the muzzle, sometimes with a brass starter. It was sunk to its place by a wooden rammer. A receptacle was provided in the stock of the gun, with a spring lid, for a supply of the patches. Powder was carried in the horn of an ox, properly fitted up, and carried at the waist by means of a cord slung over the shoulder. The hunter poured the powder into the palm of his hand until he guessed he had about enough, and then transferred it to the muzzle of his gun. The military weapon had a larger bore and thinner barrel and threw a heavy solid bullet, at first a round one and then a conical one, the latter being driven home with a slender iron rammer, so shaped at its head as not to mash the point of the bullet. Old-fashioned guns are still used in hunting in many parts of the country, especially in the South and Far West, with accuracy and effectiveness. Their owners justly entertain a remarkable affection for the weapons to which their muscles are accustomed and which have served them well for a life time. The calibre of these pieces usually ranges fom .38 to .44.

The modern rifle is a breech-loader, and is a lighter, handier, quicker, and longer-ranged weapon. The barrel varies from twenty-six to thirty-two inches in length, the weight of the piece from eight to not more than eleven pounds. Calibre is measured by hundredths of an inch, and the popular hunting sizes are .22, .28, .32, .38, .40, .42, .44, and .45. There are a few of calibre .50, .56, and .58, but these sizes are for military use. For squirrel shooting and small game, a calibre of from .22 to .32 will be chosen. For larger game especially for long range shooting, the rifle varies from .38 to .45. The military weapon is either a .45 or .50 the United States Army carrying a .45, and the National Guard either a .45 or .50. There are a large number of patents for opening and closing the breech, and for firing the piece. The hunter may take his choice. As in the case of the shotgun, the rifle should always be bought from a reputable manufacturer or from his agents, and the hunter may then depend upon having a weapon whose breech action is strong, tight and safe. The ammunition is made up into cartridges, thus superseding forever the powder flask, the ramrod, the starter, and all the clumsy and burdensome contrivances for muzzle loading. In the copper shell of the cartridge are placed the powder, bullet and fulminating cap. When the latter is placed in the edge of the rim of the cartridge, the piece is a "rim-fire," and when in the centre of the end, a "central fire." Weight of bullet and quantity of powder are determined by the size of the calibre, the range of flight desired, and the notions of the hunter. They are, now, about as folows:

Calibre .22.—Three to 5 grains of powder, 30 to 40 grains of lead.

Calibre .25.—Five or 6 grains of powder, 38 to 45 grains of lead.

Calibre .30.—Six to 8 grains of powder, 55 grains of lead.

Calibre .32.—Powder, 40 grains; bullet, 120 to 165 grains.

Calibre .38.—Powder, 40 to 50 grains; lead, 130 to 240 grains.

Calibre .40.—Powder, 60 to 70 grains; bullet, 210 to 260 grains.

Calibre .44.—Powder, 70 to 100 grains; lead, 400 to 550 grains.

Calibre .45.—Powder, 70 to 85 grains; lead, 285 to 400 grains. The Springfield army breech-loading rifle carries 70 grains of powder and 500 grains of lead. For bear shooting, 110 grains of powder and 340 of lead are a favorite charge.

Calibre .50.—Powder, 70 to 95 grains, though some have 115; bullet, 300 to 450 grains. In the Remington New-York State military rifles, the charge is 70 grains of powder, 450 grains of lead.

The cartridge is usually referred to in figures, which mean respectively calibre, powder, and lead. For instance, the regular army cartridge is a .45—70—500.

The rifle bullet is now no longer a round ball. It is long, the rear end flat, the forward end always pointed, but sometimes flattened at the extreme point, sometimes rounded spherically. A variety of bullet which has come into use for hunting large game at short range is the terrible express bullet. This missile has a cylindrical cavity in the forward end, which causes the bullet to spread the moment it penetrates, with dreadful and paralyzing effect. It is a light ball, but is fired with a much larger charge of powder than the ordinary cartridge contains. For instance an army musket with solid ball would require a .45—70—500 cartridge; the express cartridge would be about .45—125—300 .

It is, of course, well known that the object of the grooving of the barrel is to impart a rotary motion to a long bullet, and insure greater directness of flight. There have been a great multitude of experiments with grooving and twist. The matter is important, because the grooves retard the bullet and cause its flight after it leaves the piece to curve or "drift" toward the direction in which the twist turns. Modern hunting rifles usually have five or six grooves, either 3, 4, 5, or 6 thousandths of an inch in depth, and from 70 to 160 thousandths of an inch in width. The Springfield army musket has three grooves, .005 of an inch deep, .235 of an inch in width. In the Remington military rifle, calibre .50, they are .005 by .160. The grooves twist at the rate of one complete turn in from 20 to 30 inches, although the Winchester repeating rifle twists once in 40 inches, and the Remington military once in 42. Large rifles are sighted up to from 1,000 to 1,200 yards and will actually carry a bullet from 3,000 to 3,600 yards, that is to say about two miles. The military and the hunting rifles are now about the same in general appearance. The old wide divergence of bore, weight of barrel, and general character which affected the appearance no longer exists. Such differences as do exist are chiefly in the weight, the mountings, the leather gun-sling, etc.

When a marksman takes up rifle practice, there is more need for attention to fine points in holding and aiming, and especially in caring for the safety of others, than there is in the case of the shotgun. The range of the shotgun is small, whereas the rifle bullet speeds its way further than the eye can distinguish its effects. The marksman needs constantly to keep in mind that he is not entitled, by firing carelessly across country, to jeopardize the lives of human beings

Position in Firing from the Shoulder.

perhaps a mile or two away. Then in bringing the piece to bear upon a special mark, the greatest nicety and steadiness of position are essential. A rifle is an instrument of precision and successful shooting requires the most skilful management.

Position in firing is of importance, perhaps more so in military marksmanship than in the hunting field. The soldier positively must be prepared at all times to do good shooting from the shoulder, whereas the hunter can and will frequently make use of a tree or fence to steady his aim. It would be well, however, for every marksman, military or civil, to begin from the beginning in the right way.

The great desideratum is balance of the body, the centre of gravity so placed that the general position is easy, no special muscle being put to great tension to hold the body steady In firing from a standing position, the left shoulder is advanced by carrying the right foot backward about twelve inches and a little toward the right. The right hand grasps the small of the stock, the thumb uppermost and extended along the stock, or going over it and touching the second finger; the first finger extended so that the second joint is over the trigger; the right elbow raised to a level with the shoulder. The left arm is well extended, though not straight, and the elbow is brought well under the rifle so as to give the barrel a firm support. The butt is pressed firmly against the right shoulder, with the right hand, the heel of the butt on a level with the top of the shoulder. The shoulder (not the muscles of the arm) supports it firmly. The left hand gives direction to the rifle, and should not grasp it too tightly. The head is bent forward and to the right, so that the cheek touches the stock. The left eye is closed, and the right eye looks along the barrel, bringing both sights exactly into line, the forward sight just showing over the rear one. In sighting, the muzzle is first aimed below the target. In preparing to fire a careful shot draw a deep breath, and then exhaling a little, just enough to promote ease, raise the muzzle of the piece slowly, and at the same time gently press the trigger, so that when the target is covered, only a very slight additional pressure is requied to discharge the piece. When the sights cover the mark, pause a second to perfect the aim, press the trigger, and after the discharge hold the piece in position a moment so as to judge the direction of the bullet for future guidance. If the right shoulder and right elbow are well raised, the marksman

Firing from a Kneeling Position.

will escape having his cheek bruised in the recoil by his right thumb, which is over the small of the stock.

While this is the best average way of firing a rifle at short ranges, many riflemen vary the position. Some of them extend the left arm until it is nearly straight. Some of them do not press the butt against the shoulder, in order by holding the piece loosely to eliminate nearly all the vibration of the muscles; but in this case they feel the recoil more severely and have a black and blue shoulder next day; and in the long run it is better to comply with the rule of pressing the butt firmly against the shoulder with the right hand. A man's shoulder will feel a seventy-five-pound push far less than it will a fifteen-pound blow. Others rest the left elbow against the body, as nearly in front as possible, placing the left hand in front of the trigger-guard. Large men and slender men must necessarily hold the piece differently. Every man must experiment for himself.

The hunter as well as the soldier will occasionally fire from a kneeling position. In this position, again, the body must be so supported as to be steady, and the marksman able to spring readily to his feet. The left leg is straight to the front, and the lower part of it perpendicular, the left elbow resting on the knee. The right leg points directly to the right, and the foot either rests perpendicularly upon the toe, the marksman sitting on the heel of it (in which case he must wear thick double-soled shoes), or the foot lies flat upon the ground, the marksman sitting on the side of it. In aiming from this position, the right elbow must be well raised, so as to bring the butt well against the shoulder and prevent the thumb striking against the face in the recoil.

The amateur marksman will do well to practise these positions with an empty rifle, going through all the motions over and over again, until he finds that while pulling the trigger the sights hold straight at the target. Then he can repeat them with loaded cartridges. Aiming and position are so important that in the Army and National Guard there are special drills therefor.

In long range shooting it is necessary to sit or lie flat upon the ground. There are in the Army a great variety of these positions on the ground, some of which take their name from the famous marksmen who invented them, as for instance the Fulton, Tabler, Laidley, etc. The soldier's position in the field, lying flat with the head in advance, is the standard and one of the best for any ordinary shooting. The eyes then command the field. The man lies as flat upon his

The Texas Grip.

stomach as possible, the legs straightened out to the rear and toward the left, the right leg preferably resting over the left, although some riflemen prefer to spread the legs. The elbows rest upon the ground, the left one brought toward the right hand side the left hand under the piece in front of the trigger guard, the weight of the body resting chiefly on this elbow. The right elbow, arm and shoulder should be so placed that the butt of the gun does not rest against the collar-bone or the arm, but against the shoulder itself. In aiming sight below the mark as before, and bring up the piece slowly, pressing the trigger at the same time, and in general following the rules of the standing position in this respect. In antelope shooting the hunter will take this position.

At the long ranges for target practice (for instance at 800 to 1,000 yards) the best results are obtained by lying upon the back, crossing the legs in front, sometimes putting the gun-sling under the left leg and resting the barrel of the piece across one leg or in the place where the legs cross. The hands can grasp the piece about in the same manner as in the standing position, but as the butt cannot be placed against the shoulder it rests over and upon it.

In the "Texas Grip" invented by Sergeant Tabler, of the 22d U. S. Infantry, the gun sling is under the left leg above the knee, that leg resting on the right, the right hand so placed that the trigger is pressed with the thumb, the left arm behind the head and the hand grasping the top of the butt. The head is raised and takes an excellent and steady sight along the barrel.

In the Fulton back position, the legs are bent, the feet crossed, the knees spread open, the barrel resting in the crotch formed by the lower legs. The right hand is placed as in the standing position, but the left arm is behind and supporting the head, and the hand against the butt. Some remarkable shooting has been done from this excellent position.

The shape of the man has much to do with position on the ground. Every man can experiment and select the position which is best for himself. Any position is correct in which while the rifle is comfortably placed for aiming, the body rests easily on the ground either on the back or side, without tension of the muscles. These back positions are chiefly in use in the Army. They are seldom resorted to in hunting. Only upon the plains in antelope shooting or in the mountains while pursuing the mountain sheep and goat, is there much of an opportunity for these exceptional attitudes. And not often then. As a rule the hunter fires from the shoulder, either standing, kneeling or lying flat with head in front, steadiness in times of special need being sometimes gained by leaning the rifle against a tree or upon a log or stone. If the marksman wishes to attain great excellence in long range shooting, he is advised to join the militia company of his town and use his influence in favor of a great deal of target practice. The State puts into his hands, to begin with, an excellent weapon of the

The Fulton Position for a Long Range Shot.

very highest order; and he is then surrounded by congenial companions whose competition with him will spur him on to his best efforts, at the same time affording an opportunity for the comparison of experience, such as he cannot elsewhere obtain. The best shots of America now come from the Regular Army and the militia.

A few positions on the back and side, beside those named above, have been used at the various rifle ranges of the country, and may be briefly referred to.

One is the Laidley position. The man lies upon the right side, left leg upon top of the right, naturally. Th gun-sling is brought under the left knee, the barrel resting along the left leg. The right upper arm is placed flat upon the ground and the head is supported by the right hand. The butt of the piece rests across the right arm close to the shoulder.

A good back position resembles the Fulton, only that the body is turned slightly toward the right side, being sustained there by the manner in which the legs are crossed. As in the Fulton position, the legs are drawn up and crossed, knees in the air, the right foot over the left foot. The right upper arm is flat upon the ground and the right hand is brought back grasping the butt just at the side of the head back of the ear. The left arm comes across the body, fingers over the small of the stock, the thumb on the trigger.

Still another back position is gained by lying flat, legs extended straight in front, right foot resting over the left, right foot passed through the gun-sling, butt of the piece under the arm-pit, right hand grasping the small of the stock with forefinger on the trigger, and the head either unsupported or held by the left hand.

The variety of these positions is endless; but those named are standard.

In rifle shooting considerable allowance must be made at different distances from the game or target for the aberration of the ball in its flight from a straight line. The resistance of the air, the force of gravity and the rotation of the ball upon its longitudinal axis produce two changes of direction. One is called the "drift," which is a deviation toward the right hand or left hand side of the mark according as the grooves of the rifle barrel twist to the right or left. The drift of a bullet from a military rifle has been ascertained by experiment in the Army to be about as follows:

At 100 yards............	1 inch.	At 600 yards............	16 inches.
At 200 yards............	3 inches.	At 700 yards............	21½ inches.
At 300 yards............	5 inches.	At 800 yards............	28 inches.
At 400 yards............	8 inches.	At 900 yards............	35 inches.
At 500 yards............	11½ inches.	At 1,000 yards............	43 inches.

In order to correct the effect of drift, the rear sight of the modern rifle is so arranged that for fine shooting it can be moved from side to side, just the proper amount so that when the sights bear straight upon the object the bullet will hit the point aimed at fairly. This arrangement is called the "wind-gauge," because it is also employed to allow for the lateral variation produced by the wind.

The other variation in flight is caused by the dropping of the ball, under the influence of gravity, below a horizontal plane. To correct the drop of the trajectory the breech of the rifle is depressed and the muzzle raised, and the bullet then describes a curve through the air, rising from the piece and descending to the proper level again just as it strikes the mark. The rear sight is so made that the marksman can automatically obtain a correct sight at any distance up to 1,000 or 1,200 yards. So great is the curve of the trajectory at long ranges, that a man firing at an mark 1,000 yards away would clear an object 43 1-2 feet high 550 yards away and still hit the target. The highest rise of the trajectory at different ranges, with an army rifle as ascertained by United States Army experiments, is as follows:

Distance of target.	Highest rise of trajectory above the line of sight.	Distance of target.	Highest rise of trajectory above the line of sight.
100 yards	0 feet.	600 yards	13. feet
200 yards	1.1 feet.	700 yards	18.4 feet
300 yards	2.6 feet.	800 yards	24.7 feet
400 yards	5.1 feet.	900 yards	33.5 feet
500 yards	8.5 feet.	1.000 yards	43.7 feet

It is quite evident that very few hits would ever be scored at objects further away than the old forty and fifty rod distances (adopted in turkey shooting contests) were it not for the adjustable rear sight of the modern rifle. The marksman would be obliged to guess at some point away above the distant mark, and, even if he got the distance right, the bullet would be apt to drift away to one side of the object and clear it after all.

There are still two other causes affecting the flight of the ball, which must be taken into account by a marksman. (1) One is the fouling of the interior of the rifle barrel by the residuum of the powder. Fouling retards the ball and causes it to drop below or fall short of the target, so that after firing a few times it is necessary to elevate the aim. This deviation of the ball would be avoided if the barrel were cleaned after every discharge; but continual cleaning is troublesome, and as a rule experienced marksmen prefer to go through the day without cleaning. They are content with blowing into the open breech every time a shell is extracted, so as to keep the fouling soft. (2) Deviation is also produced by the force of the wind. If the wind blows directly crosswise of the line of fire, and is of considerable strength, allowance must be made by moving the wind gauge, especially in firing at long range. To indicate the direction of the wind a dial is used divided into twelve parts; the points of division indicated by the same numbers which are used on the face of a clock. When the wind is blowing from the target it is called a "12 o'clock wind"; when at right angles from right to left a "3 o'clock" wind; when from the marksman to the target a "6 o'clock"; and so on. The force of the wind is also indicated by numerals, as 1, 2, 3, 4 and 5.

The data concerning the proper adjustment of the sights for long range shooting under varying circumstances can be obtained from the rifle makers. But the marksman will of course understand that there is "no royal road to learning," and he must gain his principal proficiency in the field. Especially does he need to make a mental note, after every shot, of how he was aiming at the time he fired, the strength of the wind, and where the shot struck. He must correct his practice accordingly.

In handling the rifle, the same precautions should be observed as in the case of the shotgun. Never, under any circumstances, point the muzzle, whether the piece be loaded or not, at yourself or any one else. The writer has taught a number of women to fire the rifle and revolver, and has seen the weapon discharged several times by carelessness in the presence of a group of people, but, owing to the strict observance of this rule, without harm to any one in the party. Do not insert the cartridge before the moment has arrived for its use. Do not carry the piece at full cock. Never, as you value your life, drag it out of a wagon or over a fence, or take it up for any purpose by the muzzle.

Clean the piece thoroughly and oil it after every day's hunting, wiping it dry with a clean rag before you begin next day. After you have fired one shot, always blow into the breech before loading, so as to soften with the breath the fouling in the barrel.

Practise the aiming and firing drill, using an empty gun, frequently, between times, so as to keep your arm in training, holding your breath as long as you can, and keeping the aim upon the mark until the muscles begin to tremble.

Pace off various distances, out in a field, and learn to estimate them at sight.

The aim can be lower on a moist day than when the weather is bright and dry; and, if the sun is shining from one side do not be misled into mistaking the sparkle on one side of the forward sight for the sight itself. The front and rear sights should always be exactly in line, and the marksman must teach himself to see just the same amount of the front sight over the rear one, neither more nor less, on all occasions.

Upon one point, there is need of special caution. Amateurs frequently go out into the fields either to hunt or practise and, selecting their mark, blaze away regardless of anything except the mark itself. Too often target companies do the same thing, setting up the target in the edge of a piece of woods and firing at it from the open field, endangering life in and beyond the woods. It is essential that every precaution shall be taken in practising to prevent the bullets from going further than the target itself. A hill of soft earth is the best background for a target; and even with a bank of proper character behind, it is essential that the height shall be ample to prevent some ricochet shot flying over the crest and inflicting damage in the region beyond. Nearly every old hunter can relate anecdotes of bullets glancing from the sides of trees and endangering human life at points at right angles to, and far distant from, the marksman. There are several cases on record in which the bullet, glancing from several objects in succession, has returned to the marksman so closely as to imperil his own life. Instances of this latter class are rare; but they are sufficiently numerous to warn the amateur that he must not trifle with a gun. Make sure, as far as human foresight can go, that your shots will do no harm to others or to yourself.

The best marksmen are generally men of calm temperament, whose nerves have not been shaken by undue coffee drinking and smoking. Young men as a rule, make excellent records.

Women also make excellent marksmen. In some parts of the South and the wild West, especially on the frontier, the women nearly all know how to handle the rifle, and many of them are expert shots. It would be well if every woman knew how to handle firearms.

TRAP AND TARGET SHOOTING.

The perfection of shotgun shooting is attained when the amateur can bring down a wild fowl on the wing. No skill is required to hit an owl sitting motionless upon a limb or a heavy crow engaged in plucking up the seeds which have been planted in the cornfield. But to bag a startled partridge, roused from the underbrush and whizzing like a shell into the deeper recesses of the woods, or to bring down a duck flying across the line of fire at a velocity of a mile a minute, is a different matter. The sportsman shows his skill by firing at flying birds.

As a natural outgrowth of the abundance of expert sportsmen in the United States, a great number of gun clubs have been formed in almost every State of the Union. The object is sociability, the comparison of experience, agitation to secure good game laws, and the control of tracts of land for game preserves and, in addition, the holding of annual and other tournaments for the display of marksmanship and a competition for valuable prizes.

For a long period, in fact for the whole period until within the last ten years, shotgun tournaments were supplied with live wild pigeons for targets. The birds were trapped in the woods; and from 1,000 to 3,000, sometimes nearly 10,000, would be massacred at a single tournament. Placed in traps at a suitable distance from the marksmen, they were liberated by pulling a cord, or were thrown into the air one at a time or in pairs, and were shot by the competitors as they rose. Many a bird would be wounded, but would manage to escape, only to die a lingering death in the fields beyond. A mound of the slain would be left upon the ground at the end of a day's shooting. Sportsmen themselves were displeased with the barbarism of such sport.

Humanity has at last prevailed. At the present day, few if any reputable and right feeling sportsmen will engage in a tournament which is supplied with live birds for flying targets.

In response to the demand for inanimate targets, Captain Bogardus, a celebrated sportsman and gunner, suggested throwing hollow glass balls into the air by spring traps or by the hands of attendants. The Captain popularized glass ball shooting to some extent: but these targets did not fill the place of live birds, and hunters practising upon them were in danger of losing their skill in genuine wing shooting. A wild bird (quail, pigeon, or partridge), when breaking cover, flies off through the air at a great speed with a gently rising motion, and ends its flight by gradually settling down toward the earth again. Furthermore, its shape with wings extended, is, to the marksman in front of or behind it, that of a crescent rounded upward. Glass balls could not be thrown either to present the proper form of target, or to imitate the flight of a bird. The exact target required was finally invented by George Ligowsky, of Cincinnati, a practical sportsman, as well as manufacturer. This was the clay pigeon, a device which is now in general use at the reputable gun tournaments of the United States. The clay pigeon is a saucer of red clay, five inches in diameter, two inches deep, weighing one and a quarter ounces, very thin, and burned to a condition so brittle that one shot will break it. A clip or short handle is fastened to one edge, and this handle is inserted in the end of the arm of an iron trap, which throws the pigeon into the air, very much as a boy throws a stone by inserting it into the end of a split shingle. The trap is operated by a strong spiral spring, and a trigger pulled by a cord. The clay birds can be sent out with varying degrees of velocity and at different angles of rise into the air, and they can fly from fifty to seventy-five yards in a horizontal line. In their flight they imitate a quail or pigeon exactly. The hollow surface is toward the ground and the rounded side forms the crescent made by a bird's back and wings. Owing to their rotary motion, they break into fragments when hit with a shot. As the trap can be set at the proper "notch" to give either a slow and easy motion or a quick rush, and to throw the bird either quartering or straight away, and as the clay pigeon is liable to be deflected by the wind, this target presents to the gunner all the problems that he encounters when firing at wild birds.

Clay pigeon shooting is excellent practice for the amateur and good fun. Marvellous skill has been developed in shooting them, especially by professionals. Dr. Carver and Captain Bogardus gave a series of twenty-five exhibition shoots at clay pigeons, 100 birds on each occasion, at eighteen yards rise, the use of both barrels allowed, the trap set at the fourth notch. Out of the 2,500 birds each, Dr. Carver broke 2,327, average 93; and Captain Bogardus 2,163, average 86. Captain E. E. Stubbs and Gwynne Price gave eight similar exhibitions at 21 and 25 yards rise, and scored 764 and 720, or an average of 95 and 90 respectively. They shot with 10 bore, 9 pound guns. Captain Stubbs has shot five clay pigeons at 45 yards rise with one barrel, all broken at 60 yards distance; he has also scored 30 in succession at 25 yards rise, using the second barrel twice only. Standing at from 25 to 30 yards, other gunners have brought down from 25 to 29 out of 30; 35 to 39 out of 40; and even 95 to 97 out of 100. Captain Bogardus has frequently shot 300 from five traps in 20 minutes.

Perhaps the most remarkable exhibition in short range wing shooting ever seen in America was that given by Dr. Carver in New-Haven, in January, 1885. In six days he hit 60,016 small objects (balls of wood, pieces of coal, etc.) thrown into the air by hand. In the first seven hours 4,630 shots were fired by him. In all, 64,881 shots were fired, 4,865 of them being misses. The range was about fifteen feet. Although this work was all done with a rifle (a breech-loader, .22 calibre) yet it ranks properly with shotgun shooting, on account of the short range.

In wing shooting, the position of the marksman varies with different men. The majority of crack shots extend the left arm as nearly straight as possible, grasping the gun near the muzzle.

There has long been a strong desire among the votaries of the shotgun throughout the United States for a National Association, kindred to that which exists among riflemen. Nearly every State has had a State Association. The national organization was lacking. This want was supplied in February, 1885, by a national meeting of sportsmen at New-Orleans, and the formation of The National Gun Association, with J. E. Bloom, of Cincinnati, one of the active moving spirits, as secretary. The objects are (1) To promote shotgun wing shooting throughout the United States; (2) to adopt national rules for all classes of shooting at the trap; (3) to organize annually an International Shooting Tournament, and (4) two or more Inter-State Tournaments; (5) to organize gun clubs in various cities; (6) to publish reports; (7) to foster and assist tournaments by minor clubs and associations; (8) to secure game preserves for the members; (9) to promote kind feeling and fellowship: and (10) to devote surplus moneys to the promotion of hunting and other lawful sports, the protection of game, and the collection of specimens. This Association has already adopted Rules for Trap Shooting, which combine the best and latest practice, and are therefore standard in the United States. They are as follows:

1. The shooters elect two judges, who shall in turn elect a referee. Each shooter must come to the score in three minutes after his name is called. The judges shall raise a red flag to indicate a broken or killed bird, and a white flag to indicate "lost" bird; they shall raise both flags to indicate a "no" bird or an "imperfect" bird. The scorer shall promptly repeat his score in a loud tone of voice.

2. Cartridges—It shall be the duty of the referee to examine cartridges, to ascertain the amount of shot used by each shooter at any time during the tournament, when requested to do so by a contestant.

3. Traps—Five shall be used, set in an arc of a circle, level with the ground, five yards apart, numbered from left to right; the fourth notch, or a velocity equivalent thereto, shall be used (excepting for trap No. 3, where the third notch shall be used) with the projecting arm of the trap not elevated over 15 degrees.

4. Traps Nos. 1 and 5 shall throw across the line drawn from the shooter to trap No. 3, the crossing point being not over twenty-five yards from the shooter; trap No. 2 shall throw left, half quartering; trap No. 4 shall throw right, half quartering; trap No. 3 shall throw straight away.

5. Double birds shall be thrown from traps Nos. 2 and 3; ties from traps Nos. 3 and 4. Trap No. 3 shall be set at about 15 degrees elevation; traps Nos. 2 and 4 at about 20 degrees elevation.

6. Double birds—(1) In case one be a fair bird and the other an imperfect one or no bird, he must shoot at a new pair; both birds must be sprung at once, otherwise they shall be "no birds." (2) A shooter firing both barrels at one bird, in succession, shall be scored lost birds. (3) If both birds are "killed" by the first shot or barrel, they shall be scored "no birds": if by the second barrel, they shall be scored first "lost," second "dead."

7. Ties on single birds shall be thrown from traps Nos. 1, 3 and 5.

8. Screens—No screens or netting shall be used; "back stops" may be provided for trappers, not to exceed ten yards from the end traps, and not to exceed three feet in height.

9. Broken birds—No clay pigeons shall be examined for shot marks: birds shall be scored lost unless broken distinctly in the air.

10. Imperfect or no Birds—If a bird be broken by the trap,

it shall be optional with the shooter to accept the same; if accepted, the result shall be scored. The shooter shall be allowed another bird under either of the following contingencies: (1) In single bird shooting, if two or more birds are sprung instead of one, and the shooter does not fire (but if he fires he shall be scored). (2) If the bird is sprung before or at any noticeable interval after the shooter calls "pull," and he does not fire at it (but if he fires the bird shall be scored). (3.) If the bird does not fly thirty yards from its trap, passing over a line (imaginary) at a distance of ten yards from the traps and four feet high, and the shooter does not fire (but if he fires the bird shall be scored). (4.) If in the judgment of the referee the shooter is baulked by accident or otherwise. (5.) If the shooter's gun, being properly loaded and cocked, does not go off at any cause whatever, excepting through the fault of the shooter.

11. Pulling—When shooter calls "pull" the trap shall be instantly sprung, or the bird may be refused. If pulled without notice, or more than one bird loosed, if the shooter fires he must abide the consequences. If he fails to shoot when trap is properly pulled it must be scored a lost bird. The trap puller shall stand from four to six feet behind the shooter, and shall use his own discretion in regard to which trap shall be sprung to each shooter.

12. Purses—To be divided in fifty, thirty and twenty per cent, unless otherwise agreed upon.

13. Bribing Trappers or Pullers—Any shooter convicted of an attempt to bribe, or in any manner influence the trappers or pullers, to be debarred from all further contest during the tournament.

14. Rise—Shall be 18 yards for singles and 15 yards for doubles; ties at 3 yards additional up to the limit of handicap.

15. Handicap—All winners or dividers of first money shall be handicapped two yards; winners (or dividers) of second money shall be handicapped one yard; maximum handicap 22 yards. If a shooter shall win at the maximum handicap, all others handicapped shall step in one yard.

16. Ties shall be shot on singles at three birds each; on doubles at one pair.

17. Position of Gun—The gun shall be held below the armpit until the shooter calls "pull"; otherwise, if challenged, it shall be declared a "lost" bird, whether hit or missed.

18. Loading of Gun—Charge of powder unlimited; charge of shot not to exceed 1 1-4 ounces Dixon's standard measure, No. 1,106 or 1,107, struck off. Any one using a larger quantity of shot shall forfeit all entrance money and rights in the match, and shall be subject to further action by the management, as provided in the Constitution and By-Laws.

19. Handicap of Gun—No guns larger than 10 bore shall be

allowed. Guns of 12 gauge, weighing 8 pounds or under, shall be allowed two yards.

20. Misfire—In case of misfire through no fault of the shooter another bird shall be allowed.

21. Entries—All entries shall close at the firing of the first gun.

22. Challenging—None but contestants in a match shall be allowed the right of challenging.

23. Danger—If the bird is thrown so that to shoot in proper time it would endanger life or property, the referee shall allow another bird.

24. Closing a loaded gun before going to the score, or failing to remove a loaded cartridge before leaving the score, shall subject shooter to fine of $1. On single birds one barrel only shall be loaded; should more than one barrel be loaded in single bird shooting, the bird shall be scored lost.

25. Class Shooting—All sweepstakes shall be class shooting unless otherwise specified.

26. In all tournaments five per cent shall be deducted from all purses for the benefit of the Association; clubs shall deduct two per cent in club matches should the club so elect.

27. Fines—A fine of one dollar, to be added to the pool, shall be rigidly enacted for any of the following acts of negligence: (1.) Pointing a gun at any one under any circumstances. (2.) Firing off a gun, except when the shooter has been called to shoot and is at the mark. (3.) Closing a gun with cartridge in before arriving at the mark, or when in the act of closing it pointing it toward the shooter or spectators. (4.) Quitting the mark without extracting a loaded cartridge unfired. (5.) Having a loaded gun anywhere on the ground except when at the mark. (6.) Should any contestant attempt to take any undue advantage of a shooter when at the score, in order to cause him to lose a bird, or create or participate in any disturbance, he shall be fined five dollars or be expelled from the Association.

28. Paying for Birds—The price of birds shall be deducted from the amount of each separate pool or sweepstakes, unless otherwise specially agreed beforehand.

29. Live Birds—All birds shall be shot from ground traps, which shall be set 5 yards apart. Rise 25 yards. Use of one barrel. Boundary unlimited. In case of challenged bird the shooter shall be allowed 3 minutes to gather the bird.

30. Birds on the Wing—In double bird shooting, the birds shall be on the wing when shot at. A bird shot on the ground shall be scored lost. Double birds to be shot at 21 yards rise, boundary unlimited; 5 minutes allowed to gather birds if challenged.

31. Ties—On single birds, 25 yards rise; doubles at 21 yards.

32. If a bird is shot at by any person except the man at the score, the judges and referee shall decide whether it shall

be scored lost or the shooter allowed another bird. When traps are sprung, should bird refuse to fly after a reasonable time the shooter may call "no bird."

33. Gathering Birds—It shall be optional with the shooter to collect his own birds or appoint a person to do so for him. In all cases the birds must be gathered by hand, without any forcible means, within 3 minutes of the time it alights, or be scored a lost bird. All birds must show shot marks if challenged.

34. Team Shooting—The teams, in team shoots, will be called to the "score" in the order designated by the Executive Committee; said order will be determined by the dates of original entry, teams being allowed to choose accordingly; the members of the team will be called to the "score" in the order designated by their respective captains, each man shooting at singles 5 birds in succession, and then (when all teams have finished shooting at single birds) the members will, in a similar manner, finish their scores at the double birds.

35. Teams—In team championship matches teams of four must be residents of the same State, and in twin-team championship matches both must be residents of the same county or parish.

The new association expects by competition with teams from abroad to establish the superiority of American sportsmen in the use of the shotgun. Preeminence with the hunting rifle has already been proved.

CREEDMOOR AND LONG RANGE RIFLE PRACTICE.

Organized target practice with the rifle began in the United States in 1873, under the auspices of the National Rifle Association. Previous to that date, there had been a few small rifle clubs, composed entirely of sportsmen, in various parts of the country. One of them, though not much larger than the rest, had the title of The National Rifle Club, but was, like the others, a purely sporting club, aiming at sociability and a quiet annual competition. These clubs, almost without exception, shot with very heavy (15 to 35 pound) rifles, using rests and telescopic sights, and usually at 40 rods, a species of light artillery practice. In 1871, some public-spirited men, connected with the National Guard and the regular army, awoke to the importance of a more thorough training of the militia of the United States in the use of the rifle. While every State maintained a number of regiments of citizen soldiery these troops were, as a rule, remarkably deficient in the ability to handle in a proper manner the weapons which had been placed in their hands. Although well drilled in the evolutions of the battalion and the manual of arms, a large proportion of them had never fired any charge heavier than a blank cartridge, and strange as it may seem thousands had never even loaded a military rifle. As for accurate rifle shooting, not one man in a hundred knew anything about it. This state of affairs produced its natural result. Companies and regiments, hastily summoned to quell a sudden riot, lacked the confidence and steadiness produced by a perfect command of the rifle and a thorough understanding of its powers.

When the Brooklyn 13th formed with the 22d Regiment to march out to aid in quelling the Orange riot, two rifles were accidentally fired before they left the armory. The evil was too great to be borne in silence; and a movement was set on foot which, in its earlier stages, derived its principal support from the enthusiasm and earnestness of General (then Captain) George W. Wingate and Colonel William C. Church, both of New-York City.

On the 24th of November, 1871, a meeting was held in New-York by a large number of men belonging to the United States Army and the National Guard, together with many civilians who acted in concert with them. At this meeting The National Rifle Association was organized, under a charter from the State of New York, and officers were elected as follows: President, General Ambrose E. Burnside: Vice-President, Colonel William C. Church; Secretary, Captain George W. Wingate; Corresponding Secretary, Frederick M. Peck; Treasurer, General John B. Woodward.

This association resolved to establish a range for rifle practice at once, and to encourage the establishment of similar ranges throughout the country. The State Government through General Franklin Townsend, then Adjutant-General, took great interest in the matter, and through the exertions of the Hon. David W. Judd (commemorated by the Judd Match) a law was passed May 14, 1872, contributing $25,000 for the purchase of land for a range as soon as the association had raised $5,000 by private subscription for the same object. The same law provided for Division and State prizes for marksmanship. While waiting for this action of the Legislature, the association compiled a Manual of Rifle Practice, or rather General Wingate prepared one, which appeared during the summer of 1872 and was at once adopted by the military authorities of the State. Especial attention was paid to position and aiming, or practice in simulated firing (which forms the foundation of the modern system of instruction in shooting), and the militia of the State was as thoroughly drilled as practicable in those exercises the following winter. A site for the proposed range was selected on Long Island, twelve miles east of Brooklyn. The sum of $6,000 was raised by private subscription, the Supervisors of New-York and Brooklyn appropriated $5,000 more, and the State paid in its promised $25,000. Thus supplied with funds the association purchased the site it had in view at Creedmoor, and upon its seventy acres of land created an excellent range. Targets were bought in England. By April, 1873, an embankment had been constructed 570 feet long and 25 feet high (which was afterward surmounted by a bullet-proof fence 15 feet high), and 20 targets were placed in position against the mound. Ten ranges or firing points were located, the nearest 100 yards from the targets, the longest 1,000 yards.

The shooting at Creedmoor began informally April 25, 1873. General Dix, the Governor of the State, had been invited to fire the first shot. He could not come; and the first shot was fired, appropriately, by the energetic secretary, Captain George W. Wingate, General Woodward acting as marker. The opening match took place on June

21. Teams were present from eighteen New-York regiments, one from New Jersey, one from the Regular Army and one from the United States Engineers. The shooting was at the short ranges. It must be said that the practice on this occasion revealed in a striking manner the necessity for rifle practice among both the National Guard and the Army. During August and September about 3,000 men in all practised at the range; the first regular annual competition took place October 8. Instant success greeted the whole enterprise. Spectators flocked to the grounds at every competition; the militia took the deepest interest in the advantages that Creedmoor afforded; and the year closed with the range firmly established in the public favor.

The first match with a foreign rifle team took place in 1874. An Irish team had challenged an American team to meet them and had been met half-way; and, coming to New-York in the fall of the year, they shot the match at Creedmoor September 26. To the surprise of both parties the American team won, in spite of the fact that on that day the Irishmen made the best scores they had ever attained to and excelled, in fact, the best efforts previously for the Elcho Shield at the Wimbledon range in England. Great excitement followed this result. It was remarkable that the best long-range shooting in the world up to that date was recorded at the first international match at Creedmoor. The result of this match was to give match rifle shooting a prominence which the N. R. A. never intended, it being organized to promote military rifle shooting rather than the use of fine rifles. Still the result was beneficial to both.

From 1874 forward, Creedmoor became a place of great activity in the summer months. Two days each week from June 1 to November 1 have been set aside for the National Guard of New-York, the number of days having been recently increased to three per week. The practice has been constant. In 1876, 12,000 men practised at the range during the season. A few years later 18,000 men shot there. The number is now nearly 25,000 annually. The annual competitions have been attended by teams and by individual marksmen from the most distant parts of the country and from a large number of the regiments of the Regular Army, and there has been an occasional international match to vary the exercises. A valuable feature of the practice at Creedmoor was introduced in 1886, namely, the skirmishers' competition. In this exercise the skirmish line is formed with several teams of six men each, all carrying forty rounds of ammunition. They start at a bugle signal from the 600 yards firing point, advance at a double quick to the 500 yards range, halt, fall upon the ground and begin firing at the targets. At a second bugle call they rise and advance rapidly to the 400 yards range, halt, fire, and again advance, repeating the process until they reach the 200 yards line. They then retreat, halting and firing at the several ranges. In the skirmishers' competition of 1886 the team from the Regular Army showed great proficiency, whereas the militiamen fired remarkably wild and revealed in a startling manner the urgent necessity for this very practice. The grounds have been steadily improved by the association year by year. In every respect except the inconvenient distance from the city the range is now all that can be desired. The distance is a serious matter, for the reason that in order to have time enough on the range for a useful day's practice the military companies of New-York must rise by daybreak, and then do not reach their homes again until 10 or 11 o'clock at night.

Following the opening of Creedmoor similar ranges have been established in the following States: Maine, Massachusetts, Connecticut, New-Jersey, Pennsylvania, Illinois, Michigan, and Wisconsin. Indiana, Ohio, and a few other States practise their troops in the annual State camps.

The following are the Regulations of the National Rifle Association:

I.—MANAGEMENT.

1. Annual meetings for competition will be conducted by an Executive Officer, wearing a tri-colored badge, aided by a Statistical Officer, wearing a blue badge, a Financial Officer, wearing a white badge, a Range Officer, wearing a red badge, and assistants, wearing badges corresponding in color to those worn by the chiefs of their respective departments.

2. The Executive Officer shall have control of the range for the conduct of matches, and shall appoint an adjutant to assist him.

3. The Statistical Officer shall have charge of all statistics.

4. The Financial Officer shall have charge of all finances connected with these meetings.

5. The Range Officer shall have charge of all firing-points, and the shooting thereat.

Other competitions.—All other association competitions shall be conducted by an officer or director of the association, or other competent person previously designated as the executive officer. In the absence of the officer, director, or other person previously designated, the assistant secretary or superintendent of range shall act as the executive officer.

II.—GENERAL REGULATIONS.

1. During the progress of a match, no one, except the officers, directors and employes of the association, the competitors and the score-keepers will be permitted within the ropes without special permission of the range officer.

2. The squads of competitors will be stationed not less than four yards in rear of the firing-points, where each competitor must remain until called by the score-keeper to take his position at the firing-point, and until he has completed his score. The score-keepers will be seated close to and in rear of the firing-point stakes.

3. Score-keepers shall, as each shot is signalled, call in a loud voice the name of the competitor and the value of the shot, and at the conclusion of the score of each competitor, announce in like manner his name and total score.

Competitors must pay attention to the score as announced and recorded, so that any error may be promptly investigated.

Score-keepers shall write upon the blackboard the names of the competitors in each squad or file, in the order in which they are to fire. They shall record each shot upon the blackboard before entering it upon the score card, and shall not erase from the blackboard the names or scores of competitors until a proper officer has verified the score cards with them.

4. All competitors will be allowed to examine the records of the score-keeper during the progress of any match upon application to the range or executive officer.

5. All protests and objections must be made to the executive officer, or, in his absence, to the range officer in charge. In case a competitor is dissatisfied with the decision of the latter, he may appeal to the executive officer.

All protests must be made in writing, in duplicate. These must be given to the range officer within two hours of the occurrence. One copy of the protest will be submitted to the party protested against as soon as practicable. Except that when the protest charges fraud, it may be made at any time before the prizes for that competition have been awarded.

6. Any competitor feeling himself aggrieved by the ruling of an executive officer may make to the secretary a statement of his grievance in writing, giving the names of two or more witnesses in the case, which shall be handed to the Executive Committee at its first meeting thereafter for its consideration. The decision of the Executive Committee shall be final, subject, however, to the discretion of said committee, or any two members of it, to refer the matter to the Board of Directors for its decision.

7. All practice upon the range is subordinate and must give way to matches of the association, except as directed by the executive officer or range committee.

8. These regulations, and such special rules or directions as the executive officer may give, must be rigidly complied with by competitors and all other persons upon the range grounds.

III.—RIFLES.

The rifles allowed in the competitions are—1st, military rifles; 2d, special military rifles; 3d, any rifles, and must comply with the following conditions

1. Military rifles to be such as have been adopted by the United States Government, for use in the Army, or by any State or Territory for the use of its uniformed militia—except such rifles as have been especially issued to sharpshooters or for experimental purposes. Filing or altering the sights of such rifles, except as authorized by the proper military authorities, is strictly prohibited.

2. Special military rifles, to be fitted with an arrangement for fixing a bayonet or such other device as may be employed to take the place of a bayonet. Stock to be sufficiently strong for service purposes, and to be fitted with a metal cleaning-rod

and swivels for a sling; weight (without bayonet) not to exceed nine and one-quarter pounds. In all military rifles the minimum trigger pull shall be six pounds. Sights may be such as are allowed on military rifles or of such other pattern as may have been approved by the Board of Directors of The National Rifle Association. The sight protector of the front sight may be used as a shade for the same.

3. Any rifle, maximum weight ten pounds, minimum pull of trigger three pounds; sights of any description, except telescope, magnifying and such front aperture sights as solid disks or bushes pierced in the centre, which cover the target so as to conceal the danger signal when displayed. No stirrup constructed of metal or other substance, connected to the rifle by straps of any kind, for the purpose of taking up or lessening its recoil, will be allowed.

4. The usual military sling and swivels may be used.

5. Competitors shall submit their rifles and ammunition for inspection whenever required.

6. No hair or set trigger will be allowed.

7. No fixed or artificial rests will be allowed.

IV.—AMMUNITION.

For any military or special military rifle, any form of fixed ammunition may be used in which the bullet is securely inserted in the shell to a depth not less than two-thirds the diameter of the bore, so that the cartridge may be carried in a belt, bullet down.

For any rifle, any ammunition may be used. When a breech-loader is used it must not be loaded, or when a muzzle-loader is used it must not be capped until the competitor has taken up his position at the firing-point.

V.—TARGETS.

The targets are divided into three classes, and shall be of the following sizes, unless otherwise stated in the terms of the match:

1. Third class, to be used at all distances up to and including 300 yards—Target 4 x 6 feet. Bullseye, circular, 8 inches in diameter; centre, circular, 26 inches in diameter; inner, circular, 46 inches in diameter; outer, remainder of target.

2. Second class, to be used at all distances over 300 to and including 600 yards—Target 6 x 6 feet; bullseye, circular, 22 inches in diameter: centre, circular, 38 inches in diameter; inner, circular, 54 inches in diameter; outer, remainder of target.

3. First class, to be used at all distances over 600 yards—Target 6 x 12 feet; bullseye, circular, 36 inches in diameter; centre, circular, 54 inches in diameter; inner, square, 6 x 6 feet; outer, remainder of target.

VI.—MARKING, SCORING AND SIGNALLING.

1. Bullseye, counts 5; signal, white cicular disk. Centre, counts 4; signal, red disk. Inner, counts 3; signal, white and black disk. Outer, counts 2; signal, black disk. Ricochet, scored R; signal, red flag waved twice right and left in front of the target. Ricochet hits will be marked out after the flag signal.

2. When a shot strikes the angle iron upon which the target stands, the marker will open the trap and raise and lower his flag three times in front of the target.

3. Any objection to the record of a shot as signalled or to one not signalled must be made before another shot is fired. Any competitor challenging the marking of a shot shall first deposit with the executive officer, or his representative, the sum of $1. If his challenge is sustained the money shall be returned. In case the challenge is not sustained the money shall be forfeited to the association. The challenger shall not be permitted to inspect the target.

4. When two shots strike the target simultaneously, the shot having the higher value shall be marked first, and the competitor whose proper turn it was to shoot will be credited with that value.

5. Any alteration of a scoring ticket must be witnessed by the officer in charge of the firing-point, and indorsed with his initials.

VII.—BULLSEYE TARGETS.

1. Bullseye targets will be open all the time during the annual meetings.

2. Tickets (entitling the holder to one shot at any bullseye target) will be sold at the office of the financial officer, upon the range, at 10 cents each, or twelve for $1.

3. Each competitor making a bullseye will receive a bullseye ticket, provided he fires in the position authorized at that range.

4. At the close of the firing each evening, the pool receipts (less one-half retained for expenses) will be divided pro rata among those making bullseyes, on presentation of their tickets.

5. No person will be allowed to fire more than three shots consecutively at any bullseye, provided others are waiting to fire.

VIII.—MATCHES.

1. The commencement of the annual meetings will be signalled by the firing of a gun or blowing a horn at intervals of fifteen minutes. The first will be the signal for competitors and scorekeepers to assemble at the firing-points, and the second to commence firing.

2. The matches will take place, if possible, at the hour previously named. Any deviation from the programmes will be posted upon the bulletin board as long beforehand as practicable.

The posting upon such bulletin-board will be considered sufficient notice to all competitors of everything so posted. It should be examined by all competitors daily, both morning and afternoon, before the shooting commences.

3. In team matches, at annual meetings, an officer will be assigned to each of the firing-points as supervisor, and will, in connection with the score-keeper, keep a record of the firing; and any disagreement between such officer and score-keeper will be decided by the executive officer, subject to appeal, as provided for in the regulations.

4. Each team may appoint a responsible person to act as supervisor, whose duty it shall be to see that the rules of the N. R. A. are strictly adhered to by the team at whose target he may be assigned.

5. No practice will be allowed upon the range on any of the days of the annual meetings, unless specially authorized by the executive officer. This does not apply to days upon which special matches of the association, or of affiliating associations or clubs, take place.

IX.—ENTRIES.

1. In all cases competitors for prizes offered to military organizations must be either officers or regularly enlisted members in good standing of the regiment, battalion, company or troop which they represent, and shall have been such for at least three months prior to the match for which they are entered.

2. Entries must be made at the office of the association, in New-York City, prior to the Sunday preceding the commencement of the meetings, and all subsequent entries shall be called post entries, and a charge of 25 per cent additional will be imposed on all such post entries. This does not apply to re-entry matches.

3. Competitors who are prevented from being present at any meeting shall have the entrance fees they have paid returned after the meeting, provided that they send their tickets and give written notice to the secretary before the day on which the prize for which they have entered has been announced for competition.

4. Competitors prevented from competing by illness will receive back their entrance fees in full, on production of a medical certificate and their entry tickets.

5. The holders of post entry tickets may be ordered to fire whenever target accommodations can be provided, but should they be precluded from competing by deficiency of target accommodation, their entrance fees will be returned to them, the executive officer not being able to guarantee accommodation for all such entries.

6. All entries are received upon the express condition that the competitor is to appear at the firing-point at the exact time named upon his score card, and complete his score within the time prescribed, regardless of weather or any other cause.

7. The same person shall not be a member of more than one team in the same match.

8. Competitors selected to shoot in team matches, or who are detailed to shoot off a tie, at a particular hour, and who find that such engagements will interfere with their shooting in other competitions, must at once communicate with the executive officer. These cases will be provided for when possible, by altering the hour; and when that cannot be done, the entry will be cancelled and the entrance fee refunded, except in cases of ties, when he takes the next lowest prize.

General regulations—(1) A register ticket may be transferred at any time before the firing for the match has commenced by exchanging it at the office of the statistical officer for one having the name of the new holder. It is available only for the hour and target for which it was originally issued. Any erasure or alteration of hour or target not initialled by the executive officer will render the ticket invalid. (2) No post entries shall be received for any competition after the firing in such competition has commenced, unless expressly permitted by the terms of a match.

X.—SHOOTING.

1. Competitors must be present at the firing-points punctually at the time stated upon their tickets, or forfeit their right to shoot.

2. After a competitor has joined a squad he shall not quit it until he has completed his firing, or retired.

3. No two competitors squadded to fire at the same time shall shoot with the same rifle.

4. In all competitions confined to members of military organizations, competitors shall shoot in a uniform to consist of a military head dress, uniform jacket or coat and a body belt to be worn as is usual in their corps.

5. In each match of the annual meetings, except where otherwise stated the squad or team assigned to each target will be required to commence firing at the time named on the score card, and to continue firing at the rate of one shot per minute until the completion of the score.

6. The time for each squad to commence and close will be signalled by firing a gun or blowing a horn every thirty minutes, from 9 a. m. to 5:30 p. m., and no firing by any of its members will be permitted except between those signals. In case a competitor, without fault on his part, has been prevented from finishing his score within that time, he may apply to the executive officer for further assignment, the granting of which will be within the discretion of that officer.

7. Competitors retiring from matches forfeit all claims therein.

8. No sighting shots will be allowed in any match, but targets will be assigned as bullseye targets at which competitors may practise at any time, provided such practice does not interfere

with their presence at the designated time at the firing-point to which they may have been assigned, or in case of teams, after the hour named for the commencement of their shooting.

9. In all competitions restricted to military rifles the competitors shall place themselves at the firing-point by twos, and shall fire alternately until they have fired all their shots.

10. In other competitions the competitors shall fire their shots alternately throughout the squad.

11. No rifle shall be cleaned or wiped out except between ranges, unless specially allowed by the terms of the match.

12. Whenever the danger signal is displayed competitors about to fire will be required to open the breech block of their rifles (if breech-loaders). If they leave the firing-point they must withdraw the cartridge.

13. Any competitor delaying his squad will be passed by. In no case will the firing be delayed to enable a competitor to procure a rifle.

14. Competitors must shoot their scores at different distances in the order named in the conditions of the competition.

15. In all competitions, unless otherwise provided by their terms, competitors will be allowed one minute to each shot.

16. Warming shots must be fired into the bank between the targets.

XI.—POSITION.

Unless otherwise stated in the terms of the match, shall be as follows:

1. In all matches (except those specially for carbines), the position up to and including 300 yards, shall be standing. The elbow may be rested against the body.

2. In carbine matches the position at 200 yards shall be standing; at 300 yards, kneeling or sitting; over that distance, any position (as prescribed for infantry.)

3. In all other matches, at distances above 300 yards, any position may be taken without artificial rest to the rifle or body.

4. One-armed competitors will be allowed to use false arms without extra support, in the standing, sitting and kneeling positions.

5. In all cases the rifle shall be held clear of the ground.

XII.—TIES.

1. Ties shall be decided as follows:

(a)—In individual shooting—1. When the firing takes place at more than one distance, by the total score made at the longest distance; and if still a tie, and there be three distances in the competition, by the total score at the second distance.

2. By the fewest outers in the entire score.

3. By the fewest inners in the entire score.

4. In handicap matches (after the preceding), by the fewest centres in the entire score.

5. If still a tie, by inverse order of shots, counting singly from the last to the first.

6. In matches where two or more scores added together count; if still a tie, by adding together the last shots of each single score, and if still a tie, by adding together the next to the last, and so on.

7. By firing three shots at the longest range, and if still a tie, by firing single shots until the tie is decided.

(b)—In team shooting—1. By the aggregate total scores made at the different distances in inverse order.

2. By the fewest outers in the entire score.

3. By the fewest inners in the entire score.

4. By the total of each round in inverse order.

5. By the competitor on each side who has made the highest score, firing five rounds at the longest distance.

(c)—In handicap matches—1. In case of ties in handicap matches the handicap shall be added to the first shot or shots scored below a bull.

2. The names of competitors who have to shoot off ties will be posted on the bulletin-board as soon after each match as practicable.

3. When the ties are shot off, one sighting shot shall be allowed without charge.

4. Competitors not present at the firing-points at the hour named for shooting off ties, lose their right to shoot.

5. If, having forfeited their right to compete, they shall still be within the number of prize winners, they shall take any prize that may be alloted to them by the Executive Committee.

XIII.—PRIZES.

1. Unless otherwise specified no competitor will be allowed to take more than one prize in any competition.

2. Prize winners, upon application to the statistical officer on the range, will receive certificates, which must be given up on receiving the prizes.

3. Prizes will be delivered on the range at the close of the meeting, under direction of the Prize Committee, unless otherwise specified.

4. Any trophy competed for annually must be delivered to the secretary of the National Rifle Association, by the organization or individual holding it, at least one week before the opening of the meeting at which it is again to be competed for.

5. All prizes and bullseye money not claimed within thirty days from the day on which the same was won, shall be forfeited to the association.

XIV.—PENALTIES.

Competitors must make themselves acquainted with the regulations, as well as with the conditions, of any match for which they may have entered, as the plea of ignorance of either of them will not be entertained.

Disqualification—Any competitor—(a) Who shall fire in a name other than that under which he entered, or who shall fire twice for the same prize, unless permitted by the conditions of the competition to do so; or (b) Who shall be guilty of any conduct considered by the Board of Directors or the Executive Committee as discreditable; or (c) Who shall be guilty of falsifying his score or being accessory thereto; or (d) Who shall offer a bribe of any kind to an employe—shall, upon the occurrence being proved to the satisfaction of the Board of Directors or the Executive Committee, forfeit all his entrance fees, be forever disqualified from competing at any time upon the range of the association, and shall not be entitled to have any prize won by him the time or meeting awarded to him.

Exclusion from further competition.—1. Any competitor who shall be detected in an evasion of the conditions prescribed for the conduct of any match, shall be ruled out of such competition. 2. Any competitor, in any meeting or match, refusing to obey any instructions of the executive officer, or his assistants, or violating any of these regulations, or being guilty of disorderly conduct, or being intoxicated, will be immediately ruled out of all further competitions during such meeting or match, and forfeit his entance fees: and may also be reported to the Board of Directors or the Executive Committee, and be by them disqualified from use of the range.

3. Any competitor firing when the danger flag or trap disk is shown at the target or firing-point, or knowingly discharging his rifle except at a target to which he has been assigned, or into the blowing-off pits, or as may be directed by an officer, shall be debarred from all further competitions during the meeting, and shall forfeit his entrance fees. This shall not apply to a competitor accidentally firing at the wrong target, when no danger disk is up.

4. Any person discharging a rifle or snapping a cap within the inclosure, except in accordance with the regulations for shooting, may, in the discretion of the executive officer, be required to leave the ground.

5. Any competitor or other person found with a loaded rifle except at the firing-points and when about to shoot, shall be debarred from further competition during that meetng or competition.

6. Any person, whether a competitor or not, interfering with any of the firing squads, or annoying them in any way, will be at once expelled from the ground.

7. Any competitor discharging his rifle accidentally, either by his own want of care or by reason of any defect in the rifle, may be disqualified from further competition in the match at the discretion of the executive officer.

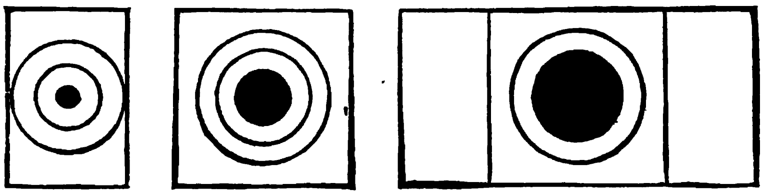
8. Should a competitor lose his register ticket, omit to take it to the firing-point, fail to attend at the appointed hour, or give a wrong ticket, and so by his own neglect miss the opportunity given him of competing for the prize for which his ticket was issued, his claim in regard to such competition shall be cancelled.

9. Any person firing on a wrong target will be reported by the scorer to the executive or range officer present and will be fined $1 or be debarred from further competition; or both, in the discretion of the executive officer.

10. Any competitor, who, after taking up his position for shooting and in proceeding to adjust his sights or change his position, shall not hold his rifle vertically, or with the muzzle toward the target, will be fined $1.

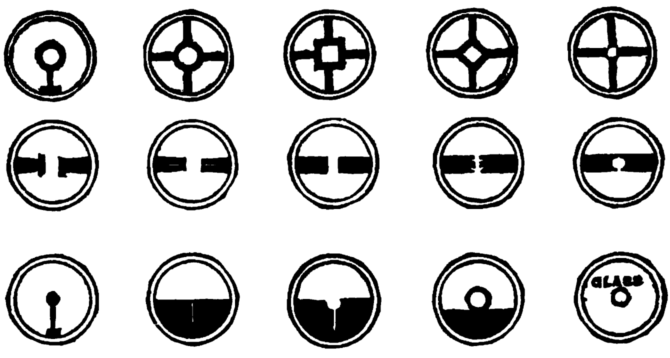
11. Any person ruled out of any meeting or competition shall forfeit all entrance fees.

The Creedmoor Targets.

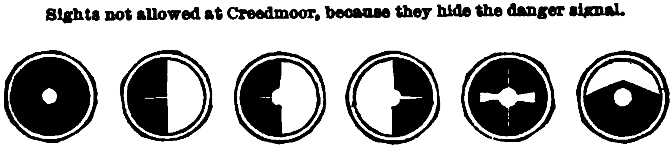


No. 1—4 by 6 feet. No. 2—6 by 6 feet. No. 3—6 by 12 feet.

Sights allowed at Creedmoor.



Sights not allowed at Creedmoor, because they hide the danger signal.



The International Rifle Matches have brought out the best long range shooting ever seen in America, not excepting the remarkable marksmanship of the sharpshooters of the Civil War. These matches have as a rule been shot with fine rifles of calibre .45.

The record of the international long range matches is as follows:

1874.

An Irish team of small bore marksmen had won the Elcho Shield at Wimbledon, beating the riflemen of England and Scotland. They challenged the Americans in November, 1873. The Amateur Rifle Club of New-York, formed to co-operate with The National Rifle Association, accepted the challenge. This club was officered as follows:

President—George W. Wingate.

Vice-President—Colonel H. A. Gildersleeve.

Secretary and Treasurer—Fred. P. Fairbanks.

Executive Committee—George S. Schermerhorn, Alonzo Alford, J. T. B. Collins, Lieutenant Henry Fulton, L. C. Bruce.

The club was not trained in long range shooting. Many of the members had never even sighted a weapon at a long range target; but, in the spring of 1874, a number of men repaired to Creedmoor and practised steadily to develop some proficiency in long range shooting. They did very well, and when the Irishmen arrived were ready for them. The first International Rifle Match occurred at Creedmoor, September 26, 1874, in the presence of 6,000 spectators. The Irish selected a team of their best six men; the Americans did the same. Each contestant was allowed fifteen shots at each of the three long ranges, viz: 800, 900 and 1,000 yards, bulls-eyes to score 4, inners 3, and outers 2. The day was clear and hot, the light good, and the breeze scarcely perceptible. The Irish fired rapidly, rolled up a better score than had ever been made in the contests for the Elcho Shield in Great Britain, and finished their work while the Americans still had a few shots to fire. When the Amerrcans had fired all except their last shot they were still one point behind. Colonel Bodine was put forward to fire the last shot. Victory hung upon that effort. The Colonel scored a bullseye and won for the Americans by three points. The scores (and the rifles used) were:

American Team—Colonel G. W. Wingate, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
Lieutenant Henry Fulton, Remington	58	57	56	171
G. W. Yale, Sharps	55	56	51	162
Colonel John Bodine, Remington	54	51	53	158
Colonel H. A. Gildersleeve, Sharps	53	51	51	155
L. L. Hepburn, Remington	53	50	46	149
General T. S. Dakin, Sharps	53	45	41	139
Totals	326	310	298	934

Irish Team—Major A. Blennerhasset Leech, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
John Rigby, Rigby	52	56	55	163
James Wilson, Rigby	54	51	55	160
Dr. J. B. Hamilton, Rigby	58	52	50	160
Joshua Milner, Rigby	57	49	48	154
Edmund Johnson, Rigby	50	49	51	150
Captain Philip Walker, Rigby	46	55	43	144
Totals	317	312	302	931

It is remarkable that the first international match was distinguished by the best long range shooting ever recorded.

1875.

The Irishmen naturally desired a return match. This was agreed to. The Americans sent a team to Ireland in 1875, and the match was contested at Dollymount, in Dublin harbor, on June 29. The day was clear, but gusty. The Americans did remarkably well. Colonel Gildersleeve, Captain Coleman, and Major Fulton each made seven bullseyes in succession, and Colonel Bodine made fourteen in all, at the 900 yards range. The Americans led from the start, and won by 39 points, as much to their own surprise as that of their competitors. The scores were:

American Team—Colonel Henry A. Gildersleeve, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
General Thomas S. Dakin, Remington	58	55	52	165
Colonel Henry A. Gildersleeve, Sharps	56	56	52	164
Colonel John Bodine, Remington	52	59	51	162
Major Henry Fulton, Remington	58	57	46	161
George W. Yale, Sharps	57	52	51	160
Captain R. C. Coleman, Remington	56	48	52	156
Totals	337	327	304	968

Irish Team—Major A. B. Leech, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
James Wilson, Rigby	58	50	55	163
Edmund Johnson, Rigby	58	54	50	162
Dr. J. B. Hamilton, Rigby	56	54	51	161
J. G. Pollock, Rigby	59	53	49	161
John McKenna, Rigby	52	44	53	149
J. K. Milner, Rigby	55	37	41	133
Totals	338	292	299	929

These scores showed an advance over the previous year by the Americans; but they were equalled in a match September 25, 1875, at Creedmoor. The Victoria Rifle Club of Hamilton, Ont., challenged The Amateur Rifle Club of New-York, and this match was the consequence. There was a rear fishtail breeze, and the Canadians, who had hoped to beat the champions, were themselves beaten by a junior team. The score was as follows:

American Team—General T. S. Dakin, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
W. B. Farwell, Remington	69	61	63	193
A. V. Canfield, jr., Remington	62	68	57	187
L. L. Hepburn, Remington	60	62	62	184
L. C. Bruce, Sharps	59	63	61	183
F. Hyde, Remington	65	60	56	181
H. S. Jewell, Sharps	63	51	66	180
J. S. Conlin, Sharps	51	55	52	158
L. Geiger, Remington	46	47	50	143
Totals	475	467	467	1,409

Canadian Team—C. K. Murray, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
George Murison, Metford	67	58	64	189
J. J. Mason, Metford	63	55	62	181
D. Mitchell, Metford	53	65	59	177
William Mitchell, Metford	58	57	57	172
F. Schwarz, Metford	58	52	60	170
C. K. Murray, Metford	60	51	57	168
George Disher, Metford	59	50	58	167
James Adams, Rigby	54	50	56	160
Totals	472	439	473	1,384

1876.

The Centennial year of American Independence was one of great glory for American rifles and riflemen. America challenged the world, and offered as a prize for the championship the costly Palma. The teams were teams of eight men. Any rifles not exceeding ten pounds in weight; minimum pull of trigger, three pounds. Any position without artificial rest. Each competitor to fire thirty shots at each of the three long ranges, viz: 800, 900, and 1,000 yards; match to last two days, each man firing fifteen shots each day. Scoring: Bulleyes, 5; centres, 4; inners, 3; outers, 2. Scotland, Ireland, Canada, and Australia accepted the challenge. England did not. The match was contested at Creedmoor, September 13 and 14, in the presence of a great multitude of spectators. On the first day, the weather being clear and calm, the scores were excellent. The Scots closed the day nine points ahead of the Americans; the Irish were five ahead. On the second day there was a lively breeze and the shooting was not so good, but the Americans did the best work. The report of the National Rifle Association points out that the Americans developed great staying power; their shooting was uniform; their holding superior, and their wind calculations good. There was great excitement on the second day, and the last shot was the signal for a terrific cheer from nearly 10,000 spectators in honor of the victors. The scores were:

Summary.

	800 yds.	900 yds.	1,000 yds.	Total.
American team	1,175	1,033	1,018	3,126
Irish team	1,037	1,009	1,058	3,104
Scotch team	1,060	990	1,013	3,063
Australian team	1,053	1,018	991	3,062
Canadian team	1,013	941	969	2,923

FIRST DAY.

Scotch Team—Lieutenant-Colonel J. H. A. MacDonald, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
R. McVittie, Ingram	71	71	67	209
William Thorburn, Metford	65	70	67	202
Dr. J. Mitchell, Metford	66	62	73	201
William Clark, Henry	65	68	65	198
Peter Rae, Ingram	71	63	62	196
D. Fraser, Henry	67	67	62	196
Thomas Whitelaw, Ingram	64	65	64	193
Martin Boyd, Ingram	66	62	63	191
Totals	535	528	523	1,586

Irish Team—Major A. B. Leech, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
William Rigby, Rigby	69	69	68	206
Edmund Johnson, Rigby	75	67	64	206
J. K. Milner, Rigby	67	66	71	204
Lieutenant George Fenton, Rigby	65	66	69	200
Lieutenant A. Ward, Rigby	64	65	65	194
W. G. D. Goff, Rigby	64	62	66	192
Henry Dyas, Rigby	66	65	61	192
W. R. Joynt, Rigby	65	64	59	188
Totals	535	524	523	1,582

American Team—Major Henry Fulton, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
General T. S. Dakin, Remington	69	65	69	203
L. Weber, Remington	68	69	65	202
Major Henry Fulton, Remington	66	64	70	200
Ransom Rathbone, Remington	70	66	63	199
Isaac L. Allen, Remington	68	62	68	198
Colonel H. A. Gildersleeve, Sharps	70	69	55	194
Lieutenant-Colonel W. B. Farwell, Remingt'n	70	66	56	192
Colonel John Bodine, Remington	69	57	63	189
Totals	550	518	509	1,577

Australian Team—Augustus Morris, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
Captain H. J. King, Rigby	69	68	69	206
Sergeant D. Gee, Rigby	65	68	68	201
Major J. T. Sleep, Rigby	69	69	61	199
J. S. Lynch, Rigby	65	64	66	195
J. J. Slade, Rigby	63	66	64	193
Captain B. J. Wardill, Rigby	71	64	56	191
Captain J. McG. Smith, Rigby	69	66	52	187
Lieutenant T. T. Draper, Rigby	60	59	54	173
Totals	531	524	490	1,545

Canadian Team—Major O'Reilly, Captain.

	800 yds	900 yds.	1,000 yds.	Total.
Lieutenant J. Adam, Rigby	69	67	66	202
A. Bell, Metford	65	64	71	200
Captain J. J. Mason, Metford	63	64	64	191
Major J. M. Gibson, Metford	64	59	61	184
George Disher, Metford	62	57	61	180
G. Murison, Metford	64	57	59	180
William Cruit, Metford	67	52	59	178
Major W. H. Cotton, Metford	67	56	52	175
Totals	521	476	493	1,490

SECOND DAY.

American Team.

	800 yds.	900 yds.	1,000 yds.	Total.
Ransom Rathbone, Remington	65	72	66	203
Colonel H. A. Gildersleeve, Sharps	68	61	71	200
Colonel John Bodine, Remington	65	69	62	196
Lieutenant-Colonel W. B. Farwell, Remington	68	59	68	195
Lawrence Weber, Remington	67	61	65	193
Isaac L. Allen, Remington	60	63	65	188
General T. S. Dakin, Remington	66	68	54	188
Major Henry Fulton, Remington	66	62	58	186
Totals	525	515	509	1,549

Irish Team.

	800 yds.	900 yds.	1,000 yds.	Total.
Lieutenant George Fenton, Rigby	68	62	69	199
J. K. Milner, Rigby	62	61	75	198
Henry Dyas, Rigby	63	62	71	196
William Rigby, Rigby	62	62	67	191
Edmund Johnson, Rigby	61	62	67	190
W. R. Joynt, Rigby	64	62	62	188
Lieutenant A. Ward, Rigby	66	54	65	185
W. G. D. Goff, Rigby	56	60	59	175
Totals	502	485	535	1,522

Australian Team.

	800 yds.	900 yds.	1,000 yds.	Total.
J. J. Slade, Rigby	70	66	69	205
Sergeant D. Gee, Rigby	72	62	62	196
Captain H. J. King, Rigby	68	61	61	190
Captain J. McG. Smith, Rigby	59	67	63	189
Lieutenant T T. Draper, Rigby	61	60	67	188
J. S. Lynch, Rigby	61	62	64	187
Major J. T. Sleep, Rigby	64	60	61	185
Captain B. J. Wardill, Rigby	67	56	54	177
Totals	522	494	501	1,517

Scotch Team.

	800 yds.	900 yds.	1,000 yds.	Total.
Martin Boyd, Ingram	66	69	71	196
William Thorburn, Metford	73	57	64	194
William Clark, Henry	67	61	62	190
R. McVittie, Ingram	60	61	62	183
D. Fraser, Henry	70	59	54	183
Peter Rae, Ingram	61	61	60	182
Thomas Whitelaw, Ingram	65	57	60	182
Dr. J. Mitchell, Metford	63	47	57	167
Totals	525	462	490	1,477

Canadian Team.

	800 yds.	900 yds.	1,000 yds.	Total.
Lieutenant J. Adam, Rigby	66	60	64	190
Major W. H. Cotton, Metford	66	60	60	186
A. Bell, Metford	63	57	63	183
Major J. M. Gibson, Metford	69	54	60	183
G. Murison, Metford	58	65	59	182
Captain J. J. Mason, Metford	60	59	61	180
William Cruit, Metford	55	57	54	166
George Disher, Metford	55	53	55	163
Totals	492	465	476	1,433

During 1876 there was also a one day long range match between the Irish team and a team from The Amateur Rifle Club. The conditions were the same as those which governed the Centennial matches. The Americans again won, as follows:

American Team—Major Henry Fulton, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
General T. S. Dakin, Remington	71	67	70	208
Ransom Rathbone, Remington	68	69	67	204
Isaac L. Allen, Remington	68	59	72	199
L. Weber, Remington	66	68	64	198
Major Henry Fulton, Remington	70	54	67	191
Lieutenant-Colonel W. B. Farwell, Remington	66	69	30	165
Totals	409	386	370	1,165

Irish Team—Major A. B. Leech, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
Joshua K. Milner, Rigby	68	72	66	206
Henry Dyas, Rigby	66	64	68	198
William Rigby, Rigby	69	61	67	197
Lieutenant George Fenton, Rigby	66	59	64	189
Edmund Johnson, Rigby	64	57	63	184
W. R. Joynt, Rigby	61	56	63	180
Totals	394	369	391	1,154

These continued successes of American riflemen at long range were dazzling and bewildering, but the contestants of 1876 parted with the best of feeling. A proposition was made, however, that the international match should thereafter be triennial instead of annual, on account of the heavy expense of sending a team 3,000 miles to engage in the competition. This was discussed informally, and was the subject of correspondence afterward, but no conclusion was reached.

1877.

In June of this year, the Americans received a letter from The National Rifle Association of England agreeing to shoot a match at Creedmoor during the year. The Americans were delighted, and made preparations to give their visitors a cordial welcome. The match took place at Creedmoor, September 13 and 14. In this contest, the very best of Great Britain was pitted against the very best of America. Scotland, Ireland and England had been culled for crack shots. The weather was fine; the shooting good. The Americans again won, as follows:

SUMMARY.

	800 yds.	900 yds.	1,000 yds.	Total.
American Team	1,143	1,101	1,090	3,334
British team	1,117	1,073	1,052	3,242

FIRST DAY.

American Team—General T. S. Dakin, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
C. E. Blydenburg, Remington	74	67	72	213
H. S. Jewell, Remington	71	66	72	209
Frank Hyde, Sharps	71	70	68	209
Isaac L. Allen, Remington	71	66	69	206
L. Weber, Sharps	69	73	64	206
L. C. Bruce, Sharps	70	73	63	206
W. H. Jackson, Remington	69	69	66	204
T. S. Dakin, Remington	73	63	66	202
Totals	568	547	540	1,655

British Team—H. St. J. Halford, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
J. K. Milner, Rigby	72	70	67	209
William Rigby, Rigby	73	65	69	207
H. S. W. Evans, Metford	71	70	66	207
William Fergusson, Rigby	72	67	67	206
Sir Henry Halford, Metford	71	63	71	205
Lieutenant George Fenton, Rigby	65	70	69	204
Lieutenant-Colonel Fenton, Metford	71	62	65	198
A. P. Humphry, Metford	63	70	60	193
Totals	558	537	534	1,629

SECOND DAY.

American Team.

	800 yds.	900 yds.	1,000 yds.	Total
L. C. Bruce, Sharps	74	72	73	219
C. E. Blydenburg, Remington	73	72	71	216
L. Weber, Sharps	74	71	70	215
Isaac L. Allen, Remington	70	73	70	213
H. S. Jewell, Remington	72	65	73	210
Frank Hyde, Sharps	72	68	65	205
W. H. Jackson, Remington	70	66	67	203
T. S. Dakin, Remington	70	67	61	198
Totals	575	554	550	1,679

British Team.

	800 yds.	900 yds.	1,000 yds.	Total.
Sir Henry Halford, Metford	72	69	66	207
H. S. W. Evans, Metford	72	67	66	205
Lieutenant G. Fenton, Rigby	69	64	70	203
William Rigby, Rigby	72	69	62	203
Lieutenant-Colonel Fenton, Rigby	70	66	66	202
William Fergusson, Rigby	70	67	63	200
J. K. Milner, Rigby	70	66	62	198
A. P. Humphry, Metford	64	68	63	195
Totals	559	536	518	1,613

An American team of six men went to Canada in 1877, and on September 3 contested a long range match with a Canadian team on the Garrison Common Range near Toronto. The Americans won by 1,083 to 1,061 points.

1880.

In response to an invitation from Ireland, the Americans sent a good team to Dollymount and met the Irishmen there in another friendly one day contest on June 20 of this year. The day was not favorable for shooting, but the competition was close, resulting in another victory for the Palma by the Americans, as follows:

American Team—Colonel John Bodine, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
H. F. Clark, Sharps	73	75	71	219
S. I. Scott, Remington	75	69	74	218
R. Rathbone, Sharps	70	75	70	215
W. M. Farrow, Ballard	74	71	69	214
Homer Fisher, Sharps	71	73	69	213
J. F. Brown, Sharps	73	73	67	213
Totals	436	436	420	1,292

Irish Team—Major A. B. Leech, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
George Fenton, Rigby B. L.	75	70	72	217
J. Russell Joynt, Rigby B. L.	73	71	72	216
S. S. Young, Metford M. L.	73	74	69	216
Joshua K. Milner, Rigby B. L.	75	70	67	212
W. Rigby, Rigby B. L.	71	71	68	210
J. Rigby, Rigby B. L.	69	72	68	209
Totals	436	428	416	1,280

An effort was made this year by The National Rifle Association of England to induce the Americans to send a long range team to Wimbledon. But as the Englishmen wished to change the terms of the competition for the Palma, the challenge was not accepted by the Association at New-York. While the American team were in Ireland, however, an unofficial team of eight was made up by Frank Hyde, which included Scott and Brown of the American six; and this team met a carefully selected British team at Wimbledon, July 25. It was an injudicious enterprise. Colonel Bodine protested with energy, but in vain. American riflemen encountered their first defeat on this unfortunate occasion, the score being 1,647 points for the British, 1,568 for the Americans.

On August 14, a long range match was shot in Canada by a six from Canada and one from America. Result, an American victory, as follows:

American Team—R. H. Keene, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
J. P. Waters	74	70	73	217
Colonel H. S. Jewell	73	70	72	215
L. Weber	74	71	69	214
R. Rathbone	74	67	72	213
L. D. Hepburn	72	69	66	207
I. L. Allen	72	69	66	207
Totals	439	416	418	1,273

Canadian Team—Colonel J. M. Gibson, Captain.

	800 yds.	900 yds.	1,000 yds.	Total.
Colonel J. M. Gibson	73	70	67	210
Albert Pain	70	74	66	210
Dr. McLaughlin	74	65	69	208
Joseph Mason	74	64	67	205
F. Schwarz	69	66	69	204
William Mitchell	67	68	63	198
Totals	427	407	401	1,235

1882.

The result of all the official contests was to demonstrate that American riflemen could not be beaten in a contest with fine rifles. No further effort was made to disturb the American championship and possession of the Palma. In 1881, however, the Englishmen challenged the Americans to a military rifle match, the British volunteers to send a team to Creedmoor, there to meet one from the American National Guard, a return match to be contested afterward at Wimbledon. The challenge was accepted, and the match of 1882 was shot at Creedmoor, September 14 and 15, the British winning by 170 points. The weather was characterized on both days by a gusty and annoying wind. Seven shots were fired at each range. The scores were:

British Team—Sir Henry St. J. Halford, Captain.

	First Day.			Second Day.			
	200yds.	500yds.	600yds.	800yds.	900 yds.	1000yds.	Total.
G. Pearse	28	31	28	29	32	27	177
Robert McVittie	31	34	30	26	30	25	176
C. J. Parry	28	33	29	25	24	31	170
C. Boulter	26	32	32	31	25	24	170
W. Caldwell	26	33	31	25	26	25	166
J. W. Dods	31	31	32	26	26	20	166
P. Oliver	27	30	29	21	31	27	165
H. Bates	28	31	28	24	28	25	164
P. T. Godsal	29	27	30	29	24	22	161
A. P. Humphry	27	32	24	21	23	32	159
J. Goodear	28	29	24	26	26	25	158
J. Heap	31	34	26	10	18	24	143
Totals	340	378	344	293	313	307	1,975

American Team—Colonel John Bodine, Captain.

	First Day.			Second Day.			
	200yds.	500yds.	600yds.	800yds.	900yds.	1000yds.	Total.
John Smith	30	34	31	26	26	21	168
J. M. Pollard	29	31	33	23	28	18	162
C. W. Hinman	30	32	28	19	26	23	158
D. R. Atkinson	29	32	27	26	23	19	156
D. H. Ogden	27	31	31	27	17	20	153
Thomas J. Dolan	25	28	34	16	27	21	151
G. E. P. Howard	31	29	25	19	16	29	149
J. McNevin	22	33	30	17	23	23	148
E. O. Shakespeare	25	29	29	16	24	21	144
J. L. Paulding	27	31	24	20	20	20	142
Fred Alder	27	30	23	27	22	11	140
M. D. Hinds	29	29	28	19	19	10	134
Totals	331	369	343	255	271	236	1,805

The Americans were also defeated in 1882 in a match in Canada between two teams of six, at the 800 and 900 yards ranges. No shooting took place at 1,000 yards. The score was 1,189 for the Canadians, 1,179 for the Americans.

1883.

On July 20 and 21, the return military match took place at Wimbledon, in England The weather was shocking, characterized by rain, a strong wind, and some thunder and lightning. The Americans were again defeated. Seven shots were fired at each range. The scores were:

British Team—Sir Henry Halford, Captain.

	First Day.			Second Day.			
	200yds.	500yds.	600yds.	800yds.	900yds.	1000yds.	Total.
C. D. Wattleworth	32	32	30	32	27	27	180
G. C. Gibbs	25	33	34	27	29	28	176
C. G. Parry	28	32	29	26	26	29	170
H. Bates	29	34	30	29	28	20	170
S. S. Gouldsmith	31	31	27	31	27	22	169
R. McVittie	29	31	29	24	30	20	163
J. P. Godsal	27	32	32	28	28	16	162
G. Pearse	27	33	29	22	26	21	158
J. H. Dods	28	23	30	32	21	21	155
E. Lowe	28	35	26	24	22	16	151
A. P. Humphry	26	29	30	27	13	24	149
C. H. Young	30	31	28	28	20	10	147
Totals	340	376	354	330	297	254	1,951

American Team—Colonel Howard, Captain.

	First Day.			Second Day.			
	200yds.	500yds.	600yds.	800yds.	900yds.	1000yds.	Total.
S. I. Scott	29	30	31	33	28	22	173
C. W. Hinman	29	35	32	27	26	19	168
A. B. Van Heusen	29	32	29	30	24	20	164
W. Scott	29	27	32	32	20	22	162
J. H. Brown	30	29	31	25	19	27	161
J. L. Paulding	31	29	30	31	23	17	161
T. J. Dolan	31	30	23	28	26	19	157
M. W. Bull	28	30	32	32	20	15	157
G. Joiner	29	33	34	28	20	10	154
J. M. Pollard	30	31	26	29	18	19	153
J. Smith	29	34	32	27	17	10	149
W. L. Cash	28	26	28	24	22	19	147
Totals	352	366	360	346	263	219	1,906

This defeat ended the international matches for a time. It is expected, however, that the contests will soon be resumed, and that the Americans will be able to make a better report, in view of the continual practice of the National Guard at the various State ranges.

WHAT THE N. R. A. HAS ACCOMPLISHED.

BY GENERAL GEORGE W. WINGATE.

If a traveller were to report having discovered a rich and powerful Nation which had equipped its army with extremely formidable but complicated weapons, and drilled it with great care to carry them in various curious positions but utterly neglected to instruct its soldiers to use these arms as they would have to do in battle, so that they were of little more practical value than an equal number of broomsticks, few would believe the story.

Yet this was practically the case with both the Army and the National Guard of the United States prior to the formation of the National Rifle Association.

The modern breech-loader is a weapon having great range, accuracy and rapidity of fire. But in the hands of unskilled marksmen these advantages are lost. In fact, the Franco-Prussian War showed that such men wasted their cartridges in random firing and hence could easily be put to flight by trained shots armed with an inferior weapon.

Before the formation of The National Rifle Association it was almost universal in the National Guard of this and other States for a man to serve out his term of enlistment without ever firing the rifle with which he was armed. There were no ranges, no instructors in shooting, and even no text books of instruction. Our army carried the Springfield .50 calibre, which the ordnance authorities reported as needing no improvement, thus inducing the State of New-York to adopt that calibre for its National Guard, although not approving of it.

With the establishment of Creedmoor in 1873, the National Guardsmen of New-York and of the surrounding States were brought together for the first time to test their skill as riflemen. Shooting side by side they not only improved, but the imperfections of the different rifles were discovered and private ingenuity set to work to do what the Government had neglected. A great impetus to this resulted from the international rifle matches. The audacity with which The Amateur Rifle Club, a young organization, not fifty strong, not ten of whose members had ever shot at over 500 yards, accepted the challenge of a team of old and trained marksmen, the victors of Wimbledon, was phenomenal.

They had no money and no rifles worthy of the name. There were not five of them that had ever seen a wind gauge, and none of them had one. I remember well seeing Hepburn a few months before the challenge was accepted tapping his sight to and fro with a hammer to make an allowance for the wind. But before the match our manufacturers had produced rifles equal, if not superior, to those of our adversaries, and we had not only learned to shoot them but had developed the system of team shooting—and we won.

The true work of the National Rifle Association, however, was a military one: to increase the efficiency of our National Guard by making the men good shots. This was greatly helped by the interest excited by these contests, but went on independently of them. A Manual of Rifle Practice was prepared by its direction, the establishment of ranges was encouraged and legislation devised until a permanent and thorough system was established.

To-day, in the National Guards of New-York, Maine, Massachusetts, Connecticut, New-Jersey, Pennsylvania, Minnesota, Michigan, California, Illinois, and some others, instruction in shooting is carried on as a regular part of the soldier's drill. The Regular Army was slow in taking up the matter. But when it did, it did so thoroughly. While at the opening of Creedmoor the team of regulars from Governor's Island were utterly ignorant of how even to adjust their sights to shoot at 500 yards (let alone hitting anything at that distance); to-day the Army as a whole is, in my judgment, the best shooting organization in the world. Under the pressure of public competition the calibre of the Army Springfield has been reduced to .45 and it has been made a good shooting weapon. Even the defeat of our team in the last British matches has resulted in great improvement in military rifles and ammunition, which is still proceeding.

It is difficult to describe the increase in military efficiency in the National forces that has resulted from the skill in marksmanship thus created. A captain of a "shooting company" in a crack regiment of the National Guard once said to me that he would not hesitate to match his company as it then was against the entire regiment as it was in 1861 and felt sure that his men would regard it as child's play to defeat them. Soldiers who are good shots are cool and brave, because they know their strength. No mob can stand before them, and no mob is likely to try. Even in warfare against regular troops, the extermination of the British regiments in South Africa by the Boers shows what can be done by undrilled men, provided they are good riflemen.

The rifle matches at Creedmoor and at other points in the State are indispensable to keep up an interest in marksmanship. Shooting is different from other military instructions, because a man cannot be made to shoot well if he is not desirous of excelling. Emulation between different organizations created by contests between their "teams" induces their members to perfect themselves, to develop promising shots, and maintains a general interest in the subject. This has been proved at Wimbledon and in our own Army, as well as in the National Guard. It is almost the universal experience that if a regiment fails to keep up a good team, its general shooting deteriorates. This result has also followed the stopping of the transportation to the matches of Creedmoor once allowed to teams from the interior of the State. On the other hand the personnel of teams should be frequently changed so as to avoid what might be called a "professional" team.

General Sherman has pronounced the work of the National Rifle Association to have added more to the military strength of the Nation than anything that has occurred since the war, and he is clearly right, but this can only be maintained in the future as in the past by keeping up its annual competitions.

GAME HUNTED IN AMERICA.*

The true sportsman hunts for the sake of hunting. Of course, he wants the game too, the choice bits for the table, the antlers of the noble stag of the woods, and the claws, head and shaggy fur of the ferocious bear of the mountains. But primarily he seeks the sport of the chase, the tramp through the fields, the excitement of the moment when the game is in sight, the exercise of his coolness, strength and skill; and the enjoyment of the numerous strange and amusing incidents which characterize every hunt. The man who kills for the market or even simply to supply his own table continually with meat is not a sportsman.

Shooting in the United States is now confined chiefly to the wild game birds of the country. Various four-footed creatures still exist in special localities, which are proper objects of pursuit; but for every one of these that can be shot, there are a hundred and perhaps a thousand birds to lure the sportsmen to the fields and marshes. A brief review of the different varieties of wild game in America will interest the younger men, and one is here presented for their benefit.

Quail.—One of the most widely distributed game birds in America is the quail (Ortyx Virginianus), often called the "partridge," though not properly so. It is a fowl with stout depressed bill, short drooping tail; the plumage of the back a reddish brown spotted with black and streaked with yellowish brown; the head almost black, with pure white throat and a white band over the eye and down the back of the neck; the breast a brownish yellow pencilled with black. There are said to be forty-seven varieties of the bird in America, but the differences in plumage are slight. The voice of the quail is a clear loud whistle, either a short and a long note or two short and one long, sounding like "Bob White," or "Bob, Bob White." The hunter concealed in the thicket decoys the quail by imitating its whistle; the bird instantly responds and approaches the spot. Though sometimes scattered, the quail are generally found in coveys, frequenting the underbrush or chapperal in the edges of the woods near cultivated fields, and the clumps of tall grass which conceal them while feeding. They frequently hatch their young in the wheat fields: and one cause of their growing scarcity in the Eastern States is the fact that these fields are mown just at the hatching time. The mowing machines often decapitate the birds, and either destroy the eggs or leave them to spoil. While not numerous there this game is found in every one

* THE TRIBUNE is indebted to the following valued friends for much of the data embodied in this chapter: Peyton S. Coles, of Estouteville, Va.; D. S. Lewis, of Harrisonburg, Va.; William M. Flint, of Beverly, W. Va.; James B. Canfield, of Huntersville, W. Va.; E. L. Brown, of Asheville, N. C.; J. W. Hedden, of Mount Sterling, Ky.; Charles E. Taft, Civil Engineer, engaged in Government Surveys in Arkansas; George N. Ives, of New-Berne, N. C.; E. L. Coldwell, of Portland. Oregon; Benjamin S. Pardee, of Glen Alpine. N. C.; B. D. Avis, of Staunton. Va.: B. F. Leisenring, of Charlestown, W. Va.; J. B. Finster, of Weston, W. Va., and H. O. Hyatt, of Kinston, N. C.

of the Eastern and Middle States. In Virginia and to the southward, in Kansas, Texas and California, the bird exists in countless numbers. One man has killed 760 quail in Virginia in one season, thirty nine in one day. It is on record that one hunting party trapped 11,000 in Texas in 1877. Texas is now the principal quail State. In the North Carolina mountains they are shot every year by the tens of thousands. In California a hunter will shoot from thirty to ninety or a hundred in a day. The hunter finds them in bunches and flocks, varying from three or four to thirty and forty. They are very shy birds. When alarmed they seek safety at first in headlong and rapid flight through the air, but they often vary their tactics by sitting close and quiet or by running rapidly a short distance and then flying, returning to the ground and squatting in the grass. When frightened they will lodge in high trees oftentimes, and will squat close upon the branch and motionless. Sometimes, when sitting close, the hunter will almost step on one and the bird will even run between his legs. In such cases he must be careful not to shoot his dog. Quail should be fired at the moment they rise, which is usually at a distance of not more than twenty to thirty yards. They are apt to scatter and hide after a shot or two. If this game is at all abundant it makes good shooting. With a good dog it can be found and flushed without decoying. A good marksman is almost certain to return with a large bag, if he has a good dog. The young hunter if out with a friend, both shooting, must take great pains in regard to one point. He must always know exactly where his friend is, and be sure that his friend knows where he is. He should not fire blindly into a thicket from which he hears the whistle of the quail. The signal may be the decoy whistle of his friend. While crawling through the bushes he should never point his piece toward dog or companion, and never have the hammer at full cock. The hammer should be at half-cock until the time comes to fire. And in firing the gun should be snugly pressed against the shoulder. It is useless to shoot at quail more than thirty yards away, if flying from the shooter; and, if the bird is flying across, the aim must be several feet in front of him, and either above or below, accordingly as he is rising or settling down in his flight. The hunter will fire only one barrel at first keeping the other in reserve for use in case he misses, or for another bird. To miss a bird is no cause for discouragement. Old sportsmen claim that not more than three out of every five birds shot at are captured; sometimes not more than two out of five.

Snipe.—Under this general name are included the great number of little wading birds that frequent the sand bars, marshes, and muddy flats, both of salt and fresh waters, in every part of the United States. Of the snipe proper there are seven principal varieties: The American or Wilson's, red-breasted or gray, robin, English, yellow legs, purple, and red-bellied. In these birds the head is pointed and terminates in a bill, which is much longer than the head, sometimes twice as long. The eye is large and set well back in the head; the body is plump; the plumage usually brown or gray: the wings are long and pointed, and legs and toes long, the latter slightly webbed. They feed on the grubs, bugs, and worms found in the soft mud, which they probe rapidly with their long bills. When discovered by a dog, snipe hug the ground at first; then, when fairly alarmed, they rise quickly into the air and fly about in a singular manner, darting at times with the speed of an arrow, often poising for a moment almost motionless, and then zig-zagging about through the air in a manner that proves the despair of the amateur gunner. They are extremely gregarious; and if, when a flock rises, the hunter can shoot one or two of them the whole bevy of survivors, after a short flight, will wheel back again, and darting back and forth will settle down again in a body close to their dead companions, giving the hunter shot after shot, by means of which he can sometimes secure nearly the whole flock. The gunner will waste a great deal of ammunition both before he learns to shoot these birds and afterward. Those who make snipe-shooting an earnest pursuit use decoys, representing a flock of birds in different attitudes poised above the surface of the water, conveniently near to the covert on shore in which the gunner is posted. The decoys are made of wood, rubber or tin, and are colored in imitation of several different varieties of wading birds. From twenty to forty constitute a good outfit. The hunter calls the birds by imitating their whistles; and he must remain quiet, no matter how hard the mosquitoes bite, until the shy and wary creatures, dropping from the sky above or reaching the scene by skimming over the meadows, begin to settle among the decoys. In snipe-shooting the hunter tries to fire at the moment several birds are in a line or bunch. If the birds are migrating they often come in large flocks and make capital sport. Robert B. Roosevelt reports one remarkable instance where more than a hundred snipe were killed at one discharge. From seventy-five to one hundred snipe make a good day's bag.

The sandpipers, of which there are seventeen varieties, are closely allied to the snipe. As a rule, they are so small that the hunter does not waste his shot on them.

Another variety of wading birds resembling the snipe in form and habits, but with gray backs and white breasts, are the tattlers. They are not numerous, and not so desirable for the table as the snipe, unless killed near fresh water, and are generally neglected by the hunter. The tattler proper or tell-tale feeds near the ducking grounds in the season of migration, and seems to have a mission to warn the ducks of the approach of an enemy. Its quick, shrill notes alarm the water-fowl and put them to flight.

Among the marsh birds are also found two or three varieties of the curlew. They are brown-backed, with bellies of lighter color, long-legged and long-billed. The bill curves downward, and in a full-grown specimen of the largest variety the sickle bill is often ten or eleven inches long. They fly in flocks, and utter a note that sounds like "cur-lew," and the hunter decoys them by repeating the note the moment he hears it over the meadows. Their meat is tough but still desirable. When one of their number is slain, the flock return again and again to the spot and make exciting sport for the gunner.

These various birds come North in April and May, returning southward in September and October. They follow the water-courses and shore of the ocean, and settle down for feeding purposes in all marshy localities. They are hunted during the periods of migration. The gunner learns their favorite resorts, hides himself behind a covert, and decoys the flocks as they skim over the region by imitating their calls. These birds rise and settle down against the wind, and it is sometimes best to await the moment when they pause in the air, preparatory to wheeling around to escape, before delivering a shot.

Grouse.—The grouse is a game bird of the woodlands, and is found distributed through the Northern tier of States from Maine to California and north of the border as far as the Arctic circle. It is also found to some extent in the Southern States. There are sixteen varieties in the Smithsonian catalogue, but the species which predominate are the ruffed, blue, sharp-tailed, and pinnated grouse. The family are characterized by stout, depressed bills, short feathered legs, plump bodies, spreading and drooping tails, and dark plumage.

Ruffed grouse is the New-England "partridge" and the Southern "pheasant." The bird has a reddish-brown back and whitish-brown breast and belly, both dotted and pencilled with gray and brown spots. There is a patch of black on the shoulders and a border of black on the tail. The head is slightly crested. Feeding upon berries and wild fruits chiefly, its meat is highly prized by every epicure. Grouse-shooting takes the hunter at once into the woodlands, in rolling country, and he finds his game where the bush is the thickest. Its note is a long, soft, mellow call, but its whereabouts is also notified to the hunter by the drumming of the male bird, produced by rapid vibration of the wings while the bird is seated on a log or stump. This noble bird is the more highly prized by the sportsman because so difficult to kill. When frightened, the grouse flies rapidly and strongly off through the thickets, sometimes returning after a long flight, but often soaring up into a tree, its body remaining perfectly motionless there upon a branch, and its hiding-place betrayed only by the bird stretching its neck out to peer at the hunter. The wild forests from Maine clear through to Oregon are the principal haunts of the ruffed grouse. The hunter seeks them with dog and gun. They lie close when discovered, but their color so harmonizes with that of the ground they are seldom sighted until they take wing.

The blue grouse (gray grouse or spruce partridge) differs in plumage, as its name purports, from the ruffed variety, but resembles the latter in its habits. It is found in the wild woods of the West, and is especially plentiful in the mountainous country beyond the plains. In Oregon it frequents the borders of cultivated land and is destructive in grain fields. It does not lie well to a dog, and flies with such speed and strength as to be difficult to shoot. In the winter, like its ruffed cousin, it retires to the depths of the woods.

The sharp-tailed grouse is a Southern and Western bird, though also found in the extreme North in British America. It is brown-backed, with whitish breast and belly, and specked and pencilled with light brown.

The pinnated grouse is the prairie chicken of the West. This delicious bird has been nearly exterminated in the East. A few scattered bevies are found in the Middle States; but, as a rule, the shooting is now confined to the Mississippi River Valley, especially in the corn-growing States, and to the region west from the river out to the Rocky Mountains. On the open prairies they are found in large flocks, sometimes numbering two or three hundred. They are of a speckled brown color, and the male bird has two bladder-like appendages each side of the neck, with which he can produce when aroused a hollow booming sound like that of a drum. They have latterly become abundant in Arkansas and Nebraska.

The sage-hen of the alkali regions of the West is the largest variety of the grouse, but is unfit for eating.

Woodcock.—This shy and wily bird is an odd-looking, long-billed, fat-bodied creature, allied to the snipe. Its meat is highly prized by sportsmen. Woodcock are shot during the season of migration, in October and November. During the day the birds hide in marshy thickets, boring the soft earth with their long bills for the grubs, bugs, and worms, which constitute their food. When startled they rise, though not rapidly, fly over the tops of the bushes, and settle to the ground again, running off a few yards for further safety. The gunner must be quick, for he rarely gains more than a brief glimpse of the bird as it flits through the thicket. They are nocturnal in their habits, seldom flying before sunset or in the early morning. The head of the woodcock is broad between the eyes, and the eyes are large and set far back in the head.

Wild Water-Fowl.—Owing to their numbers, their size, and their excellent flavor as food, the wild water-fowl are the most important game birds of North America.

Largest of the race are the magnificent snow-white trumpeter and whistling swans, weighing from thirty to forty-five pounds, and flying at a great height in the air in V-shaped flocks, during the seasons of migration. These great creatures frequent the regions in the far North, in the summer time often breeding in the Arctic circle. They move southward late in the fall, often flying one hundred miles an hour. They are seldom seen in the East, but they visit the valley of the Mississippi annually and are found in great numbers on the Pacific slope. Upon the Columbia River and the lakes of Southwestern Oregon swans are often seen in large flocks. In the winter of 1885, on one lake covering fifteen acres, there were seen at one time 3,000 of these large birds. They are decoyed with imitation swans, but the stools must be placed where the swans are used to swimming, otherwise they will not respond. They are very wary and are seldom killed in large numbers, although it is known that one party in Oregon secured more than sixty in one evening by using pillow-cases stuffed with straw as decoys. Swans are occasionally seen in the Chesapeake.

Wild geese breed in the summer time in the most solitary districts of the far North. Upon the approach of winter, they migrate southward over the whole country, visiting the lakes, large rivers, ponds and ocean coasts, en route for feeding. In the winter months, they abound in all the southern waters, especially in the sounds of the Carolinas and along the Gulf, and also on the lower Pacific coast. They fly in flocks, and they are led by their strong gregarious instincts to settle down upon the waters in which they see other wild fowl feeding, especially upon hearing the notes of their own race sounded from the spot. To bring them within range of the shotgun, the hunter plants a flock of wooden decoy birds in the water, near points of land and marshes; he conceals himself behind a leafy covert; he "calls" the game; and he fires after the fowl have settled upon the water, unless he is obliged to fire at them as they sweep past upon the wing not intending to settle. In Southern California, the flocks of the snow goose are so large that when they settle on the plain near a body of water, they are often charged on horseback and trampled down and knocked down with clubs. Of wild geese there are fourteen varieties differing in size and plumage. The principal ones are the blue-vinged, snow, American white-fronted, Canada, brant and Hutchins. Though more plentiful than the swans, they are difficult to shoot. They are very wary and strong, and even when hit will often escape, their vitality enabling them to carry off a large amount of shot. A goose must be shot in the head, if possible.

Of ducks there are no fewer than forty-one varieties in the Smithsonian catalogue. Hunters value most the canvasbacks, which are the finest of the whole race; the redheads and mallards. They are large, of excellent flavor, and gamey. The teal, widgeon, shelldrake, pin-tail, whistler, and wood duck are also abundant and desirable. The successful duck hunter must know the habits of these different varieties. Some of them feed in shoal water, tipping up and plucking their fare from the bottom with their bills. Among this class are the widgeon, mallard, teal, gadwall, sprigtail and gray duck. Other varieties, including the canvasback, redhead, and broadbills, are divers, and go below the surface many feet for the food which they desire. Duck shooting constitutes the bulk of the wild fowl hunting of the country. It is exciting sport. Cloudy weather is the most favorable for shooting, because when the landscape is obscured the game flies low and settles more readily among the decoys. The hunter is obliged to remain motionless as a flock of ducks approaches, hidden from view if he can be. If the flock intend to pass, and are within range, he must await the proper moment, then be quick, aim above and several feet ahead, sometimes ten or fifteen, and do his best. If they are coming directly toward him, his chances are excellent. If they are departing he must let them go, unless they are within good range; distance is very deceptive, and a frightened duck flies with a velocity that will place him beyond the reach of a shotgun in two or three seconds. If the hunter is hidden in a light skiff he can follow a wounded duck and secure it. If the bird is a diver and is wounded he should follow it with a boat and fire the moment it emerges from the water. A wounded canvasback will often be lost, however, by diving and catching the grass with his bill, and drowning in that position. Sometimes the birds are suspicious, they look at the decoys and circle around in doubt, and then are off with a rush. Even then one or two may sometimes be brought down. The gunners often go out in boats and pole their way through the rushes, flushing the scattered birds one or two at a time and firing as they rise, This is good sport. In many cases the gunners employ a dog to retrieve the game. In duck shooting more than in other sport, the hunter must be circumspect in the use of his gun. He is usually attended by companions, and it is necessary that all the precautions against accident shall be rigidly and conscientiously observed.

The best ducking grounds of the United States are the marshy spots on the shore of the Northern Lakes, the coast of New-Jersey, Delaware and Chesapeake bays, Currituck Sound, the valley of the Mississippi and the waters of Oregon and Washington. Such is the abundance of water fowl in the far northwest that the canvasback is the only duck that is valued there. All the others are called "trash." The principal haunts of the canvasback there are the small lakes and sloughs of the bottom lands and islands of the Puget Sound and Columbia River regions. The vicinity of the mouth of the Willamette River is a capital hunting ground on account of the abundance of the wapato, a bulbous water plant and the favorite food of the canvasback. Ducks feed with the moon, and are shot principally in cloudy weather. They decoy best to a bold shore, fighting rather shy of projecting points of land.

On Currituck Sound almost the only way to secure a chance at duck now is to join or become the guest of one of the gun clubs, which have taken up all the land at desirable points and thus secured the exclusive privileges there. To shoot under the auspices of a club has great advantages. It opens to the gunner the experience of old sportsmen who are members, and often places at his command the services of some employe who is a perfect walking encyclopædia of duck lore.

A style of duck shooting which is practised by marketmen is to fire from a battery or sneak-box, a low, flat, narrow boat, which floats merely a few inches above the surface of the water and is colored light blue so as to approach the color of the water as nearly as possible. It is anchored in a good ducking ground, with the decoys arranged near and around it. A flock of ducks can be decoyed so close as to settle down all around the boat, and in that case they can be slaughtered in great numbers. This plan is severely condemned by amateurs, not only because it is unsportsmanlike but because it is believed to drive away the game.

Pigeons.—There are several varieties of pigeons and doves, but none of them are worth mention except the "passenger," or true wild pigeon. If the gunner is able to secure any pigeon shooting at all, he gets so much of it at once as to make the sport resemble murder. These swift, wary birds breed in the far North, and migrate in search of food in flocks of immense size. Seventy years ago they flew over the country in numbers that seem incredible at this day, literally in billions. The migration would darken the sky as though the sun were eclipsed, and the flight would sometimes last from one to three whole days. Whenever they descended in some solitary district of the woods, they would load the branches of the trees to breaking, and the hunters of the county would hurriedly repair to the roost and slaughter them with gun and net by the thousand. Owing to the continued hunting and the wholesale slaughter of these birds at shot-gun tournaments the pigeon has almost disappeared from the United States. It is rare now to find a pigeon roost in the United States. There is one in Indian Territory, covering a square mile in extent, and there is a smaller one near Cresco, Penn. It is believed that few if any others can now be found in the country. The wild pigeon is hunted simply for sport; the flesh is dry, dark and undesirable, though eatable.

Plover.—A small migratory bird, affording two varieties which are prized by sportsmen, the golden and the upland. The golden plover is a shore bird. It flies at night during the period of migration, and generally settles in the meadows, especially on freshly ploughed ground, for food. The upland plover is found in the East, but the prairies of the far West are their principal home. They can be decoyed and make good shooting.

Cranes.—In the North a genuine crane is seldom seen by the hunter, except possibly at a great height in the air during the flight of a flock. There are two varieties. The whooping crane is the tallest of the birds of North America, a handsome snow-white creature with black tips to the wings. It is shot principally in the great marshes of the Mississippi River Valley. The bird feeds on grain and the flesh is palatable; weight about thirty pounds. Its plumage is prized by women. The brown or sandhill crane dwells in the Gulf States and westward to the mountains. In earlier times the species abounded all along the Mississippi and its affluents, and annoyed the farmers by damaging the corn crops: a few are still seen along the river bottoms. On the plains and west of the Rocky Mountains the bird is abundant. In Oregon it is eaten principally by the heathen Chinaman, and on that account is called the "Chinese snipe."

Wild Turkey.—This noble bird is now never seen in the Eastern States. It is abundant in the wilder localities of the Carolinas, Kentucky, Tennessee, Arkansas, Louisiana and a few other Southern States, and throughout the plain and mountain country of the West. In hunting turkey the game must be stalked or a call used. The turkey leaves a trail behind him which is easily followed until he is frightened and takes wing. Various calls are used. The hunter can try his own vocal powers if he wishes, but a number of whistles are made to imitate the note of the female bird. One is fashioned from the wing bone of the turkey. Another is made by hollowing out a block of cedar about eight inches long and two inches square transversely, until it is thin enough to vibrate when struck. When rubbed in a certain way this block gives out a note in exact imitation of the "cheep, cheep" of the turkey. Provided with a call, the hunter makes his way into the forest. Secreting himself in a thicket where turkey tracks abound, he imitates the call of the turkey to her mate. Soon an answering gobble is heard, and as the call is continued the gobble draws nearer until the big turkey steps into view. The hunter must wait until the gobbler is within range. Sometimes a whole flock is drawn to the spot by the call. Good shooting can be had by still hunting, but the birds are wary, and they conceal themselves so easily in the thickets that great skill is required to bag the game. Two hunting parties assist each other greatly in turkey shooting. Startled by the firing of one party, the birds flee in the direction of the other. Turkeys are also shot in Arkansas at the river bank when they come down for water. Concealed in his skiff on the opposite bank, the gunner waits for the turkeys to file out of the woods. The birds look suspiciously around and then come down to the water, presenting a capital mark. On Arkansas waters turkeys are often shot from the deck of the passenger boats. The birds come flying over the river and give the men on board the chance of a good wing shot.

Squirrels.—Almost every piece of woodland in America is the home of a colony of squirrels. In every part of the country except the open prairies this alert, wary, lively little creature can be found. There are two varieties, the red and the gray. While both varieties are often found in the same clump of woods, it is frequently the case that they remain apart, for enmity exists between them, and they wage deadly warfare upon each other. This game formerly existed in astonishing abundance. The Indian who entertained Hendrick Hudson stepped to the door of his wigwam and shot one from the first tree for his guest's repast. The squirrels were so destructive to the crops in early days that the settlers organized an annual campaign against them, surrounding a piece of woods and marching in toward a common centre, making a great noise and driving in and killing the game. It was no unusual matter, a hundred years ago, to kill from 3,000 to 5,000 squirrels in one day. To find the game in this primitive abundance one must go now to the Blue and Alleghany Mountain regions in the South or to the State of Arkansas. There are millions of them in those regions. They are killed by the tens of thousands in Western North Carolina annually and a small party in Arkansas can bring back a barrel full in a day, all gray squirrels. Old-time hunters shot the squirrel with a small-bore rifle and always through the head, and this is the right way. The shotgun is, however, now more often used.

Raccoons.—Coon hunting, while pre-eminently a Southern amusement at present, is still pursued to some extent in the North. This animal lives in the woods, and he sallies forth at night in green corn time and inflicts much damage on the growing crops. He is hunted with dogs, which make the circuit of the cornfield and flush the coon, which immediately takes to the woods and runs up a tree. Moonlight nights are the best for the sport, because the game can be seen at his perch on the branches and be bagged with a shotgun. If the night is too dark for that, somebody climbs the tree and either kills him there or shakes him off, when the dogs take care of him at once.

Deer.—America so abounded with deer in early times that the pioneer settlers were much troubled by their depredations upon the farms. The exportation of deer-skins was enormous in the period before the Revolution. With the clearing away of the forests the deer have been driven back from the settlements, until now they are found only in the wild uninhabited regions of the continent. In the forests of Maine, New-Hampshire, Vermont and Northern New-York, there are a few deer. The Blue and Alleghany Mountain regions and the forest land spreading in each direction therefrom abound with them. In Arkansas, Michigan, the Rocky Mountains, the Sierra Nevada and wooded districts of the Pacific slope there are swarms of the game. The destruction of deer is going on so rapidly now that unless stringent laws for their protection are enforced, and unless they can be hunted in a proper manner and for the sport only, the species will soon disappear from the continent. Probably nothing can be done to prevent the killing of the deer at proper seasons for food. The city man who positively cannot leave town and undergo the expense of travel to a deer country to hunt the game himself, is as fond of and as much entitled to a steak of venison as the man of wealth who can go. To supply the city populations, therefore, there must and will be some "pot-hunting". of the deer. But it is right that the game should be disturbed only at the proper season, and that then the killing should be limited to the strict demands of the market for venison. The cruel destruction now going on has for its object merely the pelt of the deer, nothing more. In 1885, according to the estimate of The Michigan Sportsmen's Association, there were 8,000 deer killed on the peninsulas of that State, and tons of venison, stripped of the skins, were abandoned in the woods. In California and Oregon the game is killed by the Indians and others literally by the thousand, for the skins, and the bodies usually thrown away. In Canada, Colorado, and in fact in all the regions where the deer greatly abound (which, being remote from civilization have few facilities for transportation), the same cruel and unnecessary destruction is going on every year.

The manner in which deer are hunted varies in different districts. Reference has already been made in "Horsemanship" to the method prevailing in the mountain country of the South. In the swamps of Georgia and Florida they are often shot by torchlight. A frying-pan, partly filled with earth, is filled with burning pine knots and tied to a pole. A sturdy assistant carries the beacon over his shoulder, so as to have the flame behind him. Then he can see the shine of the eyes of a curious deer. When the gleam of a pair of eyes is seen, the torch is placed behind the hunter, who then aims his rifle and fires. In Eastern Kentucky and Tennessee, hunting parties go out in buckboard wagons and on horseback, and camp in the woods often for three or four weeks. They have tents, bedding, cooking utensils, guns, hounds and several jugs of something for the cure of snake bites and bruises. They drive the deer to the water courses or steal upon them by stalking and often send back home a great deal of good venison as the result of their sport.

Arkansas is a deer hunter's paradise. The game is found everywhere within a short distance of the clearings. The most accessible of the hunting grounds of Arkansas are in the territory bordered by the White and Cache rivers and all along the White River to the Mississippi. Oftentimes drivers go out with dogs and make a wide circuit, while the hunters post themselves along the runways or beaten trails of the deer. As the drivers work back to the starting point, frightening the game as much as possible, the hunters stand ready and fire as the deer dash past them. As a rule, however, the hunter in Arkansas prefers to stalk his game, following the deer on foot. A man can approach closely, coming up against the wind, if he does not keep his eyes on the animal. If the deer scents him, of course he is off like a flash. But if the wind comes toward the hunter, and he turns his eyes away, looks down or slouches his hat over his eyebrows, he can walk up close enough for a sure shot if he is a marksman. Certainty is assured by pinning a red handkerchief across the breast of the hunter. The curiosity of the deer will keep him fixed in one position, stamping his feet, until he gets the scent of the hunter. It is claimed by old Arkansans that a man can tire out a deer as well as a dog, if he knows how to track it and keeps steadily on the trail for hours. To hunt the deer in this manner is the act of a true sportsman.

The great fir forests of Oregon and Washington Territory and the mountains along the eastern part of that region, are the chief remaining great natural preserves of wild game in the United States. So far they have scarcely been disturbed by man. The fir forests, in fact, are almost impenetrable. The trees are of gigantic height, and centuries of undisturbed growth have covered the ground between the trees with a mass of fallen trunks overgrown with thickets which make progress through the woods extraordinarily difficult. Largest of the deer of that part of the country (next after the elk) are the mule deer. They are hunted by stalking or by lying in wait along the trails by which they descend in bands from the summits to the foothills in the fall. Black-tailed deer abound, and it is this variety which is killed by the thousand in the heartless, wanton manner for the skins only, already referred to. An unwritten law of Oregon (enacted by the skin-hunters only, however,) forbids the use of hounds in pursuit of the black-tailed deer, on the ground that they drive the deer out of the country, and the hounds are often shot by the skin-hunters, who consider that dogs interfere with their own disreputable pursuits. A settler in any wooded part of California, Oregon and Washington can start out with dog and gun and get a deer any day with as much certainty as he can bring in his own cows from the pasture.

Red deer abound in the Rocky Mountain region. They are beautiful creatures, large and fleet as the wind.

In Northern New-York, among the Adirondack Mountains, deer-hunting is the sport of the summer visitors. The animals are small; and they are being rapidly exterminated, as can well be understood when we state that over 20,000 summer visitors pour into the three or four counties of that region every year, and the majority of them merely wish the reputation of having killed a deer, no matter what method is pursued or how small the animal. The season is August 15 to November 1. Hounding is limited to from September 1 to October 5, except in St. Lawrence and Delaware counties. The killing of fawns is prohibited. There are three principal methods of hunting in the Adirondacks: still hunting, jack hunting and hounding. Still hunting is little practised. It is pursued upon the coming of the first snow by the hunter stealing after the deer and tracking it. He is easily enabled to get within good shooting range. Jack hunting is carried on at night, as in the South. A lantern is covered with birch bark so that an opening is left in one side like a "bullseye." The light is then suspended on a pole and the hunter places himself in the bow of a boat with the light amidships and over his head. A stalwart guide sits in the stern paddling the boat quietly. The deer come down to the lily pads to feed and escape the flies. They see the light; dazzled by it they pause long enough for the hunter's purpose. This method of hunting is usually followed in June, July and August. The lantern is sometimes carried on the hunter's head. Hounding is the most popular method of deer-hunting and the most destructive. A guide is sent out into the woods with a number of dogs, and when he comes upon a deer track a dog is liberated. The hunters station themselves beside the runways, which the deer always follow and by means of which they are always destroyed. They frequently take to the water so that the hunter may row to some advantageous spot and await the arrival of the dog and deer. As the latter plunges into the lake he is followed by the boat and then can be easily dispatched. Sometimes he is grabbed by the tail by the guide while the so-called "sportsman" shoots; sometimes he is hit on the head with an oar by a man who should be immediately felled with a similar blow. The method preferred by a sportsman is to stand, rifle in hand at a runway. The dogs used are usually blooded hounds, but the best deer dogs are obtained by crossing a foxhound with terrier or shepherd. These dogs take to hunting instinctively and need little or no training. The obstacles which they overcome are astonishing. When the deer takes to the bed of a brook, as it nearly always does, the dog follows, tracing the deer by the splashes on the stones of the brook. When these traces cease, the dog examines each bank until satisfied that the deer is still in the stream. The sex of the animal can be determined by the track. Doe tracks are slim and peaked. The buck hoof is rounder, with a broader heel. A good hunter can also tell the age of the animal he is following by the size of the track. "Pot-hunters" have other methods of shooting the Adirondack deer, such as "yarding" and establishing salt licks. In the former case, the deer are traced to their winter herding grounds and are then shot down; in the latter case the method is to bore into trees where deer are known to pass, and filling the holes with salt. All these devices are now unlawful. Transportation of deer on railroads is now only permitted in open season, and then only when accompanied by the owner.

Elk.—This noble game is not abundant in the United States. Nevertheless it is not yet extinct. The mountain ranges and fir forests of the far West shelter the principal herds. In these dense woods, the luxuriant undergrowth furnishes both food and shelter for the animal, and it can breed without much inteference from man. Small bands of elk are found in the Rocky Mountains, in the swamps, woods and canyons extending from Northern California to Alaska. Elk are generally followed on foot and stalked, their tracks pointing the way. Sometimes a dog is employed to follow the scent and bring the elk to bay and detain him until the hunter can arrive. The strength of the animal enables him to range in almost inaccessible localities, and the difficulty of bringing in the body entire causes the hunter to "jerk" the meat on the spot. The magnificent antlers, measuring from tip to tip around the nose eleven feet, are always brought back when possible. A full grown elk will dress 800 pounds. Hunting the elk is fatiguing work, but the game is worth the effort. It is the largest of all the family of deer, and often stands higher at the shoulders than a horse. There are a few elk in Maine.

Antelope.—Twenty years ago the plains of the West swarmed with myriads of antelope, but this excellent game is being rapidly exterminated. The settlement of the country and the incessant hunting are sweeping them out of existence. The antelope are about the size of the Adirondack deer. They are dun colored, with white rumps and feet. They are stalked by crawling up the slopes of, ridges toward which they are feeding, or by lying in wait on the river banks. The old plan of decoying them by waving a red handkerchief is no longer efficacious. Owing to the fact that the antelope prefer the open plain, the shooting of them calls for good long range marksmanship. The broken country at the foot of the Rocky Mountain range, and the parks and valleys of that region, are now the best shooting grounds for antelope. The game is also abundant in Texas.

Mountain Sheep.—Before the war these wary animals abounded in the mountains of the far West. In the early days piles of their curled horns as high as a hay-stack could be seen near some of the settlements. The game is scarce and timid, and scales the most difficult mountains. Careful stalking and long range shooting are required for their capture.

Mountain Goat.—The rarest and most difficult game to capture in the Western Cordilleras.

Rabbits.—Wild rabbits are found in nearly every part of the United States. In the older States they usually frequent the swampy parts of the woods, where the underbrush gives them shelter and concealment. They are hunted in the winter season, after a light snowfall. The fresh snow reveals their tracks. A hound is put upon the trail. The hunter, armed with shotgun, waits near some runway until the little animal, swift as an arrow, darts from the brush and flees across the opening. The hunter must be quick with his aim, and bag his game with one barrel if possible. In the prairie country of the West, between the Mississippi and Missouri rivers and the Rocky Mountains, the wild rabbit grows to a larger size than in the East. On account of the length of his ears he is called the jack rabbit. He is sometimes hunted for amusement with greyhounds, the hunters following on ponies.

Bear.—Sport with danger to give it zest is afforded by hunting the larger varieties of the American bears. This game was originally distributed over the whole of the wooded portions of the continent. It is still found in every large wilderness, even in such places in the far East as the Catskill and Adirondack Mountains. In the South bears are plentiful, and bear stories are the favorite yarns of the veteran hunter. In North Carolina from 100 to 200 are killed every year; and there is now living near Black Mountain, on the north fork of the Swannanoa River, a man seventy-six years of age, Daniel Burnett by name, who has himself killed 426 bears during his life, as many as thirty in one season. Black bears weighing 400 pounds are killed in the swamps of South Carolina, Georgia and Florida in considerable numbers. The method there is to form a hunting party armed with rifles and accompanied by ten or twelve dogs. When pursued the bear takes to a tree, and he falls an easy prey to the rifle. Hunters often individually kill three or four in a day. Black bears are plentiful in the forest lands of nearly all the Southern States. In West Virginia several hundred are killed every year. The bottom lands of Arkansas have always been noted for black bears, and that region is still the best field for the sport east of the Rocky Mountains. In Arkansas the bear makes his retreat in the dense thickets and cane brakes, and as a rule, in order to get a shot at him, dogs must be sent in to chase him out. The baying of the dogs signals to the hunter that the bear has come to a stand and is fighting or has ascended a tree. The riflemen close in upon him and a few shots, perhaps one, do the work. Black, brown or cinnamon, and grizzly bears abound in the mountain ranges and forests of the far West. As a rule the grizzly is not hunted for sport. This savage and powerful creature, weighing from 500 to 1,000 pounds, and standing erect seven to eight feet high, is a disquieting antagonist, and the rifleman who meets him must have a steady nerve, a quick loading rifle and a good aim, if he is to bag the bear and prevent the bear from bagging him. Grizzly bear skins are not a drug in the market yet. Whenever the raids of a grizzly on the cattle corals become too destructive, a party is usually formed and he is hunted down and overwhelmed by superior force. The black bears of the West, like those of the East, are not ferocious; they are easily treed and shot. On the other hand the brown bear is a desperate fighter; he attacks on the slightest provocation, and though a good rifleman is usually more than a match for him, yet if one of the antagonists takes to a tree or his heels, it is not always the bear.

Other wild game.—The country affords many other varieties of wild game, though none of them in sufficient numbers to make the hunting of them an especial pursuit. They include the ferocious gray wolves and the little coyotes of the plains; the panther, wildcat and cougar; the pelican, alligator, eagle and opossum. They are all killed with the rifle.

E. L. Brown writes from North Carolina: "There is still one other kind of game that thousands of people come to this State to seek not yet mentioned. They walk after it and run after it. They come from all sections of the country to get it. Thousands of dollars are spent annually for the capture of this precious game. People go out for it alone, in parties, on horseback, in buggies, buckboards, carriages and stages. They climb rough mountains, toil over the lowlands, wade through snow and navigate the rivers, all hoping to secure the prize, and they often return to their homes happy in its possession. What they are after is Health, vigorous, abounding, exhilarating health." Shake off city life for a while and the pursuit of gain, you tired and work-worn reader; take in hand your shotgun or rifle; and go out for any one of the wild inhabitants of the woods and plains, and secure the grand prize here described as well as the one you bring down with your trusty firearm.

A FEW REMARKABLE SHOTS.

The incidents of hunting are full of variety and the hunter is as frequently surprised and amused by his extraordinary luck as he is chagrined by what he fails to accomplish. To illustrate the character of these incidents the record of a few remarkable ones is copied from *Forest and Stream.*

"I will relate a very extraordinary happening on a trouting expedition in the upper peninsula of Michigan. A .44 calibre rifle was taken to ward off emergencies. It was an old one that had been taken in pawn from an Indian. Throwing it into one of our boats, the jostling attendant upon a trip over a rough lumber road resulted in breaking off both the front and rear sights. Floating down stream one day, a duck was seen approaching, flying at a medium height. The writer grasped the blind rifle, fired a random shot, and imagine his astonishment as the fowl fluttered to the water's edge minus its head. The writer had shot the head off a flying duck with a sightless rifle."—C. L. Osborn, Florence, Wis.

"In 1872, being attached to the engineering force of the Northern Pacific Railroad, I was on the marsh across the wilderness between Fort Abercrombie and Fort Rice. I carried a .45 calibre rifle, chambered for the then Government cartridge, 70 grains powder, 450 grains lead. Seeing a flock of sandbill cranes a long distance off, I elevated the muzzle 15° or so and fired. The flock rose as the sound reached them, but in a moment one of the birds dropped out of the string to the ground. I found he had been shot through just below the wings. The distance must have been nearly half a mile."—M., Keokuk, Iowa.

"While boat shooting one day on Vineyard Sound, I saw coming four or five white-winged coots (or velvet ducks), about fifty or sixty feet in the air, and following after at forty or fifty yards, just clear of the water, a single one of the same. The former passed out of shot, and as the latter commenced to cut in when nearly opposite, I let him get well past me, and when at about forty yards distant shot him dead. A more surprised sportsman never sat in a boat, for at eighty or a hundred yards distance and fifty feet in the air out tumbled one of those that had just passed. I could only account for it by a shot changing its flight from striking the water."—F. J. C. S., Falmouth, Mass.

"I made a remarkable shot more than fifty years ago. Circumstances: corn planted, crows plenty. Scene: cornfield; a single crow on a fence stake, henhawk on next stake; country boy with big musket creeping behind stone wall running at right angles to the rail fence on which the marauders were sitting. Favorable situation gained, arguments weighed pro and con, crow or hawk, which shall it be; hawks kill the chickens, crows pull the corn. Verdict: corn has it, crow must die. Noise and smoke. Smoke passes off. Crow and hawk both in their death struggles, though twelve feet apart and not in line."—J. H. D.

"An old lawyer friend of mine, Major Knapp, took a dead rest with an old long single-barrel shotgun at a chicken forty yards distant on a brush pile, and banged away. About half way to the brush pile he picked up a chicken that walked into the line of fire just as he pulled trigger. Beyond the brush pile he found the chicken that he aimed at; and in the brush pile a rabbit giving his last kick."—J. G. H., Carrollton, Ill.

"One time we were on Montauk shooting woodcock. One of the party was an Englishman and he was seeking information. John Hull, the sportsman landlord of Bridgehampton, had poured into his ears the most outrageous lies all day. Hull threw up his gun and fired at a woodcock coming directly toward us. The bird was killed; but such was his momentum that Hull, as he dropped the muzzle of his gun, held out his left hand and caught the bird cleverly. The Englishman opened his eyes; and Hull coolly remarked: 'I always like to retrieve my birds that way, for I don't like to have the dogs tumble their feathers.' "—Boston, Mass.

"I was reading one evening on the veranda of my house at Lake Megantic, P. Q. A loon was making hideous music 300 yards out on the lake. I laid down my paper, took up a Government regulation rifle, a converted Enfield, and taking a few cartridges thought I would utilize the loon as a target. I raised the sight to 300 yards and fired. The ball fell short of the loon, which immediately disappeared, but came up a little further away. I raised the sights to 400 yards and fired again, this time splashing the water beyond the bird. I waited till he came to the surface and fired again. To my surprise the loon turned its toes to the daisies. I got into my boat and rowed out to it. Upon examination I found the ball had entered the right eye and made its exit out of the left. It weighed twelve pounds and was a beautiful specimen. It was one of those chance shots that happen once or twice in a lifetime."—H. B., Boston.

"Mr. Francis, son of the lifeboat inventor, was in the blind with me. A fine fat yelper came roaring into the stools as though he owned the world. The wind was blowing a gale, so much so that the bird had all he could do to face it, and just hung over the stools, using nearly his entire strength to hold himself poised in the air. He rested there practically motionless. I pulled the trigger and dropped the gun from my shoulder. To my surprise the bird did not move; he remained on the same spot, beating his wings. I raised the death-dealing tube once more and drew, if anything, a finer bead on his head. But again no result whatever followed. Mr. Francis, who had been cowering down in the grass out of sight both to keep out of sight and give me a fair chance, called to me to take his gun, which was lying beside me. This I did and fired both barrels, with precisely the same creditable consequences, and the fine fat yelper went off, possibly unaware that the fireworks had been gotten up for his especial benefit. I held straight enough in all cases, but did not allow for the wind. Every duck hunter understands that when the wind is strong enough to retard the flight of the bird, just as much allowance must be made for it as for his flight under full headway."—Robert B. Roosevelt, New-York.

"In the long ago, in Old Kentuck, squirrels were very plentiful and the old-fashioned muzzle-loading rifle was the favorite. My uncle told me one day that while out hunting squirrels he shot one from a tree near by which fell dead at the crack of the rifle. While reloading, another squirrel fell dead from another tree further off, both squirrels having been pierced with the same bullet."—Alpha, Evansville, Ind.

"A young friend of mine, a farmer's son, killed twenty-three quail out of twenty-five shots, all on the wing, and the shooting was done with a common old muzzle-loading D. B. gun."—A. F. R., Belvidere, N. C.

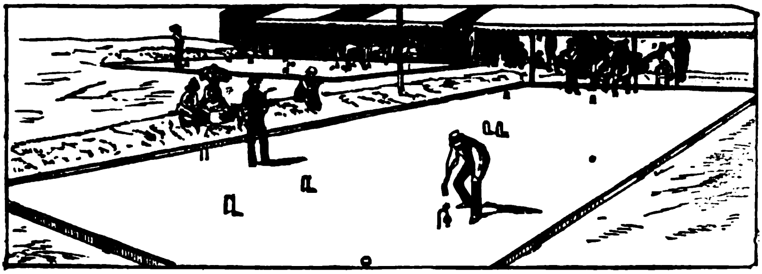
"My dog treed a squirrel up a good sized pine tree. I fired off-hand with the rifle, when the animal began a series of antics. He seemed unhurt yet unable to get away from the spot, though springing clear of the limb. The bullet had split the limb and carried the tail through, thus fastening the game after the fashion of the Virginian in securing opossums, viz., 'putting his tail in a stick.'"—A. F. R., Belvidere, N. Y.

"Picking up a half brick of bright red color, I blackened a spot in its centre the size of a 25-cent piece, and placed it in a lumber pile thirty yards distant. Stepping down into the old cellar, I rested the rifle on the embankment and fired. In an instant there was a sharp whiz by my left ear, disturbing my hair, and a sharp thud in the old chimney stack a few steps to the rear, where a little puff of brick and mortar dust rose from a crevice. Stepping to the spot I found the larger portion of the bullet I had just fired. The bullet had struck the upper part of the brick, cleaving off about one-third, and deflecting the bullet directly upward. It struck the mere edge of the board above and the projecting stick above that, giving it a direction back again."—Milton P. Peirce, Philadelphia.

"Once I was calling three wild turkeys and found them coming straight toward me along a trail. I fired a rifle ball through all three, killing them instantly.—Just after the war I was out hunting deer with a friend. A doe lay on a hillside within easy shooting distance. My friend shot an army Enfield rifle, killed the doe, and on going to the spot found two well-grown fawns shot through the neck, all three with one bullet.—I tried to stalk an old buck antelope once, and failing concluded to try one shot at long range. I was using a .40-90 Sharps rifle. Guessing the distance at 1,000 yards, I fired, the bullet passing through his heart. I call this a remarkable shot, though it was exactly what I tried to do."

"I was standing in a large apple orchard situated on a farm two miles from the town of Muncy, Lycoming County, Penn., firing at a thick oak plank, in the centre of which was a solid hard knot, the surface of which was even with the surface of the plank. The weapon used was a Colt navy revolver, .44 calibre, and the distance was about twenty yards. With the plank inclined against a tree at an angle of 45° I had fired about ten shots, when on firing again I was surprised to see the branch of a limb three feet above my head drop to the ground. It had been cut off cleanly though the centre, bearing unmistakable evidence of a bullet's passage. The bullet had glanced from the oak knot perpendicularly into the air and had cut off an inch limb almost over the shooter's head."

"I have seen two English snipe rise at a distance of ten yards apart and fly toward each other and in crossing shot with one barrel. I have seen a woodcock and kingbird killed at one shot in the same way. I know of twenty-one teal duck picked up when the person who shot only saw one duck swimming into a bunch of rushes."



CROQUET.

A PHYSICIAN named Guyard, living at the watering-place of Pau in the South of France about half a century ago, concluded that the invalids under his care needed some out-of-door recreation. Very sensibly he set about supplying the want by himself inventing a pastime. The game of croquet was the result. From Pau the English visitors carried it to England, whence it spread to the United States, becoming rapidly popular in both countries.

At first a pastime easily mastered, novel and pretty, the paraphernalia of the game inexpensive and readily set up on any home lawn or piece of level ground, croquet was played with delight by people of all ages and conditions. No great skill was required and none striven for. Indeed, fine playing was at first impracticable. The balls were not always exactly round; and the mallets with long handles were not equally weighted and they were somewhat unmanageable. The lumpy nature of every lawn, no matter how well rolled and trimmed, was liable in the end to frustrate the accuracy of many good shots, to the intense vexation of the player. In spite of drawbacks, croquet throve in popular favor for at least a generation, and it still remains a pleasant and healthful diversion and an agreeable means of bringing together a social company for summer recreation.

As was naturally to be expected, there finally arose among the older players of croquet a passion for skilful playing. Young people always care less, in every branch of social amusements, for the game itself than for the happiness of each other's company. The older players enjoy each other's society, but, possessing greater skill and strategy, they are not content unless the game is so organized as to call into play and tax these higher powers to the utmost. The operation of this principle is seen in every form of amusement; and the result of it in croquet has been the evolution of the "scientific game."

Scientific croquet originated in New-England about 1880, and so greatly was the interest of the players increased by the changes that the new game grew into popular favor rapidly. The uneven surfaces of the natural lawn at home gave way to an absolutely level, smooth and sanded court of stated dimensions, with a boundary board which checked the rolling of the ball just at the edge of the field of play. Wooden balls and long-handled mallets were succeeded by spheres of hard rubber and mallets with short handles and long rubber-tipped heads. The wide arches of the common game, which were suitable for the grassy lawn, were replaced in the sanded court by narrow wickets of wire, through which the balls could just be driven without much room to spare. Good playing then became possible, and the new game now excites the ardent attachment of its votaries.

Croquet is not an athletic game, nor could it become one unless balls and mallets should become gigantic in size and ponderous in weight. But the fact that croquet as an open-air pastime depends for its interest on the exercise of skill alone, does not diminish its value. On the contrary, the absence of the necessity for great physical exertion makes it an admirable amusement for people of mature years, who may derive from it delightful and gentle occupation in the open air, and the zest which comes from a competition of skill.

To build a croquet court, select a well-shaded spot affording a space 80 feet long by 45 feet wide. Be careful to avoid fruit trees, the debris of which will be likely to litter the court. Let the subsoil be of loam, the top dressing to be of loam mixed with fine sand, all of the top dressing well sifted. Around the court boundary boards should be placed about three inches high, with corner pieces eighteen inches in length. The boundary line should be three feet inside the boards. Salt may be strewn upon the court to keep down the grass, and the ground should also be sprinkled and rolled repeatedly. The wickets are made of steel, set into iron supports. They should not exceed eight or ten inches in height or four inches in width. In tournament games the contestants play with three and a half inch wickets. The centre or cage wicket is made of two ordinary wickets set eighteen inches apart and at right angles with the others. Cage wickets must not be more than three and a half inches wide.

The balls are made of solid rubber, wooden and celluloid balls being entirely discarded from the scientific game. Four balls form a set, costing about $7 50. They are three inches and a quarter in diameter. In color they are naturally black, but are usually tinted by dipping them in shellac.—Red, white and blue coloring can be obtained by dissolving separately in alcohol, Chinese vermillion, Prussian blue and zinc white, and zinc and flake white.

The mallets are made of hard wood, the heads being of amaranth or boxwood with hard rubber ends screwed on and secured by nickel or brass bands. The handles are of some hard wood; they are from eight to fifteen inches in length and are frequently wound with cord. Four balls are always used in playing. If there are but two players, each takes two balls.

The rules of The National Croquet Association are now the standard in the United States. They are as follows:

When the ground will admit, the stakes should be placed seventy feet apart; the first arch seven feet in front of the starting stake; the second, seven feet from the first; the third, fourteen feet to the right of, and one foot in advance of the second; the fourth on a line with the first and second, and twenty-two feet in advance of the second. The remaining five at the same relative distances: thus there will be five arches in line between the stakes, and four wing arches. The course of play is from right to left.

1. No person shall be permitted to embarrass the player, nor shall any one speak to a player while in the act of shooting except a partner.

2. The order of colors shall be red, white, blue, black.

3. There shall be no restriction in kind or size of mallet used—one or two hands may be used in striking.

4. No player shall change his mallet during a game without permission of his opponent, except in case of accident, or to make a "jump shot."

5. Every player shall be provided with a clip or indicator, the same color as his ball, painted on one side only, which he must affix to his arch next in order in course of play, before his partner plays, with the painted side showing the direction in which he is going. Should he fail to do so his clip must remain upon the arch it rested on before he played, and he must make the points again. Should he move his marker beyond or back of the point he is for, his attention must be called to such error before he plays again, otherwise it shall be allowed to stand. Should a player put a ball through its arch, he must at once move the corresponding clip.

6. The game shall be opened by scoring from the upper border for an imaginary line drawn through the middle wicket.

7. The first play with each ball shall be made after placing it on a line half-way between the starting stake and the first arch, and play may be made for the arch on any ball that is in play, or in any direction the player may choose.

8. A ball shot for the first arch failing to make it, must remain where it rests. It can be roqueted, roquet-croqueted, and can, in its proper turn, roquet and roquet-croquet any ball on the field the same as though it had run the arch.

8 1-2. Should a ball rest against or near a wire, and the umpire, or other person agreed on, should decide that in order to pass through the arch less than half the ball would be on the far side when impinging on the opposite wire, it shall be considered a push shot and shall not be made.

9. The ball must be struck with the face of the mallet.

It shall remain where it rests, and should a point be made, or a ball hit, it shall not be allowed, except by the decision of the umpire as to the fairness of the shot.

10. When making a direct shot (i. e. roquet) the player must not push or follow the ball with his mallet; but when making croquet from a ball (two balls being in contact), he may follow his ball with the mallet; but must not strike it twice.

11. If a player strikes his ball before his opponent has finished his play, the stroke shall stand, or be made over, at the option of the opponent.

12.—A ball must not be touched while on the field, except after a roquet, when it is necessary to place it beside the roqueted ball for the purpose of croquet, or to replace it when it has been moved by accident—except by permission of the opponent.

13. A ball roquets another when it comes in contact with it by a blow from the player's mallet, or rebounds from a wicket or stake, also when it comes in contact with it when roquet-croquet is taken from another ball; but not when rebounding from any obstacle that marks the limit of the field.

14. A player after making roquet, shall not stop his ball for the purpose of preventing its hitting another. Should he do so his play ceases and all balls shall be replaced as before the stroke, or remain, at the option of the opponent.

15. Loose croquet, or roquet-croquet, is striking a ball when it is in contact with another where it has been placed for the purpose of croquet, after roqueting it.

16. Roquet gives to the player the privilege of roquet-croquet only, and play must be made from the roqueted ball.

17. If a player in taking a roquet-croquet from a ball fails to move it, such stroke ends his play, and the ball must be returned, or left where it stops, at the option of the opponent.

18. A player, in each turn of play, is at liberty to roquet any ball on the ground once only before making a point.

19. Should a player roquet-croquet a ball he has not roqueted, he loses his turn, and all balls moved by such play must be replaced. Should the mistake not be discovered before the player has made another stroke, the player shall continue his play.

20. In taking roquet-croquet from a ball, if player's ball strikes another that he has already roqueted, such stroke does not end his play.

21. If a player roquets two or more balls at the same stroke, he must use the first ball roqueted only.

22. A player makes a point in the game when he runs an arch or strikes a stake in his proper play.

23. If a player makes a point and afterward at the same stroke roquets a ball, he must take the point, and use the ball. If the roqueted ball is beyond the arch and playing ball rests through the arch, the arch is held to be first made.

24. If a ball roquets another, and afterward at the same stroke makes a point, it must take the ball and reject the point. (A dead ball displaced by other than direct shot, shall not be replaced.)

25. A player continues to play so long as he makes a point in the game or roquets another ball to which he is in play.

26. A ball making two or more points at the same stroke, has only the same privilege as if it made but one.

27. Should a ball be driven through its arch or against its stake by roquet-croquet or concussion, it is a point made by that ball, except it be a rover.

28. If a player, in making a direct shot, strike a ball on which he has already played, i. e., a dead ball, his play ceases. Any point, or part of a point or ball struck, after striking the dead ball is not allowed and both balls must be replaced in accordance with Rule 29. But if playing ball in passing through its arch strike a dead ball that is beyond the arch, as determined by Rule 45, the ball shall not be considered a dead ball if playing ball rests through its arch, and the point shall be allowed. (See Rule 24.)

28 1-2. Should a player in making a stroke move with his mallet any other than his object ball, it shall be a foul and his play ceases, and all balls moved shall be replaced as before the stroke or remain where they rest, at the option of the opponent.

29. If a player play by a direct shot on a dead ball, all balls displaced by such shot shall be replaced in their proper position, and the player's ball placed against the dead ball on the side from which it came.

30. A ball accidentally misplaced must be returned to its position before play can proceed.

31. If a ball is stopped or diverted from its course by an opponent, the player may repeat the shot or not as he chooses. Should he decline to make the shot over, the ball must remain where it stops, and, if playing ball, must play from there. A ball accidentally misplaced otherwise than as provided for in Rule 28 1-2, must be returned to its position before play can proceed.

32. If a ball is stopped or diverted from its course by a player, or his partner, the opponent may demand a repetition of the shot if he chooses—should he decline to do so, the ball must remain where it stops, and, if playing ball, the ball must play from there.

33. If a ball, while rolling, is stopped or diverted from its course, by any object inside the ground, not pertaining to the game or ground, other than provided for in Rules 29 and 30 the shot may be taken over, or allowed to remain at the option of the player. If not taken over, the ball must remain where it stops, and, if playing ball, play from there.

34. Should a player, on commencing his play, find his ball in

contact with another, he may hit his own as he likes and then has subsequent privileges the same as though the balls were separated an inch or more.

35. A ball shot over boundary lino must be returned at right angles from where it stops before play can proceed.

36. A ball is in the field only when the whole ball is within the boundary line.

37. No play is allowed from beyond the boundary line, except when a ball is placed in contact with another for the purpose of roquet-croquet.

38. If a player strikes his ball when over the boundary line he shall lose his stroke and the balls shall be replaced or left where they stop, at the option of the opponent.

39. If a player roquet a ball that is off the field, either by direct shot or from roquet-croquet, the stroke shall not be allowed: and such roquet ball shall be placed in the field opposite the point where it lay before being thus hit; and if such roquet is made by a direct shot, the play ceases.

40. The first ball driven over the boundary line into a corner must be placed on the corner at the intersection of the two boundary lines.

41. If a ball, having been struck over the boundary line, is returnable at the corner, another ball being out or entitled to the corner, it shall be placed on that side of the corner on which it went off.

42. If two balls having been shot over the boundary line, rest directly behind one another at right angles with boundary line, they shall be placed on the line along side of each other in the direction from which they were played off. This can occur only when the centres of the two balls rest directly behind one another at right angles with the boundary line.

43. A ball is not through an arch when a straight edge, laid across the two wires on the side from whence the ball came, touches the ball without moving the arch.

44. If a ball has been placed under an arch for the purpose of roquet-croquet it is not in position to run that arch.

45. If a ball be driven under its arch from the wrong direction, and rests there, it is not in position to run that arch in the right direction.

46. If a ball shot through its arch in the right direction, rolls back through or under that arch the point is not made, but the ball is in position if left there.

47. A rover is a ball that has run every arch and hit the turning stake in its proper turn of play.

48. A rover has the right of roqueting and roquet-croqueting every ball on the ground once during each turn of play, and is subject to being roqueted and roquet-croqueted by any ball in play.

49. Rovers must be continued in the game until partners become rovers, and go out successively, and a rover that has

been driven against the stake cannot be removed to make way for the next rover.

50. Cage wickets may be made in one, two or more turns, provided the ball stops within limit of the cage.

51. Any playing ball within, or under a wicket, becomes dead to advancement through the wicket from that position if it comes in contact with any other ball by a direct shot.

52. If a player plays out of his proper turn, whether with his own or any other ball, or, in his proper turn, plays the wrong ball and the mistake is discovered before the next player has commenced his play, all benefit from any point or points made is lost, and his turn of play forfeited. All balls moved by the mis-play must be returned to their former position by the umpire or adversary. If the mistake is not discovered until after the next player has made his first stroke, the error must stand.

53. If a player makes a point he has already made, and the mistake is discovered before the next point is made, the play ceases with the shot by which the wicket was re-made, and the marker remains where it stood at the beginning of this play. All balls shall be left in the position they had at the time the wicket was re-made. If not discovered before the next point is made the points so made are good and play proceeds the same as if no error had been made.

54. If an error in order is discovered after a player has struck his ball, he shall be allowed to finish his play provided he is playing in the regular sequence of his partner's ball last played. In case of dispute as to proper sequence of balls, it shall be decided by the umpire; if there is no umpire, by lot. No recourse shall be had to lot unless each party expresses the belief that the other is wrong.

55. At any time an error in order is discovered, the opposite side shall follow with the same ball last played (the proper sequence); but before playing, their opponents shall have privilege to demand a transposition of adversaries balls.

Example—Black plays by mistake after Red—the error is not discovered—Blue plays in the proper sequence of his partner Red, and seeing that Black has just played is thus led to believe it the innocent ball, and upon concluding his play leaves Black by Red. Now if error in order is discovered the player of Red and Blue can demand that the position of Black and White be transposed.

56. In all subsequent construction of grounds a corner piece eighteen inches in length shall be inserted, leaving the boundary of the grounds inside, however, square at the corners.

57. The surface of grounds shall not be changed during a game by either player, unless by consent of opponent.

58. Should a ball or mallet break in striking, the player may demand another stroke with a new ball or mallet.

Charles H. Botsford, of New-York, the champion croquet player of the United States, thus outlines the general conduct of a game: "The most approved opening for the red ball is into one of the lower corners of the ground. The white then follows into the other corner; blue plays to red, and black to get to partner or opponent by a carom through the first wicket. This wire carom is made by some players with such uniform success that their opponents prefer to bunch the balls on the border in the middle rather than in the lower corners. Sometimes, though rarely, the field is run and the points all made in one play by the third ball, in which case the only absolutely safe place on the ground is secured by hiding the three balls in play against the fourth player, on a line directly behind the starting stake. Any one who tries this feat will get an inkling of the science involved in the apparently simple game of croquet. Running the field with the second ball has never been done to my knowledge in a match game. In practice games two Association players have succeeded in the attempt. Supposing that black has picked up the balls on the fourth play, unless he has one ball in the field, that is, inside the border, his play is to set the game up for his partner, white. To do this he must put a wire, or as many as possible, between red and the other balls. And here comes the opportunity for the practice of the jump shot. I have seen the next player strike his ball in such a manner as to make it leap two feet in the air, and after surmounting the stake and two wickets shoot swiftly the length of the ground, and go crashing into the enemies' 'set-up,' spoiling a prospective long run in the twinkling of an eye.

"If this shot misses—and it may be said for the benefit of the beginner that it demands much practice—white has the field before him, and may make the tour of it by careful 'nursing' and manipulation.

"The most approved method of play introduced by Jacobus, of New-Brunswick, leaves the next playing ball behind the third wicket when running it, continuing with two balls.

"To make the centre, a ball must be left close by to play from, else the run is broken. Having passed the Rubicon, the way is clear to the careful player until he reaches it on the return trip.

"If he does not succeed in putting blue behind the third wicket, he should bring it in as soon as he has reached the turning stake, and either leave it behind that obstacle or carry it to the lower side and drop it behind the wire, proceeding thence to make the middle and if possible complete the run. In the description this seems easy, in practice there are numberless obstacles."

Both hands may be used in grasping the croquet mallet; Association players, however, use only one.

A cardinal principle apt to be violated by the novice is this: Never play for position unless you have another shot with which to attempt the wicket, or unless you are so near the latter you cannot miss it.

If by making a point you are carried further from the balls go to them and sacrifice the point.

To make the "jump shot," hit the ball nearly on top with a quick hard blow. The rubber end mallets used by the National Association are made by Colburn, of Norwich.

For "clips," spring clothes-pins, painted, may be used.

To roquet a ball, is to cause a ball by stroke of the mallet to come in contact with another ball.

The game played by all clubs belonging to The National Association, and generally through the Western States, is technically known as "Loose Croquet." A few organizations play the game of "Tight Croquet." Of these clubs the Prospect Park Club, of Brooklyn, is the most prominent. That organization is a law unto itself, holding closed tournaments each year exclusively for its own members. The points of difference between "Loose" and "Tight Croquet" are as follows: In the tight game the "croquet" must always be done by striking the ball while holding it firm with the foot or hand when in contact with another ball. In the loose game this cannot be done; the croquet is accomplished by the player striking the ball loosely while in contact with another ball, making a "split shot," or "roquet-croquet."

"Loose croquet admits of pushing or following the player's ball with the mallet. In tight croquet the mallet should not follow the ball; in other words, the "push shot" is barred out. In the tight game the skill lies principally in the ability to roquet the ball into position for the arch, and then croqueting it to a place where, after the player's ball has passed through a succeeding arch, the ball can be roqueted into position for the next arch."

As before suggested, however, the loose croquet is the standard game at present.

The National Association is now composed as follows:

> Norwich Club, of Norwich, Conn.; Manhattan Club, New-York; New-York Club, Quaker City Club, of Philadelphia; New-Brunswick, of New-Brunswick, N. J.; Mutual Club, Mariner's Harbor, S. I.; Granite Club, Graniteville, S. I.; Rockville Club, Rockville, Conn.; Northampton Club, Northampton, Mass.; Gloversville Club, Gloversville, N. Y.; Townsend's Harbor (Mass.) Club, Troy (N. Y.) Club, New-London (Conn.) Club, Tremont (N. Y.) Club, Danbury (Conn.) Club.

This association was formed in 1882 and held its first meeting in New-York. Since that date the tournaments have always been held in the quaint old city of Norwich, Conn., whose towering elms and interesting old houses are as attractive to the visitor as the hospitality of its inhabitants. At Norwich, an admirable court has been established, and here playing always begins on the third Tuesday of each August. Three prizes are offered, gold and silver mounted mallets. The record for 1886, as published in THE TRIBUNE, is as follows:

	Won.	Lost.		Won.	Lost.
Charles H. Botsford	11	2	Dickey	6	7
Charles Jacobus	10	3	Strong	6	7
Bryant	9	4	Germond	6	7
Wambold	9	4	Spaulding	5	8
Bush	7	6	Baldwin	4	9
Johnson	7	6	Whitman	3	10
Read	6	7	Loomis	2	11

CYCLING.

MYTHOLOGY hands down to us the airy conception of an attractive deity, who moved through the world with great speed, treading a winged wheel; her progress brought the blessings of Fortune to those whose door her flying wheel approached. The winged wheel is now a practical reality; and its blessings of health, strength, and enjoyment accrue to the fortunate beings who, themselves mounted upon the wheel, speed along our modern streets, boulevards and country roads.

In the whole history of athletics, it is hard to find many parallels to the extraordinary popularity achieved within a short space of time by the bicycle, and by its later development the tricycle. Twenty years ago these elegant machines were almost unknown in American streets; they were equally so in Europe. But to-day they are numbered, both in the United States and in the rest of the civilized world, by the hundred thousand.

Originally it was hard to discover what entertainment was likely to be derived from locomotion by means of the bicycle, which was considered, and justly so, as a most extraordinary vehicle. Those who saw and tried the original machine came to the conclusion that it was "not at all satisfactory."

The primitive machine appears to have been first brought out by an inventor in Mannheim in Germany. It was a velocipede on two wheels, both wheels of the same size. The rider sat astride of a saddle, and pushed himself along by thrusting his feet against the ground. Clumsy, heavy and fatiguing to the rider, this velocipede failed to please. In 1852 an American patented at Washington a device which he called the "cantering propeller," a development from the idea of a hobby-horse on wheels, interesting now only from the fact that it had two wheels, a large one in front and a small one behind. In 1863 Pierre Lallement brought out in Paris a two-wheeled velocipede, propelled by cranks attached to the ends of the axle of the front wheel. The invention was introduced by him to America in 1865 and patented at Washington. It was the foundation of the bicycle of to-day.

Bicycling developed into its great popularity first in Great Britain. The first satisfactory machine, ridden in 1874, is still on view in an establishment in London, where it is placed side by side with the latest productions of the manufacturer's genius. Between that ancient machine and the elegant bicycle of to-day stretches a long bridge not of years but of improvement, a bridge significant to the

world of wheelmen of "a night of trouble" followed by a dawn of conclusive triumph. The bicycle at first shocked all preconceived notions in England as to what a land carriage should be, just as it did in America; and up to the end of 1877 a rider of one of these contrivances was looked upon in Great Britain by the general public as a lunatic, harmless, but an object of ridicule. The pioneer bicycles aroused public curiosity, however, to a remarkable degree. An old votary of the wheel, now a resident of Boston, remembers being followed around by a crowd of wondering men and women in one of the smaller pit towns of Cumberland, the populace evidently supposing that the machine was an ingenious instrument for measuring the land. In that village to-day there is an active bicycle club, and the silent wheel attracts no more attention than does a wheelbarrow.

Bicycling, or, as it was first termed, velocipede riding, was introduced to America by the manufacturers and their agents shortly after the close of the war in 1865. The new sport aroused considerable interest among the young men of the cities and villages. At first there was little thought of venturing into the streets with the new machine. A tumble from the saddle of the then unmanageable apparatus was bad enough when the rider deposited his helpless frame on the hard surface of a wooden floor. No one cared to risk a plunge upon the unsympathizing surface of a sidewalk. At first, therefore, the passion was all for riding in a rink or public hall. Nearly every city and large village throughout the Northern States had its local velocipede school; and thither, usually in the evening, the daring youth of the town flocked to cope with the forces of gravity and propulsion, in wild and erratic flights around the arena of the rink; and the young women came as amused spectators of their performances. The exercise was found to be excellent and the sport fascinating, so that after it was fairly introduced, popular interest grew rapidly.

The machine of the early days of the sport was heavy and clumsy in appearance. When finally taken from the rink out upon the sidewalk, it rattled down the street with a noise and power which cleared the way before it as effectually as a war chariot upon the field of battle. Successive improvements, however, changed and lightened the apparatus materially. Foremost in importance among the new inventions was the introduction of steel wire for the spokes in place of wood. Felloes of iron and tires of India rubber then followed. Ease of operation was promoted by bringing the saddle into a better location on the frame, by which means the rider's weight was shifted to a point more directly over the general centre of gravity. Every improvement commended the velocipede, or, as it finally came to be called, the bicycle, to a larger circle of votaries; and soon after 1868 the machine ceased to be a toy for amusing the young alone during idle hours, and became instead a delightful resource for open-air recreation among athletes, students, business men and women.

It is hard to say which country (England, America or France) has done the most to popularize this fascinating machine. All three have contributed materially toward the result. England and America, however, have perhaps made the principal improvements; and both have created a great class of enthusiastic and skilful amateur wheelmen. In England every new idea in the field of open-air amusements has always received a cordial welcome, and bicycling has been taken up there with great zest. Some of the English wheelmen have done much to show their American cousins of what the winged wheel is capable when on the road by their explorations of the highways and byways of their own land and continental Europe. Touring is an English invention.

It has now been proved that the bicycle affords the most rapid locomotion over long distances, by the power of the human muscles, that is known. It can tire out any horse on a suitable road. Wheelmen are now able to make 100 miles a day, and even 200 miles is not an extraordinary record. The run from

Tunbridge to Liverpool in England, a distance of 234 miles, has been made in 18 hours 35 minutes. On a long run it is not difficult to maintain an average speed of from twelve to fifteen miles for ten or twelve hours a day, whereas a horse should not be ridden more than forty miles a day. One of the great trips, which first brought the capacity of the bicycle into prominent notice was the famous run from London to John O'Groat's house, a distance of 800 miles, in 14 days, a part of the route lying over a hilly and difficult country. This ride has frequently been accomplished since, in considerably less time.

While bicycles and tricycles are useful for pleasure, they are also good for objects purely practical. In England the bicycle has ceased to be looked upon as simply a means of amusement; it has become a vehicle of public utility. The Postmaster-General in his report for 1880 recorded his opinion that the universal use of bicycles and tricycles as a means of conveyance of the mails was something that entered into the practical politics of his office. In the outlying districts of London telegraph messengers are now mounted upon bicycles; and visitors to the British House of Commons must have been frequently struck by the array of bicycles standing at the entrance of Westminster Hall; these machines are the property of the Press Association, and are used as a means of sending night messages from the houses of the legislature, as being surer, speedier and more satisfactory than the usual horse and wagon. Enthusiasts have even gone so far as to propose the use of bicycles in the European armies, in view of the speed with which a body of men thus mounted can be transported. In England the majority of manufacturers have decided that Coventry (the city of three tall spires) is the most suitable town for the construction of their machines; and since the decline of the silk industry there some twenty years ago, the actual existence of this town of 80,000 inhabitants has depended solely upon the manufacture of bicycles and tricycles for its very existence. It is estimated that a capital of $20,000,000 is invested in the manufacture of these machines in England, and were we to foot up the aggregate of investments associated with the bicycling industry we would find that it is no insignificant portion as compared with other industries which constitute the wealth of the country.

The most successful wheels in the world, those embodying in the most complete manner all the requirements of a road machine, are made in America. Many of the wheels in use in the United States fifteen years ago were imported from England; some of them were brought here by an enterprising American who has, since that period, created the largest bicycle manufactory in the world. In the improvement of the bicycle, the special talent of the American people in all mechanical matters has been remarkably illustrated, by the production of wheels which combine lightness and elegance with strength of construction in a wonderful degree. And so satisfactory is the result, that out of every 100 machines now used in America, 99 are of American make. The bicycle of to-day has a large wheel for driving and steering, usually in front but sometimes in the rear, varying in diameter from 30 to 60 inches, according to the stature of the rider. The trailing wheel is made with a diameter from one-third to one-fourth of its larger mate. The saddle is placed as nearly over the general centre of gravity as possible. Steering is managed by a change of direction of the forward wheel, which is effected by a transverse handle in front of the rider. See the illustrations. The wheels are constructed of steel and iron, with rubber tires. Strong, light, and elegant, a large machine will weigh not to exceed forty or forty-five pounds, will run smoothly and easily, and last for many years.

In order to increase the safety of the bicycle, several plans have latterly been introduced to increase stability. One of them is the placing of the pedal cranks, not on the axle of the main wheel, but a few inches below it, as in the illustration. This enables the cycler

to ride with a smaller main wheel and brings his weight lower. Another plan is to make the two wheels of very nearly equal size, separating them far enough to obviate the liability of "headers"; the driving mechanicism and the weight of the rider are brought between the wheels. While safety may be promoted by these devices, neither of them has proved sufficiently attractive yet to supersede the familiar standard form of the machine.

That the bicycle is not the only form of velocipede now in use is, of course, well understood. The number of different patterns is now so great that for the sake of convenience they are all classed under the generic name of "cycles." The principal type of machine, after the bicycle proper, is the tricycle. While generally a three-wheeled machine (one would naturally suppose always) the tricycle sometimes has two wheels, sometimes four, although the latter are frequently termed "quadracycles." The tricycle is a machine, on which a person rides sitting between two wheels and propelling himself while in that position. The exact number of wheels is sometimes lost sight of in the more general fact which differentiates it from other machines. The tricycle has made it possible for women to enjoy this sport, and some delightful runs have recently been enjoyed by companies of women connected with the regular clubs.

The Star is a kangaroo-like cycle, having a small steering wheel in front and the driving wheel behind. The feet of the rider rest, not on the ordinary crank pedals, but on curved levers, shaped like the hind legs of a kangaroo. The driving power is communicated to the wheels through these levers.

A tandem has two seats, arranged one forward of the other. It has two driving wheels like a single tricycle, and one small wheel, sometimes two. The latest indications in the field of cycling point to the tandem as a machine of probably great future popularity. The tandems of English construction which have been introduced into this country during the last year or two have proved inadequate, in view of the rough usage they receive upon our roads. It is a sine qua non that these machines should be built not only with greater strength but with a larger front wheel, in order that the steering shall be of the order known as "bicycle steering." The tandem with its company of two, a lady and a gentleman, presents a pretty picture, when out upon a country road, and as these machines must from necessity obtain the entire confidence of the more timid sex, in order to make them useful, the utmost care must be taken to render them strong and safe.

A sociable is a wide machine having two seats, side by side. This style of cycle has been used in Europe for wedding trips. It can frequently be seen on the smooth roads at the summer resorts. It has not been very popular so far.

The cost of a first-rate bicycle with outfit varies from $125 to $150. A good one at second hand is worth about $90 or $100. A second-class bicycle will cost from $80 to $110. A first-class "single" tricycle costs about $160, and a "tandem" tricycle about $250.

Lamp, bell, and cyclometer are worth about $15. Riding costume, including cap, shirt, stockings, shoes, etc., $30. The cost of suit can be curtailed, if needful, through the ingenuity of friends at home.

The city man who has been immersed in business or politics, and has not watched the progress of the amusements of the youth of his city, should drive out into the country on some good turnpike road on a summer afternoon, and he will be surprised at the throng of bicycles that are darting back and forth on the road. Bicycles, tricycles, tandems, Stars, and safetys will be seen, gliding past at various rates of speed. Some of the riders will amble along in a leisurely manner regardless of style or speed, clad in homely but comfortable garments, and calmly enjoying the air and the landscape. Others dressed in striking uniforms will dash past at a fast carriage gait. One man will have his legs raised from the pedals and placed horizontally over the steering handles of the machine; and, in this attitude, will coast down a gentle hill with the velocity of an avalanche. Occasionally two friends will be seen, seated side by side, in one machine. Bicycling has been in many cases practically excluded from the streets of the city, by the nature of the pavement or the throngs of other vehicles, but just out of town where the roads are good it flourishes in all its glory; and the scene on a summer's afternoon is animated and pleasing. The passion for this healthful amusement is so great, and so universal in the United States, that a man can seldom travel from one village to another without meeting wheelmen on the road.

Health, strength, and recreation are the principal objects in bicycling, as in other sports. But bicycling is conspicuous for its small expense, when the liberal return and enjoyment are considered. The first cost of a good bicycle is about the same as that of an ordinary horse, namely, about $125, while that of a first-class machine is far below that of a first-class horse. The running expense is small compared with that of feeding and grooming a horse, especially if the latter must always present a good appearance. And there is, in fact, no substitute for horseback-riding, so satisfactory and so economical, as bicycling. Fears of the danger of bicycling afflict a few people, and detain them from embarking in this exhilarating sport. Some danger does exist. This must be acknowledged. It is wiser to challenge a discussion of the point and dispose of it than to let the question of danger be raised, after this is in print, when too late to reply. A clumsy or a reckless rider will sometimes lose his balance and will capsize over the forward wheel, taking what the wheelmen term the "great North American header." If the man falls hard, not on his shoulders as he ought to, but on his head, he may be seriously injured. With good balance, however, which is as necessary in bicycle riding as it is in horsemanship, and with caution and attention to the road, the bicycler will gain the mastery of and ride the "horse of steel" with no more bruises than any boy, who is a boy, will gain in an ordinary day's chestnutting. Experience has proved that bicycling is less dangerous to life and limb than driving or horseback riding, and certainly the small percentage of danger attending the latter two amusements deters no one from enjoying them. The bicycle has certainly been commended by medical authorities.

The art of riding is so simple a matter that it need not be dwelt upon. The rider mounts with a push which starts the machine; he gains the saddle quickly but quietly; and he continues the motion by placing his feet on the pedals one after the other. He should pay close attention to balance; throw his shoulders back, sit up straight, and swing gently and easily as he propels the machine. In propelling the wheel all the muscles of the leg are in actual motion, while in balancing the muscles of the feet and the prominent ones of the thigh and groin, are brought into play. The wrist and arms are employed in steering, while the back, neck and throat muscles are used in pulling up on the handles in a spurt. In no other exercise is the exertion more thoroughly distributed.

There are now in the United States about 100,000 wheel men and women. From the Kennebec River to the Sacramento, from Buffalo to the Crescent City, the thread-like tracks of their bicycles are plainly visible. Every town of importance now has its amateur club, some of them rich and powerful; and every year is signalized with meets and tournaments, exhibitions and tours, of throngs of enthusiastic votaries of the wheel. Over all the local clubs presides a great association entitled The League of American Wheelmen, having an active membership of 10,000. An organization which has now come into prominence is The Cyclists' Touring Club, the offshoot of a powerful English organization of the same name. This club has a united membership of 30,000, and is the largest athletic institution in the world.

The progress of racing with the bicycle is simply astonishing. There are better racing tracks here than in the old country; consequently the Americans make better time. The record for fast bicycle riding is: one mile, 2 min. 29 4-5 sec.; for tricycle riding, 2 min. 41 2-5 sec. For a horse running one mile the record is 1 min. 39 3-4 sec; trotting, 2 min. 8 3-4 sec. To show how much faster bicycle riding is than unassisted human locomotion, compare the time given above with the record for fast running (4 min. 16 1-5 sec.) and fast walking (6 min. 23 sec.). The reason why greater speed can be obtained with a bicycle than by walking and running is that the wheelman exercises his strength on levers, and his weight is carried by the machine.

Some of the long distance bicycle feats on record are the following:

Distance made in one hour.—By William A. Rowe, of Lynn, Mass., 22 miles 150 yards.

Distance made in six days.—In November, 1886, by Morgan, at Minneapolis, 740 miles. He rode eight hours a day, a total of 48 hours.

Twenty-five miles.—Made by Frank F. Ives, of Meriden, Conn., in 1 h. 14 min. 23 sec.

Fifty miles.—By George E. Weber, of Smithville, N. J., in 3 h. 7 min. 42 1-2 sec. By Stillman G. Whittaker, in 2 h. 55 min. 46 1-2 sec. By Frank F. Ives, of Meriden, Conn., in 2 h. 33 min. 54 sec.

One hundred miles.—By Stillman G. Whittaker, in 6 h. 1 min. 15 sec. By Frank F. Ives, of Meriden, Conn., in 6 h. 5 min. 45 3-4 sec. Frye has made 100 miles in about 5 h. 50 min.

Ladies in large numbers are now joining the ranks of wheelmen. Many who have considered it to be an unsuitable amusement for women have modified their opinions to the extent of taking to wheeling themselves, often becoming proficient. We have heard of some who have developed such speed and stamina as to hold their own with their friends of the other sex.

Fancy riding, club and individual, has become a feature within a few years. Some of the team drills have been superb. The ease and precision with which many of the exercises are performed is astonishing. Elegant geometrical figures and military evolutions are executed with marvellous accuracy. Many years ago a comical ballad was written about Hans Breitmann and his one-wheeled velocipede. It was considered absurd at the time, and was laughed about as all caricatures are. All is changed now; people do not esteem it incredible for a man to ride a mile on one wheel; it is too startling a revelation to be amused at.

Bicycle racing has gained in popularity every year, until it has become a standard sport. The benefits derived from a good course of bicycle training are so little appreciated that we venture to demonstrate the advantages obtained physically, mentally, and morally therefrom. Few people enjoy the measure of health for one day which the trained man possesses for seven days in the week. The bright eye, rosy skin, elastic step; the blood, well charged with oxygen, rushing and throbbing in the ecstacy of life through arteries and veins; muscles hard but flexible, and glad to obey the slightest mandate of the will—these are a few of the physical benefits which follow the discipline of the body. The athlete who enjoys his work can testify to the intense satisfaction and indescribable pleasure which are the fruits of energetic yet cautious exercise. When training is suspended for a time the mind becomes dull, the body restless, and the muscles clamorous for work.

The mental advantages are great. Business over, the exercise is taken, ending with the "rub-down," and eight hours of perfect sleep follow in due course. Then what is to be expected the succeeding day? How could it be possible that a creature in such a state of existence should transact his business in any except a firm, alert and cheerful frame of mind; with a clear brain and steady hand, carrying his cares without worry and negotiating his contracts on even terms with the other athlete who is as vigorous as himself. A person in the proper condition can endure a tremendous presure of business without injury or danger.

The moral part of the question is by no means unimportant, as results often prove most conclusively. Self-control, moderation in eating and drinking, thoroughness in methods, ambition to achieve success and the power of perseverance, are the products of this wholesome amusement. The exhilaration of skimming over the water in a shell, the sense of speed while spinning on foot over the cinders, are feelings appreciated and enjoyed by the bicycler, who is conscious of a sensation akin to flying. But such results are only attained, and such speed acquired, after great labor and perseverance.

If you doubt that bicycling brings all these benefits, then try the effects yourself.

THE SPORTS OF WINTER.

BY W. S. ROSSITER.

WINTER'S arrival puts an end to the majority of the sports of the field. Bicycles, ball bats, guns, fishing rods, rowing boats and saddles are laid away for the space of five months; and social amusements of a gentler order take the place of the rough though healthful recreations of the summer season. The winter is kindly, however, and does not shut up in the house entirely the men and the women who must have fresh air. The lakes and rivers, though frozen, and the hillsides, though slippery, still call them forth for pleasure and for strength. Though few in number, the sports of winter are interesting, and a brief review of them is necessary before closing this work.

SKATING.

Skating originated in the North of Europe a long time ago. The art is known to be at least 800 years old. Its invention may reach back even to greater antiquity. One of the deities of the ancestors of the German race was depicted as being shod with skates, typical of his speed.

The first skates were pieces of smooth bone attached to the soles of the shoes; and as they were good for sliding but not for propulsion, the skater was obliged to use a pole shod with iron, with which he shoved himself forward over the ice.

To the inventive genius of Holland the world is indebted for the iron blade of the modern skate, and it is from Holland that the sport was introduced into England and America.

Fifty years ago skating was one of the favorite amusements in America. The fathers and grandfathers of the present generation were limited to recreations which were not expensive. They did not have the money to spend upon their sports which the lads of the present day possess. They toiled hard for their living; and there had not then come into existence the great, profitable, far-reaching system of home industry which now blesses America, and which places in the hands of millions of industrious men, once a week or a fortnight, more ready money for subsistence and pleasure than our forefathers saw in a month or even in two. So that fifty years ago the lads and men of the period engaged in sports which cost little money, and skating was extremely popular on that account. Women were seldom seen upon the ice; but, on the other hand, the men of all degrees of prosperity and refinement found the sport fascinating. How the beaus of that period enjoyed the ice! Skating resembled the demonstrative style of dancing then in vogue, and it enabled the well-bred man to show the grace of bearing and movement which, in that day, was much more highly prized than in this rushing and practical age.

Skating is still the delight of our youth. The long, hard winter of the North supplies an abundance of safe ice, and every bright crisp day of the hundred days of skating sees throngs of happy skaters gliding over the surface of the smooth fields of ice. In one day in New-York 5,000 skaters have visited Central Park. Now that women no longer deem it unwomanly to be strong, they too have joined the army of the enthusiasts.

As an exercise this fascinating sport is one of the best of the winter months. It promotes that bodily vigor which brings bodily warmth and fortifies the system against coughs and colds.

In the old iron skates of Holland the blade was nearly as long and large as the runner of a small sled. At the toe, the iron curled upward over the foot to a height of twelve inches. The foot-piece was of wood; the fastening, leather straps and buckles. In the modern skates the blade is reduced to moderate size. It projects only a fraction of an inch beyond heel and toe. In the cheaper styles, which cost from $1 50 to $2, the straps and wooden foot rest are retained. But in the higher grades, which cost from $5 to $8, the whole of the implement is made of good steel and the fastening is by light clamps, which are screwed up to clasp the thick soles of the shoes. The lower edge is no longer smooth and straight; it is curved like a rocker, and grooved down the centre its whole length, so as to give the sharp inside and outside edge which are so useful in fancy skating.

The novice in skating encounters many difficulties at the beginning of his career. His ankles are weak and turn under him easily. His equilibrium seems entirely to have departed. Unless he is, as he ought to be, a good walker, he lacks also the strength to remain on the ice more than a few minutes at a time. The arm of a sturdy friend during the first few exercises will remove the most of his early troubles; and a proper amount of walking in the intervals of skating will correct the rest.

Straightaway skating comes to the amateur instinctively. He turns the left skate slightly outward, so as to push with its inside edge, and leaning a trifle forward, right knee slightly bent, he slides to the front upon the right skate, keeping the blade of it perpendicular to the ice. As he loses momentum he turns the right foot outward, straightens the right leg with a vigorous thrust, and slides forward upon the left skate. The mark of the sharp steel upon the ice will show that he advances in a zigzag line. At first the slides will be short; but after a few lessons he will begin to advance with the long, steady, graceful slides which mark the confident and powerful skater.

By turning the foot slightly outward in the slide, so as to bear upon the outside edge of the skate, and by throwing the weight more forcibly over toward that side, the skater will advance by a series of curves which sweep forward and outward. By accenting this movement, throwing forward the shoulder opposite to the foot upon which he is advancing, and looking in the direction in which he is moving, he will perform the graceful "outward roll," of which experienced skaters are fond. The thrust forward is gained by straightening the leg which supports the body, with a quick, strong movement; and the change from one foot to the other is accompanied with a transfer of the balance of the body strongly over to that side. The foot which is suspended in the air is carried behind the other, toe pointing downward, until momentum is lost, when it is brought forward easily, crossed over the other, and placed upon the ice for the next slide.

To obtain perfect command of the skate, the amateur learns next the inside roll. By pressing against the ice the inside edge of the right skate, for instance, and leaning to the left, and repeating the operation with the other foot, the skater advances in a series of curves which sweep forward and inward. If a man were carrying a package of goods or a load of fire-wood on his shoulders, this would be a good method of progression. But for pleasure skating its value is chiefly in the command of skate and balance which it gives him.

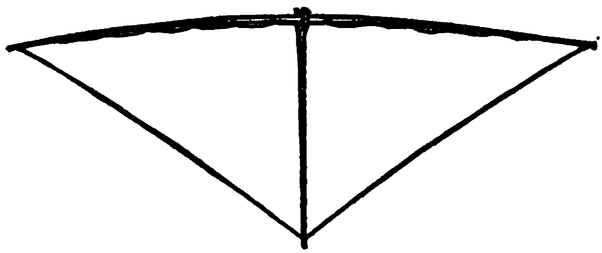
Skating backward is the reverse of the inside roll.

The fancy figures consist, as a rule, of a series of curves, circles and ellipses, combined so as to produce figures of 3, 6 and 8, true lovers' knots, the rose, spiral and other simple but graceful designs upon the ice. With a little practice the skater can write his own name with successive strokes of his keen-edged steel, and describe such figures as the outline of a fish and the spread eagle.

A tumble on the ice does no harm, if the skater falls upon those portions of his frame which nature has taken special pains to pad. The greater the velocity with which the skater is advancing, the less is he likely to be hurt, owing to the angle at which he meets the ice.

If skating over the frozen surface of a river, the skater should beware of the centre of the current. There the ice is the thinnest. If the smooth surface bends under him, he should skim rapidly over the spot or veer away dexterously in another direction. The worst thing he can do is to stop and try to go back. These streaks of thin ice are often found on lakes, near the inlets and outlets.

On the lake, on a moonlight night, the skater often encounters unexpectedly a streak of clear ice, which looks like open water, running through the more opaque mass of the older ice. The clear



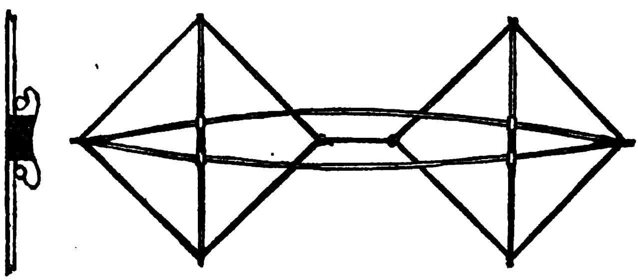
Cape Vincent Rig.

dark streak may indeed be open water. If it is too wide to leap, the skater should veer away and not attempt to cross until he knows its character.

Sticks and stones imbedded in the ice may give the skater a tumble. Look out for them.

If the ice of the lake is "booming," look out for cracks which may trip the foot. If the ice breaks, lie flat upon it and roll rapidly to a place of safety.

A new way of skating, full of its own variety of excitement, is propulsion by means of sails. This is a new invention and is becoming popular in a few localities. Charles L. Norton, the Editor of



Norton rig for sailing on skates, rear view; also side view of centre stick of sails.

"The American Canoeist," has called attention to its pleasures and has invented a light and handy sail for the use of skaters. The amateur can sail upon ice that is too rough for skating. The Norwegians and Danes use square sails (which are nothing more than cloth kites, held in the hands or strapped to the person); and they can scud, tack and wear, with the velocity of a bird. Naturally the best sail for pleasure is one that can be rolled up upon leaving the ice and carried comfortably under the arm or over the shoulder. Safety requires that it should not be strapped to the person; the velocity of the skater might carry him upon thin ice and in case of trouble the fixed sail would prove embarrassing. The Cape Vincent rig is triangular, like a lateen sail; it is made of strong cotton cloth, its long side attached to a bamboo or other light stick, from eight to fifteen feet long; the sail is spread by a sprit, having a crotch at one end that fits over the yard at the middle point of the latter, the outer end of the sprit being attached to the outer angle of the sail. The Norton rig is composed of two cloth sails, or kites, about three and a quarter feet square, and fastened to each other at one corner by a rope about a foot or eighteen inches long. The framework is of bamboo or other light wood. See illustration herewith. This can be handled by either one or two skaters. Sailing is governed by the general principles which guide the pleasure-seeker in yachting.

ICE YACHTING.

For several centuries, both for traffic and pleasure, the people of the North of Europe have practised sailing upon the ice. Their craft have been simple in form and cheap in construction, but they have answered the purposes for which they were intended.

In Russia the sled is propelled by a jib and topstil, the helmsman sitting behind the rudder, the tiller of which is turned toward him. The Sea of Azov is covered with these craft in the proper time of year. In Holland the boats are better.

It is in America that as a sport ice yachting has been developed in its greatest glory. Here the sailing is yachting, pure and simple. The boats are often of immense power; they are frequently of great beauty: and the speed which they have obtained is remarkable. There is in this age no way in which a human being can be safely transported from one point to another at a greater velocity than upon an ice yacht. A spirited horse takes a man across country at a frantic rate of speed. A bicycle will carry a man fast and far. The locomotive whirls him through the land from forty to fifty miles an hour. The ice yacht leaves them all behind, A mile a minute is a gait not at all extraordinary, and a velocity of seventy or eighty miles an hour is frequently obtained.

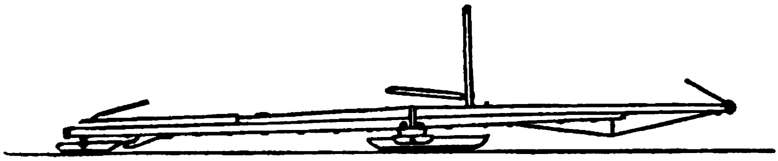
Ice yachting is practised in the ocean harbors and on the inland lakes and streams, all through the Northern States and Canada. Maine, Vermont, New-York, Ohio, Michigan and Illinois contain the principal centres of the sport. So far the largest boats have been built and the greatest speed obtained on the Hudson River, in a district forty miles long, of which the city of Poughkeepsie is the headquarters. This river freezes over early in the season and the ice lasts long. The prevailing winds of the winter sweep across the course of the stream, thus supplying an essential condition of successful yachting. And the snowfall of the winter is not heavy. The original centres of the sport on the Hudson were the villages of Glasco and Athens, not far below Albany; but the operations ol the ice harvesters and the enterprise of the river men below finally transferred the principal activity to Poughkeepsie.

The original ice boats were large sleds, propelled by some kind of a sail. The modern boats go on runners, but in every other respect they are a totally different style of craft. To carry large sail and to be able to have the wind abeam and sail in any direction, they must have great width and lateral stability. To gain this feature the shape of the boat has been altered. In substance the sled has been cut in two, lengthwise; the two halves have been separated widely; a beam has been fastened across to make the structure rigid; and the framework carried out aft to support a third runner, for steering purposes. With greater beam came the larger sail area desired and great speed, and the principle of the ice yacht was established.

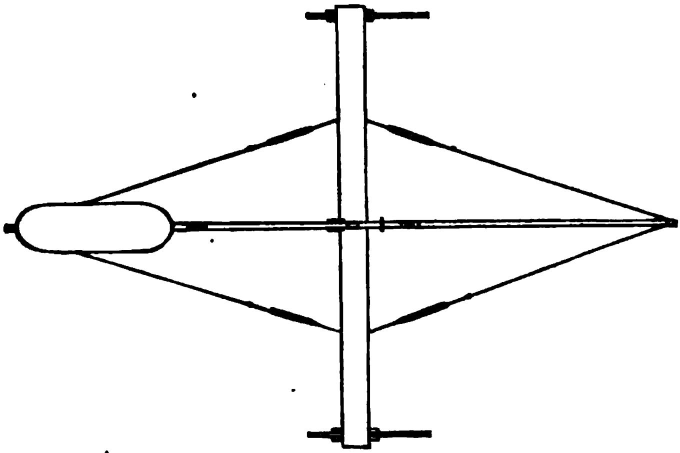
A rude ice boat can be made by any boy by building a triangle of boards, with the apex turned aft, and the base of the triangle square in front. Under each of the three corners a runner like a large skate iron is placed, the after one being movable and controlled by a tiller. Into the centre of the plank, which forms the forward side of the boat, a mast is stepped, supported by rope stays running to the forward two angles of the boat. A strong sail is hung upon the mast, a lug, lateen, sloop or leg-of-mutton. With a boat of this description the voyager may knock around on the ice in perfect safety, and he will derive from his cheap and serviceable yacht a world of exhilarating amusement.

From this simple form of ice yacht the later models have been evolved. Under the auspices of a club formed at Poughkeepsie in 1861, change after change has been introduced. The most important one was the adoption of a cross for the framework of the yacht. The two main runners rested under the two ends of the transverse beam or plank. The fore and aft beam rested, amidships, across the runner plank, the after end of it armed with the steering runner and tiller, the forward end constituting a bowsprit. The mast was stepped just at the crossing of the two beams. Upon this bed frame was laid a triangle of four by one inch plank, set on edge, the apex near the rudder, the base at the rudder plank, the piece which formed the base of the triangle passing behind the heel of the mast and supporting it. Midway between the mast and the rudder was a cross piece to brace the side rails; and in the apex of the triangle was the box for the helmsman. For many years this style of yacht was regarded with great favor; but it was finally defeated in racing by a new style of boat, the "Great Scott," and the model of the latter is now the standard on the Hudson.

In the "Great Scott" model, the mast is placed further forward and the construction of the framework is lighter and simpler. The two main timbers are retained, viz., the runner plank and centre timber. The wooden braces are abolished; and in their place iron stays, set up with turn-buckles, are employed, these stays running from the extreme forward and after ends of the centre timber to the ends of the runner plank. The box for the crew is placed away aft, is oval in form, and is cushioned. The usual mast and sails complete the yacht. Light and strong, meeting with almost no resistance whatever from the surface of the ice over which it speeds, its sail



Side view of frame of ice yacht.



Plan of frame of ice yacht.

area properly placed, this form of yacht is manageable and fast, and has proved extremely satisfactory.

Following are the scantling and details of construction of a fine specimen of the modern style of ice yacht, the St. Nicholas, owned by Archibald Rogers, of Hyde Park, N. Y.

Runner plank, basswood, 17½ inches wide and 6 inches deep at middle where the centre timber rests, and 16x3½ inches at the ends. The extreme length is 25 feet, and the upper side is curved, the amount of round or crown being 4 inches. The two lower corners are rounded off from the middle to the ends. At each end of the runner plank are two pieces of oak, 24 inches long, 2½ inches thick and 5 inches deep, called the guides. These are spaced 2⅝ inches apart and screwed to the beam with four 2½-inch lag screws each. Through each is a hole, bushed with a piece of gas pipe, ⅝ inch internal diameter, to take the runner bolt. The outer corners of the guides are chamfered off. The inner guide on each end is braced with two chocks of 2 inch oak, screwed to the runner plank. Each chock has a tenon, 1½x2 inches, running through the guide, the outer screws to guides also passing through the tenon. These four chocks give strength to resist any side thrust.

Centre timber, white pine, 5 inches wide, 8 inches deep, tapering to 5x6 inches at the after end. The bowsprit, white pine, 5x8 inches, just forward of the mast, and 4½x6 inches at the forward end, is scarfed to the centre timber, and bolted to it by ½ inch lag screws, spaced 18 inches apart, heads down. Total length from fore end of bowsprit to after end of centre timber 36 feet. The centre timber rests directly on the centre of the runner plank and is bolted to it by a strap of iron 3x$\frac{3}{8}$ inches. the ends terminating in $\frac{3}{4}$ inch bolts passing through the plank and set up against the plate on the bottom side

Frame stays, four in number, of half inch wire rope, set up with turnbuckles. The inboard-ends of each pair of stays are bolted into a plate 3x$\frac{3}{8}$ inches, which is on the under side of the runner plank, and is secured by bolts through the plank, each with a deadeye for the shrouds In the outboard end of each stay is an eyesplice and thimble In the end of the centre timber and also of the bowsprit a score 3x1 inches is cut, while through the end two $\frac{5}{8}$ inch holes are bored. A cap of $\frac{1}{4}$ inch iron, 3 inches wide, is made to fit over the end of the timber, as shown. Taking first the after end, the main traveller, of $\frac{5}{8}$ inch round iron, fits the two holes. The cap is driven on, its ends being filled with a piece of mahogany, and the traveller is passed down the two holes, the ends of the stays being first placed in the slot, one on each side, so that one end of the traveller passes through each eye, after which the nuts are screwed up on the lower ends of the traveller. The fore end is fitted in the same manner, except that a U bolt is used in place of a traveller, taking the jibstay. At the fore end is also a piece for the bobstay. This piece is set into the lower side of the bowsprit, the projection hooking over the fore end, and the ends of the bolt pass through it as well as through the timber, the cap and the two eyes in the stays.

On the top of the forecap are two lugs to which a clevis is bolted, holding the jib tack. The bobstay is of $\frac{1}{2}$ inch round steel, one end bolting into the plate screwed to the under side of the centre timber It is strained over an iron post 8 inches high, welded into a plate of iron 4x4x$\frac{3}{8}$ inches, the latter also screwed to the centre timber.

Runners, oak, 2$\frac{5}{8}$ inches thick, with shoes of cast iron, bolted on. The bolts pass down through the oak and are tapped into the iron. The sides of the shoe bevel in at the lower side their lower edge being filed to an angle of 90 degrees or a little less. It is essential to speed that the edges be kept very sharp. The runners are each hung on a $\frac{5}{8}$ inch iron pin, the hole in the former being bushed with gas pipe Two such holes are usually bored in each runner to allow for a slight shifting, if desirable The runner is fitted quite tightly between the guides, and as little play as possible is allowed in all parts

Rudder, a small runner, fitted so as to move freely. It is fastened by a pin to the rudder post, an iron forging with a stem 12 inches long and 1 $\frac{1}{2}$ inches diameter, the top being squared for the tiller. The rudder post runs through a hole in the centre timber, the latter being protected by brass plates on top and bottom A buffer of India rubber 2 inches thick is placed on the spindle under the centre timber, acting as a spring. Just forward of the rudder is an oak chock bolted to the centre timber to act as a guard and prevent the rudder from dropping into cracks. The iron tiller was formerly straight, but is now curved so as to pass clear of the body of the helmsman when lying in the car.

Car, oval, with a bent coaming of $\frac{7}{8}$ inch oak, resting on the centre timber, outside of which a piece of $\frac{3}{8}$ inch mahogany is bent The floor of the car is of pine and drops slightly in the middle. A cushion is made in one piece, with an opening to allow it to pass over the hand rail. This rail is of iron carried on two small stanchions screwed into the timber. The iron bar is served with cord, as is the handle of the iron tiller.

The cost of one of these ice yachts varies from $400 to $1,000. The Northern Light, which is the champion at present on the Hudson River, cost $630. The Icicle, a large boat, cost $700; and the Avalanche, still larger, nearly $1,000. The iron work for these boats is hammered with great care and is covered with silver bronze. On the Icicle the iron work (comprising mast step, end bands, traveller, mast band, cleats, etc.) cost over $150. A pair of good runners are worth $50.

It might be mentioned here that rival theories exist with reference to bracing the frame of a yacht. Many experts on the Hudson River believe it better to make the frame elastic, and they prefer a runner plank which is not braced or stiffened. In the Shrewsbury Club of New-Jersey the preference is for rigidity.

In the handling of an ice yacht, the navigator finds himself propelled over the surface of the deep under circumstances of astonishing novelty. He is sailing over a floor, not over a rolling and tumbling ocean. He cannot leave his seat and rush forward to take in a sail in time of need, because there is no deck for him to tread upon.

The easy rolling and pitching of the vessel at sea are entirely lacking, and in their place he experiences a series of sharp vibrations, jerks and flops, with an occasional lifting up of one side of the machine into the air, as if the whole thing were going to fly skyward, which will startle him by their intensity and originality. Once the canvas is set and the boat off under the wind, the helmsman finds himself fully occupied with the antics of his craft and the absorbing duty of steering a proper course; and he is compelled to let his sails take care of themselves. In fact the sails of a yacht are practically motionless, and the craft is handled by steering alone.

The sails are set rigidly, nearly fore and aft, the sheets being slacked off just a trifle. Flatness of set is an essential quality. The main boom is heavy and the halliards and sheets are strong, and, in order to withstand the pressure of the wind, heavy canvas is selected for the sails. The main sheet is so rigged as to give a powerful purchase upon the boom. The only tackle which reaches the hand of the helmsman is that which will enable him to haul taut the peak, which often stretches eighteen inches under the powerful pressure to which it is subjected.

When the ice yachtsman desires a sail, his boat is taken from the blocks of wood on which the runners are resting, the sails are hoisted and the halliards belayed. Sheets are made fast, and the craft is pointed in the proper direction. A start is made by pushing. As it gathers way the yachtsman leaps on board, grasps the tiller, and is off. An ice yacht seldom carries more than two persons, unless the wind is blowing a gale, in which case an extra passenger is often taken for ballast. Plates of lead are strapped to the ends of the runner plank, in the absence of other ballast. If it is necessary to reef, the yacht is luffed into the wind; the crew disembark, and, standing around the boat, lower the sail; and they reef the canvas by running a lacing line through the grommets which are hung upon the sail in place of the usual reef points. To stop a yacht, she is run off before the wind to slacken her speed, and is then luffed sharply. If going at moderate speed the boat can be stopped within two or three lengths, but this is apt to strain her considerably and requires vigorous holding on by the crew. After wearing the rudder is sometimes turned across, sending the boat around in a circle.

Ice craft naturally attain their greatest speed with the wind abeam, or a little forward of the beam. The yachtsman will usually sail much of his actual course by means of momentum. He puts the helm down enough to bring the boat into her most favorable position and holds her there, regardless of direction, until she attains her maximum velocity. He then wears, if his actual course is down the wind, or luffs if it is toward the wind, and shoots along his course driven by weight alone, until it is necessary to fill away again to gather headway.

The actual speed of an ice yacht was once a much disputed question. When the great velocity of the Hudson River boats first attracted attention a few years ago, and their owners claimed that they could sail faster than the wind, Professor Loomis and President Barnard were appealed to to declare whether it were possible for a yacht to accomplish that feat. Both men declared publicly that it was not. Professor Park Benjamin replied in behalf of the yachtsmen that it was; and he not only demonstrated the truth of the statement theoretically but he had the confirmatory evidence of the facts. An object blown before the wind certainly could not advance faster than the propelling power; but with the wind abeam, the edge of the sail cleaving the air ahead, and an entire absence of resistance, a boat can and does attain a greater velocity than the wind. So that with a twenty or thirty mile breeze the ice boats of the Hudson habitually pass the express trains on shore which are moving at a speed of forty and forty-five miles per hour, and this, too, in spite of the zigzag course of the boats.

In rushing along at such tremendous speed, the yachtsman encounters dangers in a number of forms. There are hummocks, obstructions, cracks and snow-banks in the course, and all must be watched for and avoided; and above all there is the danger of collision with other yachts. To prevent the latter form of accident, the rules of the road are very rigidly enforced by the yachting clubs. The great speed of an ice boat makes calculation necessary far in advance of any possible difficulty. Cracks can be jumped if not too wide. Fresh loose snow several inches in depth is not an inconvenience. Ice boats are frequently represented in pictures as rearing into the air and moving on the ends of two runners. That is not quite accurate. Though yachts sometimes rear under the pressure of a squall, the runners which remain down always grip the ice the whole length of the blade, as they are made movable to provide for this very contingency. If a boat with immovable runners should rear, headway would be rapidly lost, on the principle of a skater digging the heels of his skates into the ice.

It rarely happens that an ice yacht capsizes. They are more likely to become unmanageable like an excited race-horse, and spilling their owner out, to run away. This sort of thing is not as humorous to the sailor as it may be to the reader. From sliding along on runners at the rate of a mile a minute to a similar speed on the seat of the trousers is not regarded by the experienced as an advantageous change. A well-known owner of one of the larger yachts on the Hudson was thrown out in this manner not very long ago. Relieved of his weight the boat sped along down the wind, tacked several times of its own accord, and finally terminated its antics on the rocks and ice of the shore with a shock which reduced the structure to splinters.

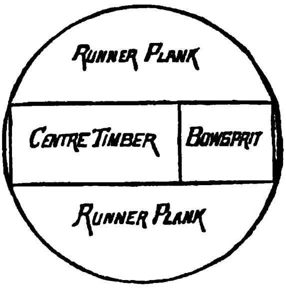
For many years the tendency among lovers of this exciting sport has been in the direction of larger and larger boats. The Icicle, owned by Commodore J. A. Roosevelt, of the Hudson River I. Y. Club, has a runner plank 25 feet in length; the total weight of the boat is 2,432 pounds, and the sail area is 735 square feet. The Avalanche, with a runner plank 26 feet long, weight 3,007 pounds and carries 841 square feet of canvas. It is believed that the limit has now been reached, not of what is possible in regard to size, but of what is suited to safe and comfortable pleasure sailing. The majority of recent boats have runner planks sixteen or eighteen feet in length.

During the summer season an ice yacht is taken apart and the two main timbers are laid away on long shelves in the club houses, somewhat as are the large racing shells. The runners are varnished and stowed away; and all other parts of the craft are carefully housed through the dull season. When winter comes again a short space of time suffices to put the yachts together for use.

As this sport is followed in the crisp, cold air of winter, an ice yachtsman dresses with great care. Over heavy underclothing is drawn a suit of linen, and over that the usual thick woollen clothing of winter, except that a fur or dogskin jacket is worn over the waistcoat, and over that a peajacket. The feet are encased in long boots of felt, half an inch thick. A fur cap big enough to cover the ears, fur gloves and goggles complete the outfit.

J. E. Buckhout, of Poughkeepsie, ice yacht builder, commenting on the sport with which his name is now prominently identified, says: "The tremendous strain requires that the frame of each yacht shall be built of wood almost perfect in grain and curing. I select my timber while it is standing and follow it until it reaches the shop. The curve which is necessary in the runner plank and centre timber is obtained by the way in which those pieces are cut. A portion of the heart of the tree is allowed to each; thus the plank in seasoning expands unequally and warps into the proper curve. Here on the Hudson we use cast iron runners. The iron is of course soft, and when a boat is first put upon the ice, the runners wear, thus indicating just what the yacht's bearings are. The runners are then filed accordingly and put back; by use they acquire what is by some called a 'water polish,' becoming so hardened that it is difficult to file the surface. On the Shrewsbury River in New-Jersey, steel runners are used; and not long ago as an experiment I made a set of runners of phosphor bronze. When the yacht was tried there was a slight carpet of snow on the ice. The bronze runners seemed to attract it and the boat could not be moved. This attraction of snow is liable to result with steel also. It is a curious fact connected with ice yachting that one does not feel the cold. I have gone out sailing to get warm, and while in a most comfortable state myself have watched the people on shore shivering and dancing about. Ice yachting would be more popular if the winters were not so variable. We never can tell when we are going to have yachting weather. Some winters there is none. But I remember one season when we had twenty days in succession. I wish we could have a taste of weather like that in these days of scientific craft. A good many doubtful points would be settled forever."

One of the successful ice yachtsmen is J. A. Roosevelt, Commodore of the Hudson River I. Y. Club. His fund of fact and reminiscences has been drawn upon largely for this paper. Of models Mr: Roosevelt says: "The designer of the new model was Hiram Relyea, the pilot of the river steamer Miller. He evidently became convinced that the old model was wrong, because, though not a man of large means, he designed a new boat and had it built himself at consierable expense. In February, 1881, just after I had won the races for the silver tiller, the new craft came up and wanted to have a brush with my yacht, the Icicle. The new boat won so easily that the attention of the people on the shore was attracted. Shortly afterward we had a match race, in which the Great Scott was victorious. A bluer set of mortals I never saw than the yachtsmen who gathered after the contest in the old brewery on the river bank. In my estimation there is not enough apparent difference between the new and old models to account for the difference in speed. Stepping the mast further forward is no doubt the most important point involved. In the old model the mast was directly over the runner plank. Now it is placed a short distance forward. Of course we have not reached perfection yet; that can only be attained by constant experiment. We are working continually toward lightness and strength. I think, how-

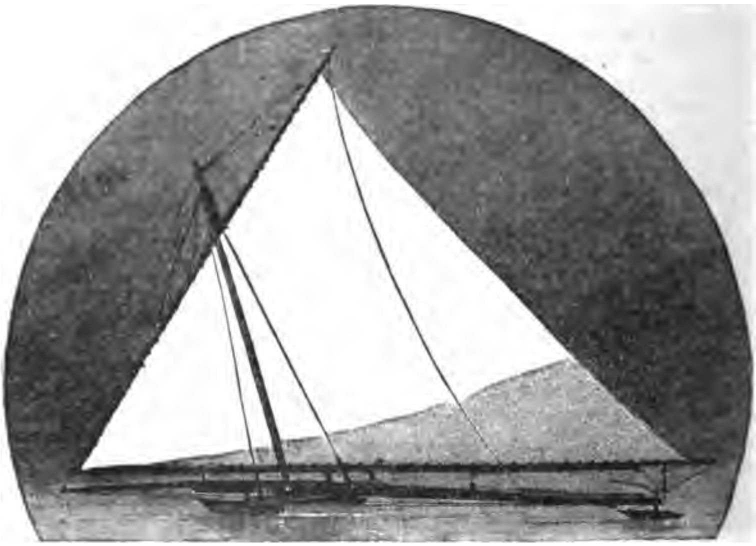


Design showing how the timbers of an ice yacht are cut out from the log.

ever, that we are sacrificing safety to speed. At first ice yachts were made heavy. We now use the lightest woods consistent with strength. The heaviest yacht on the river is the Avalanche, and she can be readily pushed. A certain amount of weight is necessary or the bowsprit will rear. Small craft can be made too light. The best wood for them is white ash. Another recent change is the relative position of centre timber and bowsprit. The heavier timber is now on top; it was formerly the other way. Moreover, it used to be thought that the sails should be low; now they are carried high and with better results. In rigging the cutter model is followed more and more. An ice yacht can sail, and sail fast, when there is wind enough to straighten out the light pennant at the masthead. An ice yachtsman must above all things be cool and clear-headed. He moves so fast that difficulties are to be met and mastered instantly. He must act almost before he thinks, for at such speed every difficulty is a danger."

Within the last few years interest in ice yachting has greatly increased throughout the country, but the conditions have not been sufficiently favorable to give the various rigs of boats a thorough trial. The sloop rig is the most popular at present; but the later sail and catboat rig both have their advocates, who have recently built superb ice yachts conforming to their ideas. An objection to the lateen sail is that it requires a strong wind to be effective.

E. H. Sanford, of the Hudson River Club, is the chief advocate of the lateen sail. He has recently built the Avalanche on that plan. Mr. Sanford says: "The objection usually urged against the lateen sail is the great weight of the spars. In my new boat, the Avalanche, the spars weigh 1,011 pounds, while in a jib and mainsail boat of the same size they would not weigh over 500 pounds. I think this drawback is easily offset by the advantages of my rig. An ice yacht fitted with a lateen sail can outpoint anything else upon the ice. Remember that in ice yachting the effort is to get the sail perfectly flat and keep it so. The lateen sail can be made absolutely flat, as tight as a drum-head. The yard hangs directly over the boom, thus the sail is at all times perpendicular. It is a matter of prime importance in

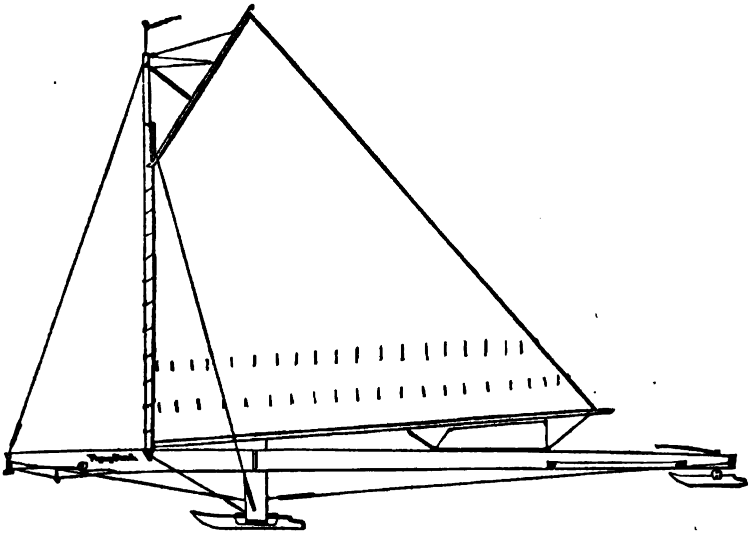


Avalanche, lateen rigged, owned by E. H. Sanford, H. R. I. Y. C.

the lateen rig to have the sail so hung that the yard will be nearly balanced, that is, have a slight weather helm. The yard hangs directly over the boom except to such an extent as it is bent by the wind. Consequently a little sheet must be allowed to get the same driving power of the wind which a smaller sloop-rigged boat obtains. The result is obtained in the lateen-rigged boat by paying the gaff off to leeward. This style of yacht has practically no leeway, and would outpoint any water boat. There is yet much to be learned in ice yachting. The lateen sail was first tried a number of years ago at Marlborough, but it is still in the experimental stage. With regard to size of ice yachts I think we have reached the limit. It is found that the weight increases in much greater proportion than the spread of canvas."

The lateen rig requires special description, because it differs from the practical rig of the same name, which is seen, for instance, on the fishing boats of San Francisco. While triangular in shape, the foot is laced to a boom, and the luff to a long yard, the two spars being united at their forward ends by a hinge joint. The mast is not a single pole; it is double, much like a derrick or shears for hoisting heavy weights. It consists of two masts, stepped on the runner plank, and leaning forward, and is well stayed by shrouds fastened to the back stays of the frame. In some cases a short plank is bolted across the centre timber forward of the runner plank, and the double mast is stepped thereon, the stays being then fastened to the runner plank. The yard has two halliards, one forward, the other aft, of the mast.

Irving Grinnell, Commodore of the New-Hamburg Ice Yacht Club, is the leading advocate of the catboat rig. His new boat, the Flying Cloud, has that rig. He says: "Every one admits that a division of sail, as in the case of mainsail and jib, is injurious. The



Commodore Grinnell's "Flying Cloud" (cat rig).

experiments with the lateen sail are not altogether final and satisfactory; but I do not think the objection urged against it can apply to the catboat rig. The latter is especially good in beating to windward. The chief objection to the catboat rig is that the large sail and forward position of the mast are likely to make the craft unmanageable. The weight of the helmsman is not sufficient to balance the boat when the wind strikes her. To overcome this objection by increasing the length, and if necessary using a very small jib, the Flying Cloud has a boom thirty-one feet in length, a gaff fourteen feet long, and a hoist of sail on the mast of twenty-one feet. The runner plank is twenty-three feet long and the sail area is 620 feet."

The Hudson River Ice Yacht Club, with its station at Hyde Park, is the leading organization. The New-Hamburg and Poughkeepsie clubs are very active, however, and there are many other clubs along the river. The Shrewsbury Club, of Red Bank, N. J., is the only other organization of note; and gives the river clubs much trouble. They are fierce rivals, and each season Shrewsbury's crack yachts go up the Hudson to fight for the pennant. They have been as yet unsuccessful, but make a gallant fight. In addition to the pennant races there are minor contests and many private races. Among the best racing records made, the Haze covered 16 miles in 24 1-2 minutes, and on February 21, 1883, made 40 miles in 49 minutes 18 seconds. This is regarded as the best racing time ever made N. P. Rogers's Bessie made 6 miles in 7 minutes 16 seconds March 1, 1886.

The following are the conditions under which the Challenge Pennant is raced for:

1. The flag is always to be considered as a challenge flag, and is never to become the individual property of any club winning it.

2. The club holding the flag is liable to be challenged during its ice yachting season by any organized club in this country or Europe, the challenge to be in the name of the club, and sent through its secretary, in writing, to the secretary of the club so challenged, and such challenge or challenges must be accepted and sailed in the order in which they are received. The club receiving the challenge must immediately appoint a committee of three for the race, who shall appoint the day, start the boats; take their time; settle all questions connected with the race, and proclaim the winner; and from the decision of this committee there shall be no appeal. The club challenging need not enter more than one boat. The club holding the flag may oppose with one or more boats, at its option.

3. Any challenge for any other purpose that may exist unsettled between the club challenging and the club challenged must be sailed before the race for the flag can be sailed between them.

4. All races for the flag shall be sailed over the annual regatta course of the club challenged; but if the ice on such course be in no proper condition for sailing, the race shall be sailed over the nearest neutral course, said course to be selected by the committee appointed for the race.

5. No club can challenge the club holding the flag more than once during one ice yachting season.

6. All races for the flag shall be sailed according to the rules and regulations of the club holding it.

7. The flag is a silk pennant, thirty feet long, with the words "Ice Yacht Challenge Pennant of America," in gold letters on a blue ground, and it shall always be known and sailed for as the Ice Yacht Challenge Pennant of America.

In the Hudson River Yacht Club Sailing Regulations, the following is the most important section:

When two yachts have to cross each other on opposite tacks, the one on the starboard tack must invariably keep her course, and the one on the port tack must keep away and pass to leeward, or tack short when the smallest doubt exists as to her being able to weather the other. All expenses of damage incurred by yachts on opposite tacks running on board each other fall upon the one on the port tack unless the one on the starboard tack has kept away with the intention of passing to leeward, in which case the expense of damage falls upon the yacht on the starboard tack, because by her keeping away she may have prevented the other from passing to leeward. Should a vessel on the port tack attempt to weather one on the starboard tack when it does not seem possible to do so, the latter rather than keep away should put her helm down. Nothing should induce a vessel on the starboard tack to keep away.

To what development the sport of ice yachting may attain can scarcely be foreseen. That the amusement is in its infancy is certain. Will the future ice yachts have decks? Will they accommodate large parties of guests? Will it be possible to manipulate the sails in the heaviest blow as on the summer yachts? Will they have cabins? Will they make 100 miles an hour? Horace Greeley used to declare that it was of no use to say in this age that a thing could not be done, because some man would then be sure to go and do it.

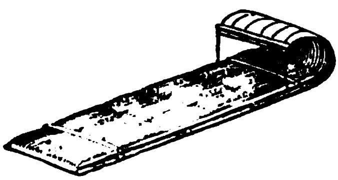
SLED AND TOBOGGAN.

Sliding down hill was the amusement of the boys and girls of New-England and the Middle States in the "good old colony times." It was the sport of the boys and girls of the later Revolutionary period. It is still the delight of a great army of our American youth, in all the States where the snowfall is heavy and the cities and villages possess sloping hillsides for the prosecution of the sport. Possibly the boys of New-England slide with more daring than elsewhere in the country. Certainly they have hillsides innumerable and all the snow that boyhood's heart can desire; and they slide in all the cities and villages of New-England with a fearlessness and jollity that are very attractive to the spectator. On Boston Common a special slide is set aside for the use of the boys; and the scene upon a winter's evening is so remarkable as often to draw a crowd of spectators several thousands in number. The slope is a sheet of ice from the top to the foot of the hill; and a constant stream of pickerels, clippers, cutters, and bobs, shoot down the hill laden with hearty lads and merry maidens, and men and women grown, sometimes steered with an extra runner, sometimes by the foot of a muscular steersman on the rear of the sled, and sometimes by the two feet of the man at the bow of the craft. Sliding down hill is full of excitement, and the passion for it is universal. Even the students at college often return at noon and supper time from the recitation rooms on the hill to their boarding houses at the foot, on sleds that coast down the sidewalk or roadway with fearful speed.

The latest development in the way of coasting in this country is known as tobogganing. While inferior in many respects to coasting, it is safer; and it is therefore growing in favor among people of mature years, to whom an overturn in sliding down hill would be a more serious matter than it would to boys and girls.

Tobogganing is of Indian origin and is one of the few sports derived from the custom of the aboriginal inhabitants of this continent. The original Indian word was "Odaboggan," and meant a large flat sledge for the transportation of goods and passengers over the snow. The sled of America, which slides on two runners, requires hard snow or hard ground with not too great depth of snow for its use. The toboggan can be dragged over deep snow. In this vehicle the Indian had no difficulty in returning from long distances with his captured elk, deer or caribou; and on toboggans the squaws dragged their pappooses and loads of goods over the hardened snow.

During the early campaigns between the Indians, French and English, and during the Revolution, the toboggans were invaluable in transporting camp and army impedimenta through the pathless wilds of the North. They were dragged by men walking with snowshoes on the crust. These sleds figured in the campaigns of Montcalm, Tracy and Courcelles, and in the march of the Brunswickers under Baron

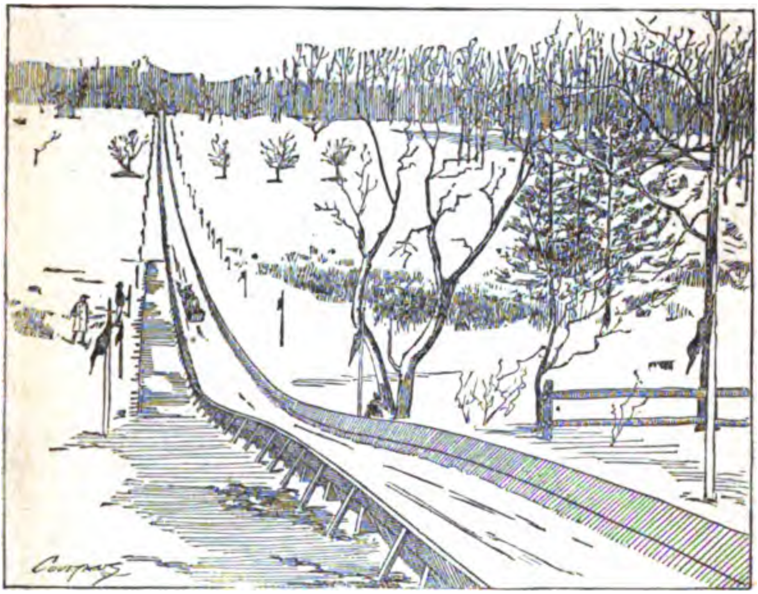


Reidesel, who were striving to effect a junction with Burgoyne. By French military writers the sled was called "train sauvage."

Tobogganing was first made a sport by British officers stationed at Montreal about fifty years ago. On these sleds the officers coasted down Mount Royal. A new sport was thus created, growing rapidly in favor.

The old Indian sleds were made to turn up at both ends and were usually hewn from trees. The modern toboggan is made of a strip or strips of tough elastic wood one-eighth to one-fourth of an inch in thickness. The woods formerly used were basswood and birch. White oak, hickory, and ironwood are now preferred; but racing toboggans are sometimes made of steel. Fine grain and elasticity are needed; and well seasoned white oak may perhaps be considered as the best wood that can be used, as it will always take a high polish. The modern toboggan is from one to two feet broad and three to seven feet long, the rule as to length being that the toboggan shall be one foot longer than the steerer standing with his sled on end. The vehicle is ribbed across on the upper side at intervals for strength, and turned up at the front end until it curls to half a circle. Along each side and firmly lashed with deer thongs and on the top of the ribs are hand or side rails which extend the whole length of the toboggan. To these the riders cling. There is also a cushion to deaden the jolting from inequalities in the slide. The Canadian toboggans were put together with deer thongs only, no metal fastenings being used, and that is the popular method now; but in the United States copper rivets are used in place of leather thongs, thus securing superior durability, cheapness and elasticity.

A simple toboggan on the old Canadian plan may be easily built by any one. Take a white oak plank from fifteen to eighteen inches in width and six feet long. Have it planed to one-fourth of an inch in thickness. Obtain seven strips of hard wood equal in length the width of your plank; and two strips four feet long; they should each be one inch square; or better, have them round, one inch in diameter. Procure four pairs of stout leather shoestrings. Lay six



Toboggan Slide at Orange, N. J.

of the round sticks across the board, one foot apart, beginning at one end. At right angles and near the ends lay the long strips. Bore four holes in the corners and tie both pieces, the long strip and short one under it, to the board; tie all the corners thus, with the knots on top, and have the leather appearing underneath parallel with the board; or better still, sink it in a slight groove (not too deep). In fastening the last brace or cross piece on the intended front, reverse the operation and put the brace on the under side.

Now bend the front end. If the plank is not too thick this can readily be done; if it cannot be done, soften the wood by steaming or immersion in hot water. Having obtained a graceful curve, tie the ends by thongs to the next cross rod and your toboggan is finished. If the end has been bent by steam, it will soon keep its shape without a cord.

The most approved styles of toboggans now have strips of wood along the bottom somewhat similar to the hand rails, thus supplying runners which reduce the friction and increase the speed. If the old-fashioned flat-bottomed toboggan is a trifle slower than one with runners, it yet furnishes an exhilarating sport, as many a small boy can testify, who has gone tearing down some icy hill in an impromptu toboggan composed of his mother's best milk-pan or beaten the next boy on his father's snow-shovel, even if he finds with horror at the bottom of the hill that the last "thank-you-marm" jolt has split his embryo toboggan down the middle.

At first toboggans were used on hills just as in ordinary coasting; but to avoid the rough spots called "cahots" artificial slides have now been built to supplant the natural slope. The artificial slide is really a Russian device, and consists of a trough supported by strong timbers placed on some convenient hillside. This trough, or "chute," as it is technically called, is two feet wider than the toboggan and guarded by heavy boards set high at either side so that it is impossible for the sled to bound out. The height and length of the chutes vary in different localities, according to the ideas of their builders, the tendency being, however, more and more toward great slope and length. An ordinary slide should not cost over $200. That at Orange, N. J., cost $1,000. The trough itself is packed with snow and sprinkled with water, thus converting it into a sheet of ice. Beside each chute there is a track by which the pleasure-seekers regain the top of the hill. The toboggan starts in a bed at the top of the chute, and almost immediately acquires great speed, the greatest on record probably being at the rate of fifty miles an hour. When the tracks are double they are placed parallel and a few feet apart laterally, but with their tops on opposite hills. The impetus acquired in one carries the riders abreast of the other; and with only a few feet to ascend they slide back to the foot of the tower from which they originally started.

With ordinary care there is little danger in tobogganing, in fact, much less than on a long slide on a sled. Its safety makes it a sport open to both sexes and to people of mature years.

A little steering is needed, and this is now done with the foot, though formerly with short sticks held in the hand. The practice of using sticks has, however, been ruled out at the artificial slides, bcause it cuts up the ice. The steerer sits at the rear, usually reclining on the left side so as to use the right foot, though an accomplished steerer can guide a toboggan equally well with either foot. The toes point to the rear and the leg is allowed to trail behind. The steering is done by pressing the ice with the toe or heel,—the latter practice is not so graceful,—and the toboggan obeys more readily than would a sled. An ordinary toboggan will carry three or four people.

Tobogganing costumes are peculiar. They are made of soft warm woollen blankets of bright colors, as scarlet and blue. The head is covered with a sort of woollen hood called a tuque. There is a bright-colored sash about the waist and moccasins encase the feet.

When viewed against the background of snow in the evening, by the light of the lanterns that always illuminate the toboggan slide, the scene is wonderfully picturesque.

There has recently been an effort to regulate the manufacture of toboggans by patents; but the market is well supplied, the prices of toboggans ranging from $3 50 to $7.

Saratoga constructed the first slide in the United States, the Woodlawn. It was built in 1884. But there are clubs and fine slides in Detroit, Mich.; Utica, N. Y.; Albany, N. Y.; St. Paul, Minn.; Dorchester, Mass.; Brookline, Mass.; Orange, N. J.; Chicago, Ill.; Buffalo, Syracuse and New-York. Many others are in prospect.

A large toboggan can be rigged in such manner as to make it available for general transportation. The builder of the great slide at Orange, N. J., drives from his house to the slide, with his family aboard, in a toboggan which is illustrated herewith.

SNOWSHOES.

The snowshoe and toboggan might readily be called twins of the snow. The snowshoe is the only contrivance ever invented to facilitate walking on soft snow, and probably never will be surpassed. It was formerly in universal use among the American Indians, and the Esquimaux and Laplanders still use the shoe to-day. Some of the tribes in Central Asia also employ it. Travellers have found the snowshoe all through the North of Europe and in Siberia and Tartary.

The American shoe is made of a piece of light ash, about half an inch thick, bent to a long oval, and fastened closely with cat-gut where the two ends meet. A strip of flat wood is fitted across the the frame about four inches from the large end, and other pieces about two feet from the ends, to give it spring and strength. The interior of this framework is woven with cat-gut, which allows the shoe to press on the snow without sinking. A hole about four inches square is left behind the centre of the front cross-bar for the partial protrusion of the toes in lifting the heel. The centre bears the weight of the body. The Indian shoe measures from two to six feet in length, and from thirteen to twenty inches in width; but for club races it has been reduced to the regulation measurement of not less than ten inches in width, without limitation as to length. A short, broad shoe is preferable for the forest or long tramps on soft snow. The Indian's shoe was always broad, adapted for the chase. Some of the tribes turned up the shoe at the toe.

A member of the Montreal Snowshoe Club applied the shape of the pointed turned-up toe of the shoe used by the Sioux to that made and used by the Iroquois; and this modification is now the shoe in general use. Moccasins are worn on the feet, and by means of an ingenious tie, also introduced by the Montreal Club, the snowshoes can be slipped on and off with greatest ease.

To the accomplished snowshoer walking is a delightful pastime. He tramps over fields and buried fences unmindful of drifts or obstructions. In all Canadian cities there are numerous snowshoe clubs that take weekly tramps in costume. Races and sports are also carried on on these shoes. In the Western parts of our own country the snowshoe is much used. It is said that the most expert runner, "Snowshoe Thompson," once made 1,600 feet in 22 seconds, and he is also said to have jumped into a snow-drift from a height of 180 feet.

USEFUL FACTS.

A few facts not properly belonging to any special open-air sport, but yet of interest to all amateurs may be properly included in this work.

ACCIDENTS.—In open-air sports a man is sometimes bruised and hurt, and he should know how to act properly in an emergency. "Wood's Household Medicine, Hygiene and Surgery" prescribes the treatment in all imaginable cases. The few simple accidents met with in sports and the proper treatment in each case are as follows:

In case of a bruise, to prevent discoloration and the settling of blood in the injured part, press the hand firmly upon the spot for half an hour. Or, apply a snug and neat bandage for the same length of time; no longer. Ice and cold water may also be applied to any ordinary bruise.

Nose-bleeding may be stopped by sitting erect, the hands clasped over the head. In a severe case, bathe the back of the neck and the face with ice water. Or, inhale the vapor of turpentine.

To stop bleeding from a cut, if it is an artery that bleeds, press the thumb or finger firmly on the bleeding point. If the blood is dark, it is from a vein; press up the edges of the wound and hold them firmly together. In a severe case, find where the main artery is; then place a stone or potato the size of an egg in the middle of a handkerchief; roll it in; tie a knot there; place the knot over the artery and tie the cloth tightly around the arm or leg. Cuts in the head and face bleed freely and present an alarming appearance, but are seldom serious. Press the spot with a cold wet rag, or stop it with flour, a cobweb, lint, or even earth. Court-plaster is useful in some of these cases.

When stung by a bee or wasp, remove the sting and apply a smooth poultice of clay, loam, or raw mashed potatoes. In a severe case apply ammonia water or sal volatile until the pain abates; then exclude the air by a cool poultice. The bite of a hunting spider should be treated with ammonia water.

For a rattlesnake bite, bind a cord, a shoestring, necktie, or any ligature, between the wound and the heart to prevent the poison making the round of the circulation. Put on two cords, if one will not do. Get them on without a moment's delay. Then take a sharp knife and cut out the part bitten; cut deep, suck the wound thoroughly, but look out that your lips are not cracked. Then stimulate the system with any alcoholic drink until signs of intoxication appear. Half a teaspoonful of ammonia may be usefully added to the whiskey. Other snake bites may be treated the same way.

For cases of suffocation in the water use "Resuscitation from Drowning" in "Swimming."

Injuries to the eyes are referred to under "Eyesight" on a following page.

In case of broken bones, the main object in treatment is to bring the broken member in a natural position, so as to relax the muscles, and then to bring the two ends of the bone straight together and hold them there with splints until they unite. As a rule, no great harm will come from waiting until a physician can set the bone, and this is always preferable when possible. In severe cases, it is necessary. If the leg is broken an impromptu stretcher should be made so as to carry the patient comfortably home, where he can be attended to by a doctor.

Fainting is cured by placing the patient on his back, the head a little lower than the heart, loosening the dress about the neck, chest and waist, and dashing cold water suddenly into the face. Throw a dipperful. Apply a little ammonia to the nose, or push the forefinger gently back into the throat to stimulate the opening of the windpipe, or slap the chest over the heart. The patient must have plenty of fresh air.

CHANCE.—It frequently becomes desirable in games and sports to know the probabilities of a certain thing occurring, when the incident is dependent on chance (1.) The chance of the concurrence of two independent events is the *product* of their separate probabilities. If a stable contains 10 saddle horses, all equally good, and one of them has a white foot, the chance of the horse with the white foot being taken out by any customer is 1 in 10. If a certain rider calls for a horse once in 7 days, and takes whatever is given him without preferences, his chances of having the horse with the white foot brought out for him are 1 in 10x1 in 7 = 1 chance in 70. Suppose 4 days in 7 are dry and a game must be played 2 days in 7. The chances of a game having a dry day are 4-7x2-7=8-49, or about 1 in 6⅛. (2.) If two phenomena cannot concur, the chance of one or the other happening is the *sum* of their different probabilities. If one good ball-player in ten can throw a ball 300 feet, and one in 20 cannot throw it more than 200 feet, then in every 100 players there would be on an average 10 men who could throw over 300 feet and 5 who could not throw more than 200. There would be 15 who would belong to either one or the other class. (3.) The chance that any special statement by a witness will be the truth is found by noting his average. If he is correct 5 times out of 6, the chance that any particular statement is true is 5-6. If he obtained his information from a man who is correct only 3 times out of 4, then in repeating this information he is likely to be correct 5-6x3-6= 15-24, or 15 times out of 24; 9 of his statements will be incorrect. It is this circumstance which impairs the value of oral tradition. (4.) To decide whether a phenomenon is due to Chance or whether some Cause is at work to produce the result, consider how frequently the phenomenon itself is likely to happen; if there is either greater or less frequency than the average, then some Cause is at work either for or against. (5.) The chance of a small number of things concurring out of a greater number of things is found by the rule following: For instance out of the 9 figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, how many different sets of three can be drawn? (9x8x7)÷(1x2x3)=84, which is the answer. How many different hands of cards are there in Whist, where 52 cards are used? Answer, (52x51x50x49x48x47x46x45x44x43x42x41x40)÷(1x2x3x4 x5x6x7x8x9x10x11x12x13)= the enormous number of 63,501,355,960,000.

DISTANCES.—To learn to judge of distances, on land or sea, the best plan is to pace or measure off different distances, and then to study the apparent size and the prominence of details of objects at the distances established. In the army, the following rules are fixed for the guidance of the men, under ordinary conditions of the air and light:

At 30 yards, the white of a man's eyes can be seen.

At 80 yards, the white is invisible but a man's eyes can be seen.

At 100 yards, the general lines of a man's face are distinguishable. If he has brass buttons, they can be counted.

At 150 yards, brass buttons can still be counted.

At 200 yards, the lines of the face are confused and rows of buttons look like stripes.

At 300 yards, details of clothing disappear, but the colors, if bright, can be made out.

At 400 yards, the face is a mere dot, but the movements of a man's limbs are distinct.

At 600 yards, it becomes impossible to see the motions of a man's arms and legs.

At 800 yards, a group of men standing together cannot be counted.

At 1,000 yards, a company of soldiers looks like a broad line, but cavalry and infantry are easily distinguishable.

At 1,200 yards, a man cannot be told from a woman, but horsemen are distinguishable from footmen. A cow can be told only by its color.

At 1,600 yards, it is impracticable to distinguish a man from a horse.

At 2,000 yards, a horseman is a mere speck.

At sea, where the convexity of the surface is regular, the distance of an object is told by the height of that part of it which has sunk below the horizon. The following table will give the facts :

Height of object.	Distance at which it sinks below the horizon.	Height of object.	Distance at which it sinks below the horizon.	Height of object.	Distance at which it sinks below the horizon.
Feet.	Miles.	Feet.	Miles.	Feet.	Miles.
0.582	1.	16	5.29	150	16.22
1	1.31	17	5.45	200	18.72
2	1.87	18	5.61	300	22.91
3	2.29	19	5.77	400	26.46
4	2.63	20	5.92	500	29.58
5	2.96	25	6.61	1,000	32.41
6	3.24	30	7.25	2,000	59.20
7	3.50	35	7.83	3,000	72.50
8	3.73	40	8.37	4,000	83.70
9	3.96	45	8.67	5,000	93.50
10	4.18	50	9.35	1 mile	96.10
11	4.39	60	10.25	1½ miles	108.96
12	4.58	70	11.07	2 miles	123.23
13	4.77	80	11.83	2½ miles	140.64
14	4.95	90	12.55	3 miles	154.10
15	5.12	100	13.23	5 miles	199.15

These distances are ordinary statute miles of 5,280 feet.

DRINKING.—It is the universal testimony of the best authorities that endurance under long-continued effort is best secured by athletes, soldiers, travellers and workers, by abstaining, as a rule, from every beverage except milk and cold water. Coffee may be taken for breakfast and tea for supper, or after hard exertion. The liquids of the human system waste away at the rate of from one to two quarts a day, the excretion being greater in men than in women. The quantity varies with the amount of liquid taken into the stomach during the day, the kinds of food, etc. The waste must, of course, be repaired. But the temptation is great to drink too much and to drink the wrong things. The less the hunter drinks while in the fields, or the athlete while training, the soldier while marching, or the farmer while busy with his crops, the greater his vitality and the less he suffers. It is a good practice for the warm and thirsty man to moisten his lips and rinse his mouth with water. The heat of his body is gradually relieved by a judicious bath. But the less the actual quantity of liquids taken, after the actual demand of the system is supplied, the better. Above all, the use of fermented and spirituous liquors should be strictly avoided. The man who drinks water, milk and tea and coffee only, will walk, row, ride, play ball, and work longer than the man who drinks beer, wine, or spirits. It has been tried in the American army, in mountain climbing, in sports, and in a thousand ways. The fact is now clearly established. Alcoholic drinks not only impair the general vitality and alertness of a man, but they actually shorten life, as well as give rise to most of the crime, immorality, and misery of the day. The statistics in possession of the life insurance companies show that the habitual user of alcoholic drinks at thirty years of age has a probability of living only fifteen years more; if he is forty, his chance of life is twelve years more. Whereas, the man who drinks water or milk only, with coffee for breakfast and tea at supper, has at thirty the promise of thirty-five years more of life; at forty he has the promise of twenty-eight years more.

EYESIGHT AND CARE OF THE EYES.—Marksmen, ball players, sailors, and all whose success depends upon good eyesight, frequently impair the keenness of their vision by injudicious practices. If their eyes are diseased they must go to a physician; but they can take care of their sight by their own exertions. On the principle that "an ounce of prevention is better than a pound of cure," many preventive measures can be adopted and much anxiety and mischief obviated thereby. We are too apt to forget that we have any eyes, until they trouble us; and just here lies the secret of the preservation of the eyesight. Always remember that you have two eyes, both of a delicate mechanism, and that if you over-fatigue them, or ill-treat them, they will be sure to protest in some practical and disagreeable manner.

Keenness of sight is secured by the focussing power of the eyes, or that power by which the sight is adjusted to objects at different distances. While looking out upon the

water and watching some noble vessel as it sails toward you, the sight as the vessel approaches is constantly undergoing a change in order to adapt itself to the changed position of the object. This is done, unconsciously to the observer, if the eye is strong and healthy, by the constant efforts of a tiny muscle in the centre of the eyeball. One can understand how much work this muscle is called upon to perform when he considers that from the time he opens the eyes in the morning until he closes them at night this little muscle is constantly called upon to contract and expand and to accomplish all sorts of herculean feats to adapt itself to the unthinking demand of its owner. Now, if this muscle be overstrained, it will act just as will any other overstrained muscle; that is, it will not act at all, or it will cease to act after a limited period of time. When the eye begins to feel fatigued, after a short period of use, and the sight blurs, and the eyeballs feel hot and dry, and one must close and press upon them for awhile before he can resume his work, he may be sure that the muscle referred to is growing tired and is beginning to rebel like an overworked animal. If the eye is naturally near-sighted or far-sighted, this muscle has still more work to perform, unless, like a prudent person, the owner has had his sight assisted by a carefully selected pair of glasses.

To avoid the strain of this muscle: (1.) Do not read when riding in the cars or in a carriage, or while on horseback. The sight is unsteadied by the jolting of the body and the rushing of the air, and the mechanism of the eye thus called upon for increased effort. (2.) Do not read when lying down. The recumbent position favors a presence of blood in the head and eyes, and this, too, requires increased effort of the muscle referred to. For the same reason avoid reading with the head bent forward, and do not bend over any work that you may be doing. If you are near-sighted, wear a pair of properly selected glasses. (3.) Be sure that the light is sufficient and falls properly on the work. Do not allow the sun to shine directly into the eyes or directly upon the work. A steady northern light that falls across the shoulder upon the object observed is the best. Never work or sit facing the light. Artificial lights, such as candles or gas, are injurious, and especially the flickering light of an open fire. Do not attempt to perform any minute work or reading by such a light.

Remember that the general bodily health influences the sight materially. The eye is not an organ distinct by itself. It derives its blood from the heart, its nutrition from the food placed in the stomach, and its nerve from the brain. It cannot exist in good condition without the active and healthy co-operation of all these organs. Preserve the digestion and eat nutritious food; keep the nerves in order and get plenty of quiet, refreshing sleep. Avoid excessive use of tobacco and spirits, as these tend to disarrange both digestion and nerves.

If the eyes feel fatigued in spite of careful attention to all precautions, do not persist in using them after the tired feeling begins. Put aside the work and rest them for awhile before resuming. Should the eye become fatigued and dazzled by prolonged use on some pronounced, glaring color, the most simple method of securing rest is to transfer attention to the opposite, or complementary color, for a few moments. The three primary colors from the combination of which all other colors are made are red, yellow, and blue. The complementary color to any one of these would be the combination of the other two. Artists who work persistently on red have a green object to gaze at to rest the fatigue of sight, and vice versa. Those fatigued by yellow turn their attention to a combined color of red and blue, or purple, and so on.

These points relative to the preservation of *keenness* of sight can be observed by all. They are of much importance, but, unfortunately, are often ignored, until too late. Many diseases of the eyes have their origin in this simple strained condition.

A common occurrence with athletes is the lodging of grains of gravel, bits of wood and dust, or possibly a cinder, under the lid of the eye. To remove these particles: It will usually suffice to evert the lid and to use the point of a handkerchief, or the sharpened end of a match, care being observed to avoid too vigorous scratching of the mucous surface. The most simple method of everting the lid is to turn the eyes downward (keeping the head upright), seize with the thumb and forefinger of the left hand the eyelashes, draw the lid out and away from contact with the eye ball; then, while pressing on the outside of the lid with a match or blunt knitting needle held in the right hand, quickly to double the lid up over it. This will expose the under surface of the lid, and will facilitate the removal of the particles lodged there.

Bruises of the eye should be treated with a weak solution of *arnica* and water. Dissolve one teaspoonful of *arnica tincture* in one pint of cold water, and bathe the eye frequently. Place a small pad of cotton cloth, soaked in this solution, over the eye at night.

There is a popular belief that the color of the eye affects the keenness and longevity of the sight, especially that the blue eye is the stronger, and its sight more lasting. This may have arisen from the fact that the lymphatic temperament of the light-haired and blue-eyed Saxon renders him more capable of withstanding fatigue and muscular exertion than the quick, nervous temperament of the dark-haired, dark-eyed son of Spain and Italy. In the latter case, the increased nervous and muscular action, called into play by temperament, followed by quicker fatigue and exhaustion, would finally cause an earlier giving out of nervous power. This principle, applied to the action of the small muscle, which has been referred to, would explain the popular belief.—[John H. Payne, M. D., Boston, Mass.

EXPECTATION OF LIFE.—A man or woman, sound in bone, muscle, and general health, living in a wholesome and prudent manner, without habits to impair the vitality, taking sufficient sleep and eating well-cooked and nutritious food, is liable to live a number of years which can be calculated with great exactness. Overwork, defective nutrition, lack of exercise, and drinking shorten the years to which a human being is justly entitled. Care and attention to every requirement of health will lengthen them. The average expectation of life, according to the "American Table," is as follows:

AGE.	Expectation of Life.	Number Dying of each 1000.	AGE.	Expectation of Life.	Number Dying of each 1000.
20	42.20	7.81	58	15.39	22.94
21	41.53	7.85	59	14.74	24.72
22	40.85	7.90	60	14.09	26.69
23	40.17	7.95	61	13.47	28.88
24	39.49	8.01	62	12.86	31.29
25	38.81	8.07	63	12.26	33.94
26	38.11	8.13	64	11.67	36.87
27	37.43	8.19	65	11.10	40.13
28	36.73	8.27	66	10.54	43.71
29	36.03	8.34	67	10.00	47.65
30	35.33	8.42	68	9.47	52.00
31	34.62	8.51	69	8.97	56.76
32	33.92	8.61	70	8.48	61.99
33	33.21	8.71	71	8.00	67.66
34	32.50	8.83	72	7.55	73.73
35	31.78	8.95	73	7.11	80.18
36	31.07	9.09	74	6.68	87.03
37	30.35	9.24	75	6.27	94.37
38	29.62	9.41	76	5.88	102.31
39	28.90	9.59	77	5.49	111.06
40	28.18	9.79	78	5.11	120.85
41	27.45	10.01	79	4.74	131.73
42	26.72	10.25	80	4.39	144.47
43	25.99	10.52	81	4.05	158.60
44	25.27	10.82	82	3.71	174.30
45	24.54	11.17	83	3.39	191.56
46	23.80	11.56	84	3.08	211.36
47	23.08	12.00	85	2.77	235.55
48	22.36	12.52	86	2.47	265.68
49	21.63	13.10	87	2.18	303.02
50	20.91	13.78	88	1.91	346.69
51	20.20	14.54	89	1.66	395.86
52	19.49	15.39	90	1.42	454.54
53	18.79	16.34	91	1.19	532.46
54	18.09	17.40	92	.98	634.25
55	17.40	18.58	93	.80	734.17
56	16.72	19.88	94	.64	857.14
57	16.05	21.33	95	.50	1000.00

FOOD.—To sustain the strength, to keep the digestion good, and to have an overflowing stock of physical and mental vigor, the waste of the system must be continually repaired by food. The rules for eating are: Not to eat too much; gormandizing is as bad in its way as starvation. The food must be tender and well cooked; many a man has cured his indigestion by changing his cook. Thorough mastication before swallowing; Gladstone bites every morsel of solid food thirty-three times, and that is not too many times for anybody. Drinking very little water, and discontinuance of the bad habit of sipping a great deal of fluid during a meal. An important rule is not to eat heartily before beginning any work that taxes mind or body severely; a light diet is the best preparation. Considerable variety, and plenty of bread and vegetables

with the meat, are important; variety enables a man to get the nutrition he wants, out of a smaller quantity of food, than if his diet were limited to one or two articles.

Value of different Foods, with reference to the amount of Nitrogenous elements they contain, Human Milk being 100, as reported by Dr. Edward H. Janes:

Rice	81	Cheese	331
Potatoes	84	Eel	434
Maize	100	Mussel	528
Rye	106	Ox liver	570
Radish	106	Pigeon	756
Wheat	119	Mutton	773
Barley	125	Salmon	776
Oats	138	Lamb	833
White bread	142	White of egg	845
Black bread	166	Lobster	859
Cow's milk	237	Veal	873
Peas	239	Beef	880
Lentils	276	Pork	893
Haricots	283	Turbot	898
Yolk of egg	305	Ham	910
Oysters	307	Herring	914
Beans	320		

FORDING OF STREAMS.—The fording of streams becomes difficult if the water reaches higher than to a man's thighs. The safe depth is not over 3 feet for men, 4 1-3 feet for horses, and 2½ feet for wagons and artillery. The direction of the ford should be observed before entering the water. A gravel bottom gives the best footing. A sandy bottom wears away and becomes deeper with use. A stony bottom is dangerous for horses, and if the stones are large impracticable for carriages. The force of the current must be taken into account, especially if the water is deep and the body is immersed. The pressure of water in motion is as follows:

Velocity per minute.	Pressure in lbs per square foot.	Velocity per minute.	Pressure in lbs per square foot.
60 feet	1.	360 feet	36.
120 feet	4.	420 feet	49.
180 feet	9.	480 feet	64.
240 feet	16.	540 feet	81.
300 feet	25.	600 feet	100.

At a velocity of 540 feet a minute, which is about 6 miles per hour, the water would sweep a man away, if he were to get into a depth of 4 feet. To estimate the current, throw a chip into the stream and pace off the distance it is carried in one minute. One pace at double quick is 33 inches long on the average.

Rafts of timber, cut on the banks, may be used for crossing streams, if the water is too deep for safety. They are safe in any current under 4 miles per hour. Put the logs together in the water, and lay an upper course crosswise of the lower one.

GOOD MANNERS.—Vigorous health, great physical strength, and the excitement of competition, frequently render men brusque, uncivil, and even boisterous in their manners. The true athlete will never lose sight of the necessity for unshaken good temper and perfect urbanity and gentleness of manner, no matter how great the heat of the strife or the magnitude of the provocation. It is in the critical moment that the chance is given him to show whether he is a brute or a gentleman. Courtesy and consideration for others are demanded of a gentleman under all circumstances, and especially in trying situations. Good manners show themselves in respect for woman in word and deed; in manly regard for the feelings of equals; in prompt and cheerful submission to disappointment, and in honor, kindness, firmness, and justice toward the helpless.

SMOKING.—Dr. Hammond, formerly Surgeon-General of the United States Army, lays down the rule that if a man has enough to eat he does not need to smoke; but, if a man does not have enough to eat, or if he works so hard as to waste his muscular tissue too rapidly, he can smoke with impunity. The effect of tobacco is to retard the waste of tissue in the system. Consequently, men of sedentary lives should not smoke. The accumulation of effete matter in the system deranges the heart, diminishes the appetite, and interferes with sound and refreshing sleep. It has the secondary result of producing a bad taste in the mouth, especially after sleep, and it renders the breath unpleasant to others. A smoker owes to society the duty of using his tooth-brush immediately after smoking. If he cannot do that, has he a right to smoke? Except in the case of the poor and hungry, and the hard-worked man, smoking is injurious. For twenty years Dr. Hammond advocated smoking in moderation as beneficial to the health, and wrote books and pamphlets in support of the theory. He then became convinced that the habit was injurious, and, in 1884, he became a total abstainer from tobacco, and publicly announced his change of views. If a smoker is a gentleman, he will never smoke in public while in company with a lady, nor will he smoke in a room occupied by women, in which the odor of stale tobacco will linger. No matter if the lady does not object; the probability is that she is more polite than the smoker, and endures the annoyance pleasantly, from pure courtesy. The smoker can decide for himself whether he wishes to be outdone in politeness.

SOUND.—The velocity of sound through the air, and the distance at which sound can be heard, varies with the state of the air. Ordinary velocity at 32° Fahrenheit, 1,090 feet per second. The rule is: Let V represent the velocity in feet per second; A, the temperature of the air by Fahrenheit thermometer; D, the distance the sound travels in time T; T represents time in seconds. Thus:

$$V = 1089.42 \sqrt{1 + 0.00208\ (A - 32)}$$

$$D = 1089.42\ T \sqrt{1 + 0.00208\ (A - 32)}$$

A yacht down the lake was seen to fire a cannon. The report was heard in 6½ seconds. The air was at a temperature of 60°. Then:

$$D = 1089.42 \times 6\tfrac{1}{2} \sqrt{1 + .00208\ (60^\circ - 32)} = 7300 \text{ feet, or } 1.38 \text{ miles.}$$

Ordinary sounds can be heard the following distances:

	Feet.	Miles.
A strong human voice in the open air, no wind	460	.087
Report of a musket	16,000	3.02
A drum	10,500	2.
Music of a strong brass band	15,840	3.
An ordinary cannon shot	105,000	20.
Heavy cannonading	575,000	90.
In a light, scarcely observable breeze, a human voice has been heard, down the wind	15,840	3.

SPECIFIC GRAVITY.—The comparative weight of substances is called their Specific Gravity. The unit of measurement is distilled water, of which 1,000 ounces weigh exactly 62½ lbs. avoirdupois.

Name of Substance.	Specific Gravity.	Name of Substance.	Specific Gravity.
Aluminum, cast	2.560	Marble, common	2.686
Aluminum, sheet	2.670	Chalk	2.784
Antimony, cast	6.702	Granite, Quincy	2.652
Arsenic	5.763	Pearl	2.650
Brass, cast	8.396	Quartz	2.660
Brass, sheet	8.525	Flint	2.594
Bronze	8.222	Gypsum	2.164
Copper, cast	8.607	Salt	2.130
Copper, sheet	8.785	Sulphur	2.033
Gold, pure	19.258	Common earth	1.984
Gold, hammered	19.362	Clay	1.930
Gold, standard	17.647	Brick	1.900
Gold, 22 carats fine	17.486	Sand	1.800
Gun metal	8.153	Coal, anthracite	1.436 to 1.640
Iron, cast	6.955 to 7.125	Coal, bituminous	1.270
Iron, wrought	7.56 to 7.80	Charcoal	.441
Lead, cast	11.352	Coke	.744
Lead, sheet	11.400	Eggs	1.090
Mercury, fluid	13.568	Honey	1.450
Mercury, solid	15.632	Milk	1.032
Nickel	7.807	Blood	1.054
Pewter	11.600	India rubber	.934
Platinum, pure	19.500	Tallow	.94
Platinum, sheet	20.337	Alcohol	.883
Silver, pure	10.474	Oil, linseed	.940
Silver, standard	10.534	Oil, olive	.915
Steel, cast	7.818	Oil of turpentine	.870
Steel, soft	7.834	Oil, whale	.932
Tin	7.291	Beeswax	.965

Name of Substance.	Specific Gravity.	Name of Substance.	Specific Gravity.
Zinc, cast	7.028	Butter	.942
Zinc, sheet	7.291	Camphor	.988
Limestone	3.180	Gum Arabic	1.452
Diamond	3.521	Lard	.947
Glass, flint	2.933	Sugar	1.605
Glass, bottle	2.732	Atmospheric air	.0012
Marble, Parian	2.838		

Specific gravity of gases, taking atmospheric air as the unit for comparison :

Carbonic acid	1.527	Chlorine	2.500
Hydrogen	.069	Smoke of bit. coal	.102
Oxygen	1.104	Smoke of wood	.90
Nitrogen	.972	Chlorocarbonous acid	3.472
Steam at 212°	.488	Hydriodic acid	4.346

The specific gravity of woods cannot easily be given, but their weights can be. The figures given below have been compiled from various sources. The weights of American woods have in many cases been obtained from Professor C. S. Sargent, the Census Expert on Forestry in 1880.

Woods.	Weight per cubic foot, in pounds. When perfectly dry.	When in the condition as ordinarily found in the lumber yard.
Acacia	44.4	....
Alder	50	....
Ash	48	52
Apple	49	53
Beech, American	43	49
Birch, common	41	46
Birch, American black	47	52
Box	63	....
Butternut	24	....
Chestnut	28	36
Cedar, white	21	25
Cedar, Puget Sound, white	24	28
Cedar, red	30¾	35
Cork	15	....
Cherry	44	....
Cypress	29	35
Elm	34	41
Ebony	79	83
Filbert	37	....
Fir, Puget Sound	33	46
Fir, New-England	34	....
Gum	53	....
Horse-flesh Dogwood	54½	....
Hackmatack (larch)	38	42
Hazel	53	....
Hemlock	26	30
Hickory, shellbark	43	53
Hickory, pignut	49	....
Holly, white	47	49
Hawthorn	57	....
Juniper	33	36
Lance-wood	43	....
Locust	46	....
Lignum Vitæ	83	....
Laurel, white	41	....
Logwood	56	....
Maple, rock	42½	45
Maple, black sugar	43	46
Mastic	63	....
Mahogany, Honduras	35	....
Mahogany, Spanish	66	....
Madeira wood	59½	....
Oak, white American	46	56
Oak, red	....	....
Oak, live	59	76
Oak, heart of, 60 years old	72	....
Pear	41	....
Plum	48	....
Poplar, southern	24	....
Poplar, white	32	....
Pine, pitch, New-England	31	35
Pine, white	24	33
Pine, Southern	43 2-3	48
Pine, Jersey	31	35
Redwood, California	26	....
Rosewood	46	....
Satinwood	55	....
Spruce, black	28½	33
Sarsafras	30	....
Sycamore	35	....
Teak	55	61
Walnut, black	42	....
Willow	31	....
Yew, Spanish	50	....

WEATHER.—People, who spend much of their time in the open air, learn to watch the changing shapes and colors of the clouds, the looks of the sun, and the direction of the wind, and to judge of coming weather with great accuracy by the general appearance of things.

A few signs of coming weather are the following: (1.) When the upper clouds go one way and the lower clouds, or the lower wind, another, a change of wind is indicated. (2.) Exceptional clearness of the sky and twinkling of the stars, denote great humidity in the upper air, with rain to follow. (3.) A light scud moving rapidly under hazy clouds means wind and rain. (4.) If the cumulus clouds are sharp in outline, fair weather is indicated. (5.) Halos around the sun or moon betoken rain or snow. (6.) A red sunset promises fair weather next day; a bright yellow sunset, wind; a red sunrise, bad weather. (7.) Fog is not ordinarily followed by rain; on the contrary, a foggy morning is generally followed by a pleasant day. (8.) A cyclone is indicated, first, by a rise in the barometer, and by cirrus clouds, which show the outer edge of the storm, moving from southeast to northwest, or from east to west; the barometer begins to fall, and drops to below 29 inches; the storm is then at hand; the clouds are thickening; the wind changes and blows from the north or west; a heavy bank of clouds follow, which shows the centre of the storm.

There are still other signs, familiar to the eye of hunter, sailor, or fisherman. Any good observer can soon tell the weather for nearly a day ahead. The Signal Service, having telegrams from every part of the country, can predict with certainty about a a day ahead. The special weather observer of THE NEW-YORK TRIBUNE predicts regularly for two days ahead, and sometimes three.

The latest science in weather matters shows that atmospheric air contains about .791 per cent of nitrogen and .209 of oxygen. There is from .0004 to .0006 of carbonic acid in the open country; and always a varying amount of vapor of water. The height of the atmosphere is greater than formerly supposed. There is an appreciable atmosphere at the height of 66 miles. Loomis says that shooting stars and aurora borealis indicate that there is a very rarefied atmosphere at 250 and 300 miles, and perhaps 500 miles, from the earth. The pressure of the air on the earth's surface varies with the weather from about 12½ to 15½ lbs. to the square inch. Average 14.7 lbs.

The winds are caused by the air rushing from an area of high pressure into an area of low pressure somewhere; by unequal specific gravity of the air due to temperature and humidity; and the rotation of the earth, which at the equator moves with a velocity of 1,036 miles per hour, in latitude 15° at 1,000 miles, in latitude 45° at 732 miles, and in latitude 75° at 268 miles.

The clouds are fogs floating in the air. The *Cirrus* clouds consist of long slender feathery filaments; they float at a great height, from 6 to 10 miles, and are generally the first to appear after perfectly clear weather; they are believed to be composed of flakes of snow or spiculæ of ice. *Cumulus* clouds are rounded masses with a horizontal base, and are caused by currents of heated air rising into the cooler regions above; they float in the lower regions of the atmosphere. *Stratus* clouds float in a uniform bank or sheet, often covering the entire sky; they are the lowest of the clouds and often touch the earth's surface. The *Cirro-Cumulus* are the round fleecy masses, woolly clouds, which are seen in warm dry weather. The *Cirro-Stratus* clouds are a delicate, featherlike formation; sometimes they mottle the sky in such way that is called a mackerel-sky. The *Nimbus* is the rain cloud.

Rain drops vary in size from 1-75 to ¼ inch. They fall slowly, varying from 8 to 34 feet per second. New-England averages 90 rainy days per year; in the West the average is somewhat greater; in California, there are 50 rainy days per year; in Oregon, 130; in Alaska, 235. In Great Britain the average is 156; less in Europe. The bulk of the population of the United States lives where the annual rainfall is from 35 to 50 inches. The range of annual rainfall in the United States is from below 10 inches in Nevada and Arizona, to 15 inches on the great plains, 30 and 35 inches in New-York and the Lake Regions, 40 and 45 inches in the valleys of the Ohio and Mississippi as far north as Iowa, 50 to 55 inches in the States south of Tennessee and North Carolina, and 60 inches and over on the Middle Gulf coast and the coast of Oregon and Washington. Rarely more than an inch a day is experienced; but heavy local showers in the United States have been known to precipitate 5, 8, 9, and 15 inches of rain in less than one day. In the tropics, rainfalls of 400 to 600 inches a year are known.

Hail usually comes with a thunderstorm. Its fall is usually preceded by unusual heat of weather. Large hail generally falls in the hottest part of the day, just after noon. Hailstones vary from less than 1-10 inch in diameter to 4 inches. August 13, 1851, hailstones fell in New-Hampshire weighing 18 ounces. Pound weight stones have fallen in Pittsburg. Hail is formed by an icy current of air descending and forcing hot and moist air upward to a great height, where its vapor is condensed suddenly and frozen, the air at the time being violently agitated.

Storms are caused by a strong upward motion of the lower air into the upper regions, where its vapor is condensed. The fall of rain liberates the latent heat of the air, and thus continues the upward motion for days in succession. A violent storm is usually attended by a spiral motion of the wind toward the centre of the storm, the wind often blowing with great velocity. In this case the storm is a cyclone. Cyclones are from 100 to 500 miles in diameter, sometimes 1,000. Previous to a cyclone the air is close and sultry and the barometer falls rapidly. Tornadoes are violent whirlwinds, a little above the ground, into the vortex of which the surface air is sucked inward and upward with a spiral motion, and with extraordinary velocity and violence. A whirling funnel hangs from a dark and agitated cloud, and causes terrific destruction wherever it touches the earth. A waterspout is caused by the suction of one of these tornadoes in passing a body of water.

Lightning is now attracting the special attention of weather observers. Its nature is not well understood. The long, irregular, crooked flashes of lightning are called zig-zag or forked lightning; they will dart 4 and 5 miles, and even 10, across the sky. Ball lightning appears in the form of a ball, leaping from cloud to cloud, or dancing along the earth and generally is attended with terrific thunder. Sheet lightning is merely the general illumination caused by bright flashes of common lightning. Heat lightning is the light of a distant thunderstorm.

WORK OF MEN AND ANIMALS.—In measuring the work performed by men and animals, a standard of measurement is necessary. The unit of work is taken at one pound, raised one foot per minute. A man's power is estimated at 50 lbs. raised one foot per second, or 3,000 lbs per minute. A horse power is 33,000 lbs, raised one foot per minute. Still a larger unit is the workman's day, which represents the dynamic force put forth by one man working eleven hours. It is equal to one horse-power working one hour; or, 1,980,000 lbs, raised one foot per minute. This last unit is adapted to expressing large amounts of work, such as the building of a large ship, a bridge, a church, etc., but it is seldom employed. The following are some of the observed results of power put forth by men and animals:

MOVING WEIGHTS HORIZONTALLY.

	Working Hours per Day. Useful effect.	No. of Units of Work per Day. Useful effect.	Weight Raised in lbs.	Velocity, in feet, per Minute.	Horse Power exerted.
A man walking without burden at the rate of 1 mile in 15 minutes	8	24,499,200	145	352	1.54
Man moving at a double-quick, 165 steps to the minute, each step being 33 inches	6	23,698,800	145	454	1.99
Soldier at a double-quick, carrying 20 pounds	6	26,967,600	165	454	2.27
Laborer transporting weights in a wheelbarrow, and returning with it empty	10	7,815,000	130	160	.66
Horse, in a horse-mill, walking moderately	8	9,158,400	106	180	.577
Horse, in a horse-mill, trotting fast	8	27,475,200	106	540	1.73
Horse, drawing a loaded car, at a walk	8	129,600,000	1,500	180	8.18
Horse at a trot, drawing a loaded carriage	8	194,400,000	750	540	12.27
Horse, with rider, alternately walking and trotting	8	29,700,000	225	275	1.87
Horse at a gallop with rider would exert this work	8	129,600,000	225	1,200	8.18

RAISING WEIGHTS VERTICALLY.

	Working Hours per Day. Useful effect.	No. of Units of Work per Day. Useful effect.	Weight Raised in lbs.	Velocity, in feet, per Minute.	Horse Power exerted.
A man mounting a stairway, ladder, or gentle incline, without any load	8	203,200	145	29	.127
Man raising a weight, by a single fixed pulley	6	720,000	50	40	.06
Laborer lifting weights by hand	6	531,000	44	34	.045
Laborer carrying weights on his back up a ladder or gentle incline (his own weight included), but returning unladen	6	406,000	145	8	.034
Laborer lifting earth with a spade to an average height of $5\frac{1}{4}$ feet	10	281,000	6	78	.014

A man will carry from 30 to 50 lbs.
Llama of Peru will carry from 75 to 100 lbs.
A pony or an ox will carry from 150 to 200 lbs.
A horse will carry from 250 to 300 lbs.
A donkey will carry from 175 to 200 lbs.
A mule will carry from 250 to 360 lbs.
A camel will carry from 320 to 450 lbs.
An elephant will carry from 1,500 to 2,000 lbs.

One man can lift with both hands from 200 to 290 lbs. He can support on his shoulders 330 lbs. A man can lift with the greatest effect when his weight is to that of his load as 4 to 3. A man can draw or push horizontally 110 lbs. Men pulling together will pull about 70 lbs. each.

A horse can usually draw seven times as much as he can carry; a good draft horse will draw 1,600 lbs. twenty-three miles a day, weight of wagon included. A good horse can carry 225 lbs. about twenty-five miles a day in eight hours, moving a part of the time at a trot.

Three men each carrying 100 lbs. will ascend a hill faster than a horse carrying 300 lbs.

INDEX.

PUBLISHER'S DEPARTMENT.

BEST PERIODICALS FOR FAMILY READING.

HARPER'S MAGAZINE during 1887 will contain a novel of intense political, social, and romantic interest, entitled "Narka,"—a story of Russian life—by Kathleen O'Meara; a new novel, entitled "April Hopes," by W. D. Howells; "Southern Sketches," by Charles Dudley Warner and Rebecca Harding Davis, illustrated by William Hamilton Gibson; "Great American Industries"—continued; "Social Studies," by Dr. R. T. Ely; further articles on the Railway Problem by competent writers; new series of Illustrations by E. A. Abbey and Alfred Parsons; articles by E. P. Roe; and other attractions. Subscription per Year, $4 00.

HARPER'S WEEKLY maintains its position as the leading illustrated newspaper in America; and its hold upon public esteem and confidence was never stronger than at the present time. Besides the pictures, Harper's Weekly always contains instalments of one, occasionally of two, of the best novels of the day, finely illustrated, with short stories, poems, sketches, and papers on important live topics by the most popular writers. The care that has been successfully exercised in the past to make Harper's Weekly a safe as well as a welcome visitor to every household will not be relaxed in the future. Subscription per Year, $4 00.

HARPER'S BAZAR combines the choicest literature and the finest art illustrations with the latest fashions and the most useful family reading. Its stories, poems, and essays are by the best writers, and its humorous sketches are unsurpassed. Its papers on social etiquette, decorative art, housekeeping in all its branches, cookery, etc., make it indispensable in every household. Its beautiful fashion-plates and pattern-sheet supplements enable ladies to save many times the cost of subscription by being their own dressmakers. Not a line is admitted to its columns that could shock the most fastidious taste. Subscription per Year, $4 00.

HARPER'S YOUNG PEOPLE has been called "the model of what a periodical for young readers ought to be," and the justice of this commendation is amply sustained by the large circulation it has attained both at home and in Great Britain. This success has been reached by methods that must commend themselves to the judgment of parents, no less than to the tastes of children—namely, by an earnest and well-sustained effort to provide the best and most attractive reading for young people at a low price. The illustrations are copious and of a conspicuously high standard of excellence. Subscription per Year, $2 00.

The Volumes of the Weekly and Bazar begin with the first numbers for January, the Volumes of the Young People with the first number for November, and the Volumes of the Magazine with the numbers for June and December of each year. Postage free to all subscribers in the United States or Canada.

Subscriptions will be commenced with the number of each periodical current at the time of receipt of order, except in cases where the subscriber otherwise directs.

Remittances should be made by Post-office Money Order or Draft, to avoid chance of loss.

Address HARPER & BROTHERS, Franklin Square, New York City.

ATHLETIC OUTFITS.

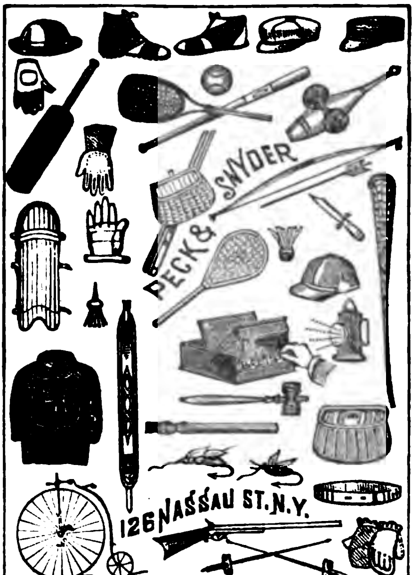
For outfits and paraphernalia for all sports in the open air and within doors, the headquarters in America is the large store of Peck & Snyder, 126 Nassau-st., New-York.

This firm make a specialty of all goods for gymnasiums and athletic use. From a simple pair of Indian clubs of any weight for a private individual to a snug outfit for a home gymnasium in a private house, or the full paraphernalia of an athletic club house, this store can supply anything that is wanted.

There is no extra charge for goods made to order. Schools, colleges, teachers, clubs and individuals are supplied with sound, substantial, first-class goods at reasonable prices.

The firm also keep on hand a large stock of uniforms for open-air recreations, including baseball and athletic suits especially. An elaborated illustrated catalogue has been prepared giving prices of every style of goods, which will be mailed to any part of the United States on receipt of 25 cents, provided the address is accurately and clearly given.

The firm keep on hand everything that is required by the votaries of Baseball, Lawn Tennis, Football, and Cricket. Also Archery outfits complete. Orders are filled from stock on hand, promptly for Boxing Gloves Dumb Bells, Indian Clubs, Trapezes, Developing Weights, Tenpins and Balls, and all other gymnastic apparatus. They also keep a full supply of Ice Skates, Roller Skates, Fishing Rods and Tackle, Croquet Sets, Bicycles and Tricycles. Parlor games are not neglected, and Parlor Guns and other apparatus.



The oldest and largest manufacturers in the trade. Send for our new catalogue, 320 large pages, over 5000 illustrations, cover printed in fifteen colors. Sent by mail for 25 cents.

"FOREST AND STREAM."

Among the notable newspaper enterprises of the day is *The Forest and Stream*, whose offices at No. 40 Park Row are just across from THE TRIBUNE. *The Forest and Stream* is a product of the increased public interest in the particular out-door recreations to which its columns are devoted. Its success is an indication of the popular taste for sport with rod and gun. Time was when the old-fashioned "sporting paper" gathered into its pages all the heterogeneous pursuits dubbed "sport," good, bad and indifferent. That day has gone by. Some of the old-time "sports" have been outgrown and some have been frowned down by a change in public sentiment. Others have grown in favor and expanded to great proportions. Among the last are the sports of the field—angling, shooting and camp life. To these *The Forest and Stream* is devoted.

It is an admirably conducted journal, crowded every week with contributions from a host of writers, and has built up for itself a very strong constituency. Contributors and readers are found among the men of all professions and occupations, and one charm about the weekly numbers is that they contain not only accounts of scenes and experiences in out-of-the-way places, but deal also with the familiar out-door life about one's country home. Another characteristic worthy of all praise is the high tone maintained, and the thoroughly clean and wholesome character of whatever finds a place in *The Forest and Stream*. The editors evidently understand that the ideal paper for men is a paper that every man can receive into his home and put on the sitting-room table where the whole family can share its good things.

The field occupied by *The Forest and Stream* is a wide one. The "Sportsman Tourist" department has accounts of travel, exploration and adventure, field excursions and woods life. The "Natural History" page describes the habits of birds and other animals, and records notes of original observations of nature's ways. A notable work done by this department during the past year was the formation of the Audubon Society for the Protection of Birds, which had in December, 1886, a membership of over 16,000. The "Game Bag and Gun" columns contain reports of shooting and hunting trips, hints on guns and gunning, accounts of days with quail, partridge, deer and fox; and many useful wrinkles for beginners with no end of anecdotes and reminiscences from the veterans. In the "Sea and River Fishing" pages are likewise accounts of angling methods and experiences, instruction about tackle and fishing for all varieties of fish, and now and then a humorous yarn, though such stories are usually given a place by themselves in an odd department called "Camp Fire Flickerings." Outside of the Government Fish Commission reports we presume *The Forest and Stream;* has published more valuable material in its "Fish Culture" columns than has been given anywhere else in the world. In the "Kennel" are many useful things about field, watch and pet dogs; while the

"Rifle and Trap Shooting" pages are equally valuable for their records and instructions in shooting.

The wonderful growth of canoeing is largely due to the encouragement given to it by *The Forest and Stream* in its "Canoeing" Department and in the books published from the office. "Yachting" completes the list of sports discussed by *The Forest and Stream*; for others there is no room in its twenty-eight pages.

The paper is heartily commended to the attention of readers; it will be a welcome visitor to all who are interested in Open-Air Sports. The address is Forest and Stream Publishing Company, No. 40 Park Row, New-York. The terms are $4 per year, or 10 cents per copy.

AMATEUR PHOTOGRAPHY.

Amateur photography is now attracting the attention of all classes of people in private and active life. Two years ago, if one wanted a photograph of his residence, he employed a professional photographer to make it. Photography being regarded as a technical, mechanical art, it was not supposed that a layman could take up practical work in photography without having first been educated, by a slow process and under skilful instructions which required years of application and a heavy outlay of means. Scientists, especially those who studied science for the love of it and who were perhaps not more than novices in the very branches to which they had given their study, were the first to discover that any one with slight attention to the necessary investigation could do very creditable work in photography. There sprung up, therefore, a demand for cheap apparatus, by the employment of which those interested could prosecute their experiments at a very small outlay.

Quick to perceive the requirements connected with photography, the Scovill Manufacturing Company, the largest and most extensive manufacturers of photographic goods in the world, devised and introduced the various appliances which have since become so popular in connection with amateur photography. The present status of this business is enormous, far exceeding the knowledge of the uninitiated.

So useful has amateur photography become that every man may be his own photographer, utilizing this important helper to his pleasure or profit, as his taste may incline. Many applications of this fascinating and useful art might be mentioned, but by way of illustration a few classes of people will we referred to, to whom the art is especially useful:

The tourist avails himself of an outfit that he may secure mementoes of his trips and rambles.

The artist, that he may fasten in his memory the impression of scenes which he may have sketched, but desires to finish in his studio.

The physician, that he may secure accurate pictorial representations of deformities, instances of morbid anatomy, abnormal growths, etc.

Railroad superintendents, for securing accurate views of scenes of accidents and washouts; of rolling stock, buildings, etc.

Bridge builders and contractors, that they may show progress in their work from time to time during process of construction.

Engine builders and tool makers, for making pictures of locomotives, steam engines, boilers, and machines, and tools of all kinds.

Ladies and gentlemen of leisure, that they may cultivate their tastes for the beautiful in nature, and may recover or improve their energy, which may have suffered from sedentary habits.

In short, picture-making by photography is now so simplified that any person of intelligence may practise it successfully.

"How to Make Photographs," is a simple manual of instruction combining a descriptive catalogue, and is sent without charge to any one interested in the subject, by the Scovill Manufacturing Company (established 1802), 423 Broome-st., New-York. W. Irving Adams, agent.

WHERE TO BUY GUNS.

Hartley & Graham, 17 and 19 Maiden Lane, New-York City, a firm of the best reputation in the trade, are sole agents here of the shotguns made by W. & C. Scott & Son, makers of the finest English breech-loading guns. These guns range in price from $65 to $500, the higher-priced having two sizes of barrels, 12 and 10 bore. The accuracy, finish, and durability of these guns make them among the very best in use among sportsmen. The high standing of the makers and of the New-York agents is a sufficient guarantee to any buyer.

Cheaper guns are sold by Hartley & Graham in great variety.

They also have the Colt machine-made guns, both with hammers and hammerless. The firm are the New-York agents of these goods.

Repeating breech-loading rifles are now the most popular for hunting, and for any quick work certainly the most useful. The Colt Lightning Magazine rifles are the latest invention and give great satisfaction. They are of .32, .38, and .44 calibre; the .40 calibre will also shortly be placed on the market, using 60 grains of powder. Excellent in every respect that makes a rifle desirable, handy and strong, these weapons are commended to sportsmen. Hartley & Graham also sell the Marlin and Bullard rifles.

The best ammunition is indispensable to good shooting. Without it the best firearm would be a failure. The Union Metallic Cartridge Company of Bridgeport, Conn., are one of the oldest and best known firms manufacturing ammunition: their product ranks the highest and is celebrated everywhere. Their immense manufactory produces every variety of cartridge, with either brass or paper shells, gun wads, primers, percussion caps, etc. The demand for "U. M. C." wads and shells is so great that the production keeps pace with the sale with difficulty. Order from Hartley & Graham.

Gun implements are a necessity to every hunter. Hartley & Graham supply everything that is made by The Bridgeport Gun Implement Company, the pioneers in this large industry and the leading manufacturers of gun implements.

The large gun establishment of Hartley & Graham at 17 and 19 Maiden Lane, New-York, is virtually an arsenal, with a full supply of all the goods above referred to, and of canvas and leather gun cases, gun slings, and other paraphernalia of the hunt. They are importers and manufacturers, sell at retail and wholesale, and can fill any order.

THE NEW-YORK TRIBUNE.

If good books are important for the formation of the minds and tastes of a growing family, good newspapers are important also. If good company affects a man's general standing, his ideas, habits and intellectual growth, so also do good newspapers.

The Tribune, while complete with respect to all the general news of the day, and the special features which characterize a useful newspaper, has also this distinct feature: It has never lowered its tone and opened its columns to crime and coarseness, although it could at any time gain a large increase of circulation by doing so. It gives the news and all of it; but it seeks for and reports with especial fulness those matters of social and practical value in which people of earnest purposes and active occupations take the keenest interest. It is the paper that can be taken at home.

The Tribune yields to no paper in its devotion to a patriotic administration of public affairs, directed expressly to the general welfare of the people; but it believes earnestly that that welfare will be best insured in every respect by placing the Government under the management and direction of the Republican party.

The Daily is printed every day of the week. Mail rate, postage paid (in the United States and Canada), $8 50 per year. Per month the charge by mail to points out of town is 75 cents.

The Semi-Weekly is conceded to be, for the general reader, the most delightful and satisfactory newspaper in America. It is printed on Tuesday and Friday of each week, and is sent out of town on the early fast mail trains which carry the daily papers. Terms, $2 a year.

The Weekly, which is issued every Wednesday morning, contains the best of all the good things of the Daily. Terms, $1 a year.

Letters should be addressed to "The Tribune, New-York."

A CHAPTER ON PATENTS.

The patent law is emphatically the poor man's helper. It augments industries, opens up new employments, raises the price and increases the demand for labor. It helps a man to better his condition, and often to attain wealth, no matter how obscure he may be. Thousands have risen to affluence by invention, by a happy thought, for which a patent was obtained.

When a man obtains a patent for a good article he begins its manufacture, perhaps in a small way, in his own village. The humble shop soon grows to be a great establishment, employing thousands of people; other trades, other industries come in; a large city soon arises. This is the history of many a flourishing community, and illustrates the actual workings of our patent laws.

The Government fees for a patent are $35; but the applicant is also required to furnish, at his own cost, a drawing and specification of his invention. These form legal documents and if not properly drawn the patent will be invalid.

Almost everybody, we suppose, has heard of *The Scientific American* the leading journal in this country pertaining to the industrial arts and sciences. It was established more than forty years ago. It is an illustrated weekly newspaper, $3 a year; has a very wide circulation.

Every number contains sixteen large pages, beautifully printed, elegantly illustrated; it presents in popular style a descriptive record of the most novel, interesting and important advances in Science, Arts and Manufactures. It shows the progress of the world in respect to new discoveries and improvements, embracing Machinery, Mechanical Works, Engineering in all branches, Chemistry, Metallurgy, Electricity, Light, Heat, Architecture, Domestic Economy, Agriculture, Natural History, etc.

In connection with *The Scientific American* the proprietors, Messrs. Munn & Co., have for many years carried on a very extensive business in securing patents for inventors. They have a staff of scientific experts and mechanics who make the drawings and specifications for the patents and everything pertaining to the work is done promptly, in the best manner, at moderate costs. The reliability of this house is unquestioned.

To one who has made an invention or discovery almost the first inquiry that suggests itself is, "Can I obtain a patent?" If so, "How shall I proceed? Whom shall I consult? How much will it cost?"

The quickest way to settle these queries without expense, is to write to Munn & Co. describing the invention. Send also a small sketch. Never mind your inexperience. Nicety of writing or drawing is not essential; all they need is to get your idea.

They will immediately answer and inform you whether or not your improvement is probably patentable; and if so give you the necessary instructions for further procedure. Their long experience enables them to decide quickly. For this advice they make no charge. Letters should be addressed to Munn & Co., Scientific American Office, 361 Broadway, New-York.

43

24