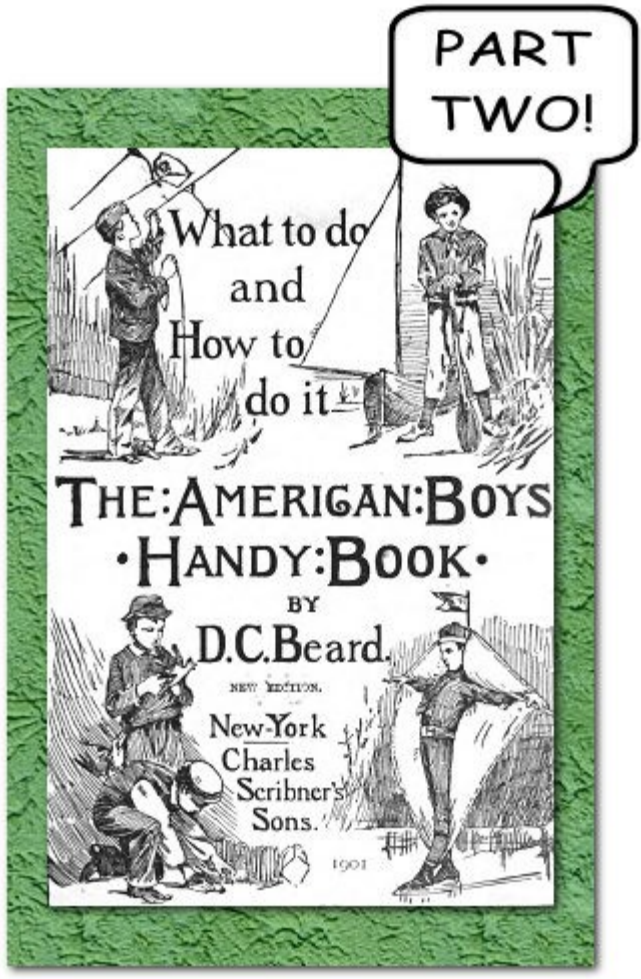
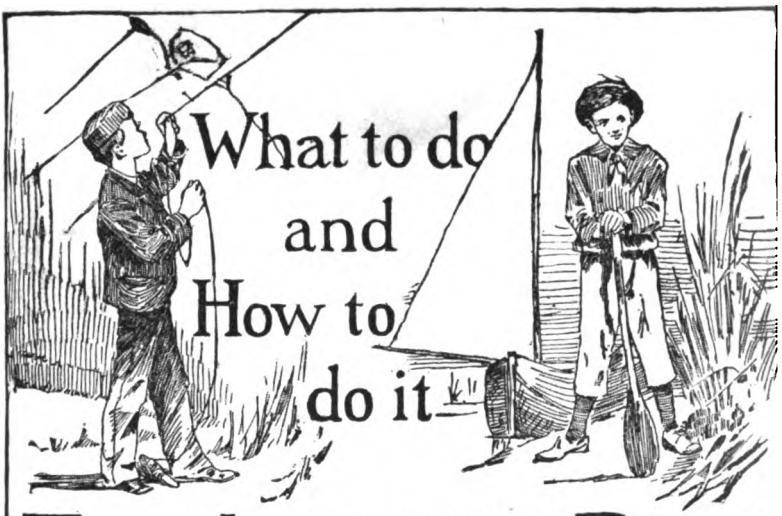


Part Two of
The American Boys Handy Book
by D. C. Beard



What to do and How to do it

THE·AMERICAN·BOYS ·HANDY·BOOK·

BY

D.C.Beard.

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CHAPTER XXIII.

TRAPS AND TRAPPINGS.

SUMMER is over. Again the air becomes cooler. The straw hats are discarded, so also are the linen suits; we begin to look up heavier clothing, for although the sun still shines brightly, the nights are growing chill. Even at midday we no longer seek the shady side of the streets or roadways.

In the woods all the little inhabitants are preparing for the approaching winter. Backward and forward, from the beech tree to his nest under the wood-pile, runs the nimble little brown-coated, striped-back chipmunk, each trip adding to the pile of beech nuts secreted in the storehouse of this provident little fellow. Scampering along the top rail of the fence the gray squirrel may be seen, also busily engaged in laying up a supply of winter stores. The birds are gathering in large flocks, with noisy twitterings and excited flutterings, preparatory to their yearly pilgrimage to the Sunny South. The bouncing hare is thinking of discarding its summer coat of brown and donning its white winter furs. The leaves of the ivy vines shine like red fire wreathed around the tree trunks. All nature seems busy going through a transformation scene—an air of preparation is visible everywhere.

The reports of the sportsmen's guns may be heard, and their dogs may be seen in the stubble-fields manœuvreing like well-

drilled soldiers promptly obeying every command of their masters.

And far and wide—in the cold Northern regions, in the pine woods of Maine, in the Rocky Mountains of the West—the hardy trappers are busy collecting their traps and making preparations, or are already engaged in their annual campaign against all fur-bearing animals.

In order that my reader may not be behind the season, this chapter is devoted to the description of a few simple but effective traps and snares, such as may be made of the material always at hand, with the aid of a pocket-knife, hatchet, or other tools within the reach of boys.

Rats.

We have in North America more than fifty kinds of rats and mice, the largest of which is the muskrat. Next in size comes the great, ugly brown rat.

More than three hundred years ago the black rat found its way from Europe to this country, settled here with our ancestors, and, like them, increased and prospered. The black rat is rather a neater and prettier animal than the now omnipresent Norway brown rat. The latter is of Asiatic origin, and appears to have made its way to this country since the advent of the black rat, which it has supplanted and almost exterminated. The roof rat in the Southern States came originally from Egypt, and the little brown mouse that creates so much mischief in our closets is of Asiatic parentage. All rats may be caught in traps, and for an amateur trapper the house rat is a good subject to practice on. By no means a fool among animals, possessing a due regard for his own safety, and looking with suspicion upon most traps, the Norway brown rat is not so easily caught as one who has never baited a "figure four" might suppose. A very successful way to capture house rats

is to carefully close all the doors of the kitchen, barn, or room infested with them, and after removing all small objects from the floor, bait each hole with crumbs of meal and cheese; over the holes place little doors made of tin or wire, hung on with strings or screw-eyes, these doors open but one way and are so arranged that the rat can easily push the door open from the inside, but as soon as the animal makes its appearance in the room the door falls back into place, thus cutting off all retreat. In a short time the room will be overrun with rats, and if allowed to remain undisturbed for a few hours they will all escape through new holes made by their sharp teeth; if a terrier dog or a few cats be let into the room, not many rats will live to tell the tale of the massacre.

The Paper Pitfall.

Over the top of an earthenware jar fasten a piece of writing

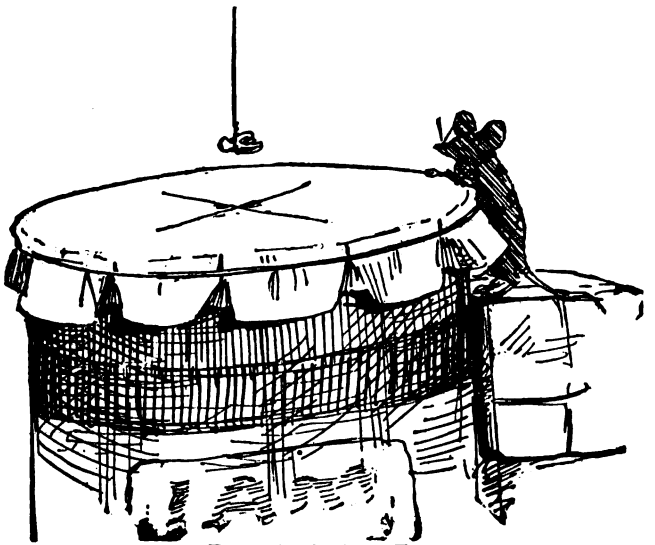


FIG. 136.—A Mouse Trap.

paper, tightly binding it with a string or elastic band. In the centre of the paper cut a cross as shown in the illustration (Fig. 136). Set the jar in the closet and suspend by a string a piece of toasted cheese over the centre of the jar. If there are any mice in the closet the bait will attract them, but just as soon as the first mouse reaches the centre of the paper he will drop into the jar, and the paper will fly back in place again ready for the next comer. A trap arranged in the same manner can be used for the capture of field mice, shrews, and harvest mice, some of which make odd and amusing pets. All of these pretty little animals may be found in the fields or under brush heaps in the clearings. A barrel covered with stiff brown paper can be used for common rats, but they will gnaw out unless the barrel be partly filled with water.

Jug Trap.

An old earthenware jug with a small hole knocked in the upper part may be utilized as a trap for small burrowing animals. Bury the jug in the earth (Fig. 137) near the haunts of the animal you are after; then arrange an artificial burrow extending from the surface of the ground to the hole in the broken jug; strew appropriate bait along the passageway, and although the little creatures might hesitate to enter a broken jug above

FIG. 137.—Old Jug Trap.

ground, they are said to have no fear of one beneath the sod, and either jump or fall inside, where they may be allowed to remain some time with no fear of their escaping.

The jug trap is only suitable for small animals.

The Mole and How to Trap Him.

Moles are, generally speaking, harmless creatures who render the farmer a great service by devouring immense quantities of grubs and larvæ; but when one of these little animals finds its way under the sod of the lawn it plays sad havoc with the looks of the grass, furrowing the surface with ridges, and marring the appearance by dirt hills.

From the fact that the mole travels under ground, I have spent considerable time in trying to find a trap to catch this subterranean animal. Among we boys that lived in the valley of the Ohio River, a mole skin was highly prized as a sort of fetich that, when used as a "knuckle dabster" to rest our hands on in a game of marbles, not only prevented our hands from becoming soiled —which was no great matter—but also insured good luck to the happy boy who possessed a knuckle dabster made of a mole skin. There are but very few animals that can boast of fur as soft and fine as that which covers the back of the common mole.

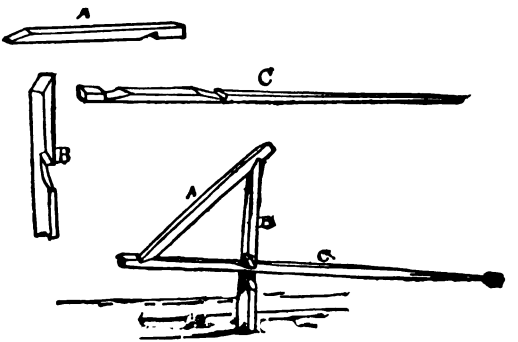


FIG. 138.—Construction of the Figure Four.

A mole trap can be made in the old reliable figure four style, with which most of my readers are no doubt familiar.

The Figure Four

is made of three sticks; a catch-stick, A, an upright, B, and a trigger, C (Fig. 138). When these sticks are set in the position shown by the diagram, and a weight allowed to rest on the top of the catch, A, the sticks will keep their positions and support the weight until the trigger, C, is touched.

At the slightest derangement of the trigger all the sticks fall, and the weight above, being left without a support, instantly drops to the ground. This trap has been ingeniously adapted to the purpose of a

Mole Trap.

A heavy weight is fastened on a piece of plank or board for a deadfall; in the centre of the board some sharp-pointed spikes or nails are driven, so that the pointed ends extend sev-

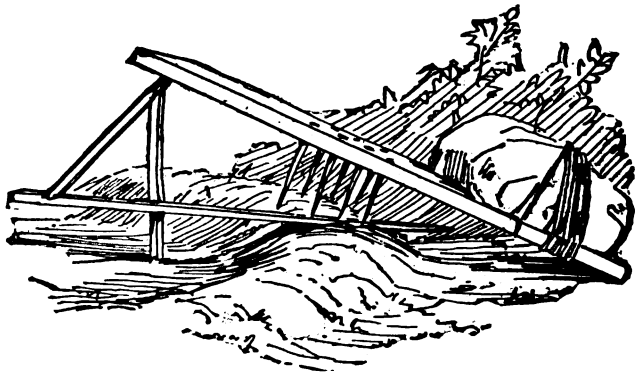


FIG. 139.—Mole Trap.

eral inches below the deadfall (see Fig. 139). This trap should be set over a fresh mole-way, no bait need be used.

First press down the loose earth in a line across the ridge, then set the trap with a figure four, allowing the trigger-stick to rest in the place where you have pressed down the earth across

the mole hill. The trap should be so arranged that the sharp spikes will be directly over the hill. The next time the mole makes his way through the underground passage he will sooner or later come to the place where the earth has been pressed down to make room for the trigger.

When the little animal reaches this point and proceeds to loosen the earth again, the movement will displace the trigger and bring the dead weight down, pinioning the mole to the ground with the sharp spikes, to which the loose earth of the mole hill offers but little resistance, if the weight be heavy enough. If the skin of the animal be desired, it is best to use as few spikes as practicable, for the fewer holes there are in a pelt the more valuable it is.

I object to deadfalls on principle, and it is not without some reluctance that I include them among the traps. As a boy, the only traps I ever used were made for capturing animals alive; but there are occasions when it is perfectly proper to use a deadfall. If the animal sought is a nuisance upon whose extermination you have settled for good reasons, then use a deadfall, or if you desire the animal for food and have no other means of capturing him, the deadfall is very convenient. Supposing your supply of fresh meat has run short at camp, or that you are on a canoe trip and are placed under similar circumstances, if there be a rabbit or squirrel in the neighborhood no one will find fault with you for trying to capture the game by any means in your power.

The Toll-gate Trap

is so called either from its resemblance to a toll-gate, or from the fact of its being set across the top of a rail fence, which has been called the "squirrel's highway." This trap can be made in a few minutes with the aid of a pocket-knife and a hatchet. The toll-gate is a deadfall, and the little traveller pays the toll

with his life. With your hatchet cut a forked stick and drive it in the ground a few feet from the fence; rest one end of a plank on this forked stick and allow the other end to protrude some distance beyond the opposite side of the fence. Select a heavy stick for the deadfall, and a very much smaller stick for the trigger; near the end of the trigger cut a notch for the catch-stick to rest in. Sharpen the ends of two small forked sticks and drive them into splits made near the ends of the board with the corner of the hatchet. Lay a cross piece from one forked stick to the other, and with a bit of string or vegetable fibre suspend the catch-stick from the centre of the cross stick. Tie the inside end of the trigger loosely to the deadfall, and adjust the trap so that when the end of the deadfall rests upon the catch-stick the latter will hold the trigger an inch or so

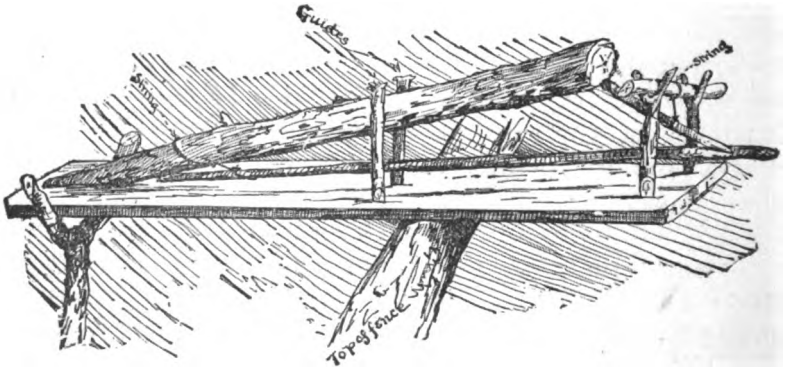


FIG. 140.—Toll-gate Trap.

above the plank. To prevent the trap from swaying and to guide the deadfall in the proper direction, two upright guide-sticks should be erected (Fig. 140). The weight of a squirrel's foot upon the bottom bar slips it from the catch-stick and down comes the deadfall upon the shoulders of the victim.

This same style of trap may be made upon a much larger

scale and set on logs or trees that have fallen across a water course and are used as a bridge by minks, 'coons, or other animals. The forked sticks supporting the end of the plank must in this case be driven into the bed of the creek, and a plank twenty feet long substituted for the short one used in the trap designed for squirrels.

To be a successful trapper a boy must be a keen observer of the habits of the game; by this means he will soon learn to take advantage of the very means designed by Nature as a protection for her creatures. For instance, the partridges are not good flyers, but their unobtrusive coats mingle and blend so closely with the stubble as to take a sharp eye to detect their presence; hence we find that these birds are loth to take to the wing, but will run along any slight obstruction they meet, poking their heads about to find an outlet, apparently never once thinking of surmounting both the difficulty and the obstruction by using their wings. The "down East" Yankee boys are thoroughly acquainted with the habits of the partridge, and catch a great many of them by building little hedges like the one in the illustration entitled

The Partridge Snare.

The snare in this case consists of a slip-noose made of string. Make a bow-line knot (Fig. 58, diagram XIII., described on page 76) in one end of a piece of common string or fish line; slip the other end of the string through the loop and make the free end fast to the top of an arch made of a bent stick (see Fig. 141). In a semi-circular form, around some feeding ground, build a low fence of sticks, brush or stones, leaving openings at intervals only large enough to fit in arched gateways. Make an arch for each opening and arrange a slip-noose in each archway; spread the loops apart and keep them in this position by catching the strings slightly into notches made upon the outside of

the arch (see Fig. 141). The birds, when they seek their accustomed feeding place, will walk into the semi-circle, and in searching for an outlet they will go poking their heads about until they come to an archway; here they thrust their heads through the slip-noose, and as, instead of backing out, a part-

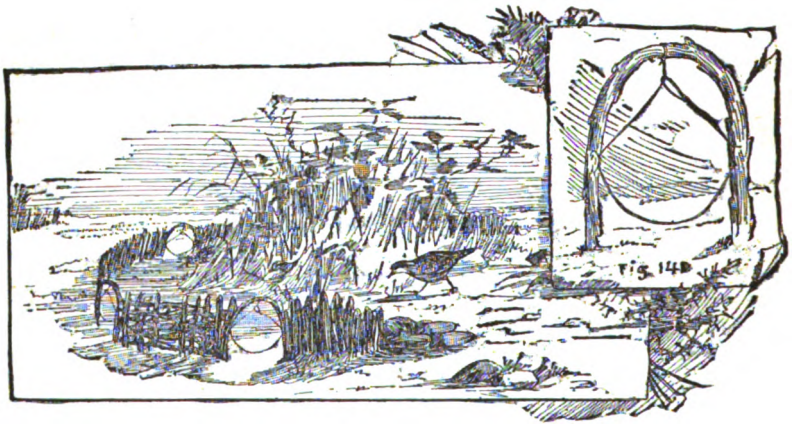


FIG. 141.—The Partridge Snare.

ridge will try to force its way through, the noose tightens and holds the bird a prisoner. Sometimes the youthful trapper will find the lifeless body of a rabbit with the fatal noose around its neck, and often he will miss one or two of his arches that have been uprooted and carried away by large game becoming entangled, and walking off, carrying arch, noose, and all with them. This partridge snare will also catch quail or prairie chickens.

Set-Line Snares.

Snares when used for catching birds alive should be closely watched; which will not only prevent the captured wild birds from beating themselves to death, but will save them from suffering any more pain than is absolutely necessary.

Select a smooth piece of ground and drive two stakes; to these attach a long cord, allowing it to stretch loosely upon the ground from one stake to the other. At intervals along the line fasten strong horse-hair nooses (Fig. 142). Sprinkle food

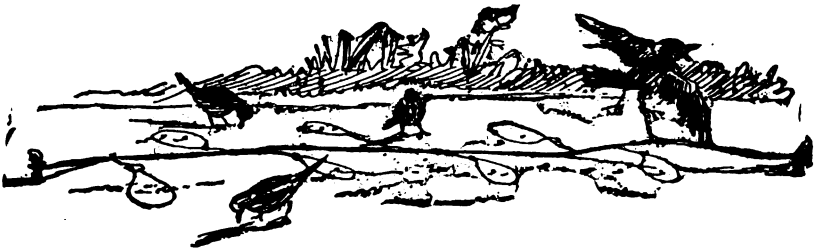


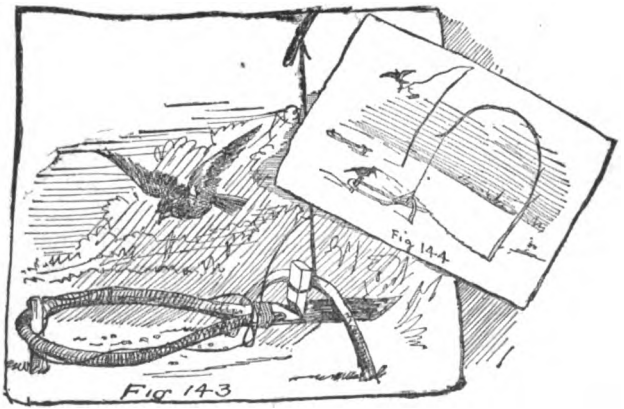
FIG. 142.—Set-Line Snares.

around and retire out of sight to watch. When the birds discover the food they will collect around it, and some one of them is almost certain to become entangled in one of the snares. As soon as a bird is snared it should be disentangled and put into a covered basket or a paper bag; pin-holes may be made in the bag to allow the air to enter. In this way birds may be carried home without injury; being in the dark they are not likely to hurt or disfigure themselves by struggling for their liberty. A cage is not only an awkward, unwieldy contrivance to carry in the field, but is objectionable from the fact that a wild bird caught and thrust into a cage will bruise its head and wings badly by striking against the bars in the efforts it makes to escape. Paper bags, pasteboard boxes, or covered baskets will do to carry home captured wild birds in.

The Spring Snare.

Make a low arch by pointing both ends of a stick and forcing them into the ground. Cut a switch and bend it into the form of a lawn tennis racket, and with a string fasten the small end of the switch to the part that answers to the handle of the

bat or racket; just beyond the point where the small end terminates cut a notch in the large part or handle for the catch-stick to fit in. Make a short stick, with one end wedge-shaped, for a catch-stick. Drive a peg at such a distance in front of the arch that when the loop of the spreader is slipped over the peg the notch on the butt end will come just far enough to allow the catch-stick to hold it, as in Fig. 143. For a spring use an elastic young sapling. After stripping off the leaves



and branches, attach a line to the top, tie the other end of the line to the catch-stick, and just above the cross stick fasten one end of a slip-noose to the line. To set the snare, bend the sapling until you can pass the catch-stick under the bender or arch, Figs. 143, 144. Raise the spreader from the ground about an inch; let the catch-stick hold it in this position, and spread the slip-noose over the loop-stick; your trap is now ready. To attract the birds, scatter some appropriate bait inside and very little outside. The birds will follow the trail of food up to the stretcher, and seeing the bait inside will hop upon the stretcher preparatory to going within. The stretcher, being only supported by friction where it bears against the

catch and peg, will drop under the weight of a very small bird. The catch loosened slips out from under the bender, and the spring flying suddenly back draws the slip-noose around the wing, legs, or neck of the unfortunate bird. Unless speedily released by the trapper the bird will strangle or beat itself to death against the ground, or any objects within reach. *All snares should be watched if the birds are wanted alive.*

Hen-Coop Trap.

This rustic trap is sometimes set with an ordinary figure four (Fig. 138) by the colored people down South, and with it they catch a great many wild ducks and other water fowl.

The coop is made of sticks piled up after the manner of a log cabin (Fig. 145). To one of the bottom sticks a withe, made of a green wand,* is attached; the other end is then brought over the top of the trap and attached to the bottom stick upon the opposite side. The withe is tightened by forcing sticks under it at the top of the coop. When all is taut the sticks keep their positions, and unless very roughly used

FIG. 145.—Hen-Coop.

* Withes may be made of ozier, willow, alder, hazel, white birch, white cherry, or even cedar branches.

Cut a branch or sapling, and after trimming the small branches off, place the small end under one foot, grasp the large end with both hands, and by a revolving motion twist the wand until the fibres become loosened and the stick looks like a rope. Indeed it will be a vegetable rope, which, if well made, will bear considerable strain, and be not only serviceable in making traps, but answer for binding logs together for a raft. Remarkably good and strong swings can be made of withes of wood.

will not slip out. Fig. 146 shows another manner of setting the hen-coop trap, by fastening a piece of willow or any other similar wood by two strings or withes to one end of the coop, so as to allow considerable freedom of motion to the semi-circular arch formed by the willow, which should be small enough and bent in such a manner that all parts of the arch will come inside the coop. Take two forked sticks and make the straight part of one of such a length that it might support one end of the coop. Cut one of the forks off the second stick and leave about two inches of the other fork on (see B, Fig. 146). Make B about an inch shorter than A (Fig. 146). Raise the side of the coop, thrusting the crook on the end of B through the fork on the end of A, slip the crook under the edge of the coop, and push the bottom of B back inside of the willow, lifting the latter high enough to bear on the stick B and hold it in position. A will rest outside the coop, as in the illustration. A bird hopping upon the willow wand will cause it to slip down; this will displace the stick A, loosen the catch, and down comes the coop, enclosing the bird. A rustic trap of this description can be made without the aid of any other tools than a hatchet or a knife for cutting the sticks.

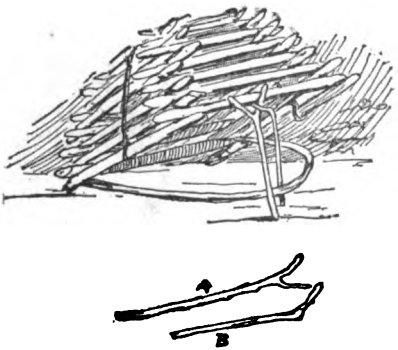


FIG. 146.—Hen-Coop Trap.

CHAPTER XXIV.

DOGS.

What They are Good For and How to Train Them.

IT is true that a boy *can* do without a canine companion and live to enjoy life, but he is almost incomplete; he lacks something; he has lost a gratification, a harmless, pleasant experience, and the loss leaves an empty space in his boyhood life that nothing can ever quite fill up. A boy without a dog is like an unfinished story. What your left hand is to your right, a boy's dog is to the boy. More particularly is all this true of the lad who lives either in the country or within walking distance of forest and stream.

To be of any value either as a hunting dog, a watch dog or even a companion in one's rambles, it is absolutely necessary that the dog should be educated, and where there is a possibility of doing so, it is desirable to secure a young puppy. No matter what your choice in breed may be, whether it is a Newfoundland, bull, skye, greyhound, pointer, setter, or toy terrier, get the pup and *train it yourself.*

How to Choose a Dog.

"Blood will tell," whether it flows in the veins of a horse, man, or dog. The reader can readily understand that it would be not only absurd but absolutely cruel to keep a Newfoundland, deer-hound, water-spaniel, pointer, setter, or any other similar breed of dog confined within the narrow limits of that small bit of ground attached to the city house and dignified by the name of a yard. It would be equally as absurd and almost as cruel for a farmer boy to try and keep one of those expensive, diminutive, delicate, nervous, city dogs known under the general title of a "toy dog" or "fancy breed." The agile, bright-eyed "black-and-tan," and the delicate and graceful Italian greyhound, are full of fun, but as unreliable as beautiful. Thoughtless, rollicking, exquisites! Such dogs are scarcely the kind either city or country boy would choose for playmates or companions. What most boys want is a dog that combines the qualities of a boon companion and a good watch dog. By the latter is meant a dog whose intelligence is sufficient for it to discriminate between friend and foe, and whose courage will prompt it to attack the latter without hesitancy. It must also be a dog that may be taught to "fetch" and carry, to hunt for rat, squirrel, or rabbit, as well as to obey and trust in its master. It should be so cleanly in his habits as to be unobjectionable in-doors, and should possess judgment enough to know when its company is not agreeable, and at such times keep out of the way.

The poodle is perhaps the best trick dog, but is disliked by many on account of its thick woolly coat being so difficult to keep clean. The wirey-haired Scotch terrier is a comical, intelligent animal, and a first-rate comrade for a boy. The Newfoundland is faithful, companionable, and powerful enough to protect children, to whom, if there be any around the house, it

will become very much attached and a self-constituted guardian. The spaniel is pretty, affectionate, and docile.

Almost all the sporting dogs make first-class watch-dogs, but are restless and troublesome if confined, and, as a rule, they are too large for the house. The shepherd is remarkably intelligent, and, when well trained, makes a trusty dog for general purposes.

The bull, although not necessarily as fierce and vicious as one would suppose from its looks and reputation, still is hardly the dog for a pet or companion, being of a dull and heavy nature, and not lively enough to suit the taste of the boy of the period. A little of the bull mixed in the blood of another more lively breed makes a good dog, of which a thoroughbred bull-terrier is an example. The Rev. J. G. Wood, in speaking of the latter, says:

"The skilful dog-fancier contrives a judicious mixture of the two breeds, and engrafts the tenacity, endurance, and dauntless courage of the bull-dog upon the more agile and frivolous terrier. Thus he obtains a dog that can do almost anything, and though, perhaps, it may not surpass, it certainly rivals almost every other variety of dog in its accomplishments. In the capacity for learning tricks it scarcely yields, if it does yield at all, to the poodle. It can retrieve as well as the dog which is especially bred for that purpose. It can hunt the fox with the regular hounds, it can swim and dive as well as the Newfoundland dog. In the house it is one of the wariest and most intelligent of dogs, permitting no unaccustomed footstep to enter 'the domains without giving warning.'" Although some may think the Rev. J. G. Wood to be a little too enthusiastic in his description of the bull-terrier's good qualities, still if they have ever owned a properly trained animal of this breed, they will undoubtedly agree with the great naturalist so far as to acknowledge this particular dog to be about the best for a

boy's dog. With an ardor not excelled by his young master, the bull-terrier will chase any sort of game, and will attack and fight any foe at its master's bidding. Indeed the great fault of this kind of dog is that it is inclined to be too quarrelsome among other dogs, and careful attention should be paid to correcting this fault, which may be entirely eradicated by kind and firm treatment; but should any canine bully attack your pet, woe be unto him, for, unless he comes from good fighting stock, he will rue the day he ever picked that quarrel.

How to Train Dogs.

First of all teach your dog that you mean *exactly what you say*, and that he *must* obey you. To do this you should never give a foolish command; but if a thoughtless order be once given, even though you repent it as soon as it has escaped from your lips, do not hesitate, but insist upon your pupil instantly obeying—that is, if the dog, in your judgment, understands the order. Never, under any circumstances, allow him to shirk, and even a naturally stupid pup will learn to look upon your word as law and not think of disobeying.

Strict obedience to your word, whistle or slightest gesture once obtained, it is an easy task to finish the dog's education. Bear in mind that there is about as great a difference in the character and natural intelligence of dogs as there is in boys. Not only does this exist between the distinct varieties of dogs, but also between the different individuals of the same variety. All Newfoundlands possess similar characteristics, but each individual varies considerably in intelligence, amiability, and all those little traits that go to make up a dog's character. I mention this fact that you may not be disappointed, or make your poor dog suffer because it cannot learn as fast or as much as some one you may know of. And here let me say, and impress upon your mind, that to make your dog obey, or to teach it

the most difficult trick or feat, it is seldom necessary to use the whip. If the dog, as he sometimes will do, knowingly and wilfully disobeys, the whip may be used sparingly; one sharp blow is generally sufficient; it should be accompanied with a reprimand in words. Never lose your patience and beat an animal in anger. To successfully train a dog it is necessary to place the greatest restraint upon your own feelings, for if you once give way to anger the dog will know it, and one-half your influence is gone. To be sure the special line of education depends upon the kind of a dog you have, and what you want him to do.

The pointer or setter you may commence to teach to "stand," at a very early age, using first a piece of meat, praising and petting him when he does well, and reprimanding when required. Do not tire your pup out, but if he does well once let him play and sleep before trying again. As he grows older, replace the meat with a dead bird. The best sportsmen of to-day do not allow their bird dogs to retrieve, saying that the "mouthing" of the dead and bloody birds affects the fineness of their noses. To bring in birds, the sportsman has following at his heels a cocker spaniel, large poodle, or almost any kind of dog, who is taught to follow patiently and obediently until game is killed and he receives the order to "fetch."

To Teach a Dog to Retrieve.

Commence with the young pup. Almost any dog will chase a ball and very soon learn to bring it to his master. When you have taught your dog to "fetch," he may be tried with game. It is very probable that the first bird he brings will be badly "mouthed;" that is, bitten and mangled; to break him of this, prepare a ball of yarn so wound over pins that the slightest pressure will cause the points to protrude and prick any object pressed against the ball. After the dog has pricked his mouth

once or twice with this ball he will learn to pick it up and carry it in the most delicate manner; he may then be tried again with a bird. This time he will probably bring it to you without so much as ruffling a feather; but if notwithstanding his experience with a ball of pins your dog still "mouths" the game, you must skin a bird and arrange the ball and pins inside the bird skin so as to prick sharply upon a light pressure; make the dog "fetch" the bird skin until he is completely broken of his bad habit of biting or "mouthing" game.

Pointers and Setters.

At first you will have to give your commands by word of mouth, but if you accompany each command by an appropriate gesture, the pup will soon learn to understand and obey the slightest motion of the hand or head. The less noise there is the greater is the chance of killing game. Nothing is more unsportsmanlike than shouting in a loud voice to your dog while in the field.

After teaching a dog to "heel," "down charge," and to "hi on" at command, you may show him game and teach him to "quarter" his ground by moving yourself in the direction you wish the dog to go. The dog will not be long in understanding and obeying.

When your pointer comes to a point teach him to be steady by repeating softly, "steady, boy, steady," at the same time holding up your hand. In course of time the words may be omitted; the hand raised as a caution will keep the dog steady; but should he break point and flush the game, as a young dog is more than liable to do, you may give him the whip and at the same time use some appropriate words that the dog will remember; the next time the word without the whip will correct him. After your dog has been taught to obey, it is well to put him in the field with an old, well-trained dog.

As every sportsman has a peculiar system of his own for breaking a dog, it is scarcely necessary for me to give more than these few hints; only let me again caution you against using the whip too often. Spare the lash and keep a good stock of patience on hand; otherwise in breaking the dog you will also break his spirit and have a mean, treacherous animal that will slink and cringe at your slightest look, but seldom obey you when he thinks he is out of reach of the dreaded whip.

Pet Dogs.

All dogs, whether intended for the field, for pets, or for companions, should be taught to follow at their master's heels at the command of "heel," to run ahead at the command of "hi on," and to drop at the command of "charge" or "down charge." When your dog learns to obey these simple commands, it will be found an easy matter to extricate and keep your canine friend out of scrapes. Suppose you have a small but pugnacious dog and in your walk you meet a large, ugly-tempered brute much too powerful for your own dog to master in the fight that is certain to ensue unless by some command you can prevent it. The strange dog will not obey you, but if you give the order to "heel" to your own dog he will follow with his nose at your heels, and the enemy will seldom if ever attack a dog while so near his master.

Study the characteristics of your dog, and by taking advantage of its peculiarities it may be taught many amusing tricks. I have a little dog called Monad, and whether his master walks, drives, sails or rows Monad always accompanies him, even sitting in front of the sliding seat of a single shell boat for hours at a time, perfectly happy and apparently conscious of the attention he attracts from all people on the shore or in the passing boats; the latter he generally salutes with a bark. Monad will, when requested to do so, close a door, sneeze, bark, or sit

upon his haunches and rub his nose, besides numerous other amusing tricks.

One day Monad smelled of a lighted cigar; the smoke inhaled caused him to sneeze; this gave me an idea; lighting a match I held it toward him, at the same time repeating, "sneeze! sneeze, sir!" The smoke made him sneeze, and after repeating the operation several times I held out an unlighted match and commanded him to sneeze; the dog sneezed at once. It was then an easy step to make him sneeze at the word without the match. Monad is now very proud of this accomplishment, and when desirous of "showing off" always commences by sneezing.

In much the same manner I taught him to rub his nose by blowing in his face and repeating the words, "rub your nose." The breath coming in contact with that sensitive organ apparently tickled it and he would rub it with his paws. After one or two trials he learned to rub his little black nose in a very comical manner whenever commanded to do so. By patting your leg with your hand and at the same time calling your dog, it will learn to come to you and place his fore paws against your leg. If you take advantage of this and pat the door the next time with your hand, the dog will stand on its hind legs and rest its fore paws against the door. Reward him with a bit of meat or a caress, and then opening the door a few inches go through with the same performance, giving the command to close the door; by degrees, as the dog learns, open the door wider, and without moving from your chair or position in the room give the command, "close the door, sir." The dog will by this time understand your meaning, and resting his fore paws against the panels, follow the door until it closes with a bang. Perhaps there is no simple trick that excites more surprise than this. A friend comes in and leaves the door open; you rise, greet your friend, ask him to be seated; then, as if for the first

time noticing the fact of the door being open, speak to your dog; the latter closes the door and lies down again by the fireside in a most methodical manner. The friend is thoroughly convinced that that particular dog has more sense than any other canine in the world, and ever after, when dogs are the topic of conversation, he will tell the story of the dog that shut the door.

In the same manner innumerable odd, amusing, or useful tricks may be taught, among the simplest of which are the ones which excite the most applause from spectators. If your dog is fond of carrying a stick in his mouth, it will be an easy matter to make him carry a basket. Take advantage of every peculiarity of your pet's character, encouraging and developing the good points, but keeping the bad traits subdued, and you will soon have an amusing and reasoning canine companion.

Never throw a dog into the water; it frightens him and makes the poor animal dread a bath. Let the dog wade at first; then by throwing sticks or other objects a little further out each time, and commanding him to fetch, the dog will not only learn to swim after the object, but also learn to thoroughly enjoy the bath, and can even be taught to dive and jump off of high places. There are dogs that will jump from an elevation twelve feet above the water. Always be firm but kind; teach your dog to have confidence in you, and you may place implicit trust in your canine friend, and be sure whatever misfortune befalls you, you will have a friend who, though he be a four-footed one, will never forsake you, but live and die for the master it has learned to love and trust.

CHAPTER XXV.

PRACTICAL TAXIDERMY FOR BOYS.

To the practical naturalist a knowledge of taxidermy is not only an interesting accomplishment from which to derive amusement, but is almost an absolute necessity, an indispensable adjunct to his profession. Probably there is no study the pursuit of which affords such opportunities for physical exercise and real healthy enjoyment as that of natural history. It is a study that, by broadening the horizon of thought, enlarges the capacity for pleasure. To the pride of the sportsman in exhibiting the results of his skill and success, the naturalist adds the intelligent pleasure of acquiring a more complete knowledge of the life and habits, nature and anatomy of his trophies, as well as the ability to detect at a glance any unknown genus or rare variety he may capture; and here the practical knowledge of taxidermy enables him to properly preserve the otherwise perishable specimen.

Captain Thomas Brown, F.L.S., says that *boys* ought to be instructed in the art of stuffing birds and mammals. So, boys, you have good authority for commencing young; but do not suppose that after reading the following directions you can sit down, and, without any previous experience, set up a bird as neatly and perfectly as one of those you see in the museums or show windows. On the contrary, you must expect to make one or two dismal failures, but each failure will teach you what to avoid in the next attempt.

Let us suppose an owl has been lowering around suspi-

ciously near the pigeon house or chicken coop, and that you have shot the rascal. Do not throw him away. What a splendid ornament he will make for the library! How appropriate that wise old face of his will be peering over the top of the book-case! (Fig. 147). He must be skinned and stuffed! With a damp sponge carefully remove any blood-stains there may be upon his plumage. Plug up the mouth and nostrils with cotton; also insert cotton in all the shot holes, to prevent any more blood oozing out and soiling the feathers. You may then lay him aside in some cool place until you are ready to begin the operation of skinning and stuffing the owl.

FIG. 147.—Stuffed and Mounted.

Measure the length of the bird, following the curves of the form, from root of tail to top of head, and its girth about the body; make a note of these figures.

Skinning.

Place the bird on its back upon the table, in such a position that the head will be toward your left hand; then, with the knife in your right hand you are ready to make the incision.

With your left hand separate the feathers, left and right, from the apex of the breast-bone to the tail (Fig. 148). Cut a straight slit through the skin between these points, using the utmost care to prevent the knife penetrating the flesh or the inner skin which encloses the intestines. With a bird as large as the owl, you will find that you can easily separate the skin from the flesh with your fingers, though it may be best to use a blunt instrument, such as a small ivory paper-cutter, to reach

the back by passing it underneath the skin. In removing the skin you must try to shove in lieu of pulling, lest you stretch it out of shape. Press as lightly as possible upon the bird, stopping occasionally to take a view to see that all is right and that the feathers are not being soiled or broken. When you come to the head do not let the skin dangle from your hand or its own weight will stretch it. Bearing these things in mind, you can commence removing the skin in the following manner: Press the skin apart at the incision, and dust the exposed part with Indian meal to absorb any fluids that may escape; carefully lift the skin on one side and separate from muscles of the breast with the point of your knife and a small ivory paper-folder alternately, as occasion may require, until the leg is reached and you have approached as near as possible to the wings. Having accomplished this, and dusted again with the Indian meal, the thighs must be pressed inward and the skin turned back far enough to allow you to use your knife and disarticulate the hip-joint. Bend the tail toward the back; keep down the detached skin upon each side of the incision with the thumb and first finger of the left hand; then with your knife make a deep cut, exposing the backbone at a point near the oil gland, which you will find near the root of the tail: sever the backbone near this

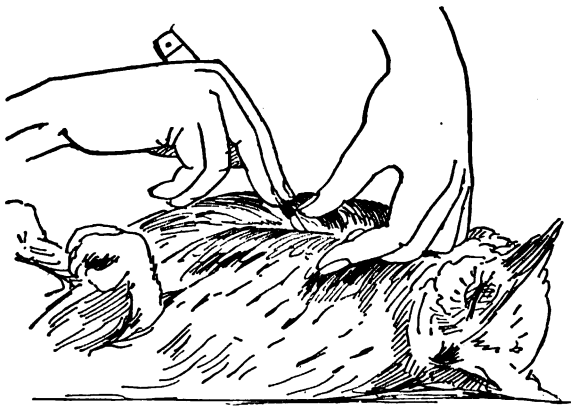


FIG. 148.—The Incision.

point, but be careful to leave a large enough piece of it to support the tail feathers.

Take the part of the body which is now denuded of the skin in the left hand and peel the skin upward to the wings; during this operation your knife or small scissors may be used to cut any of the tendons which are met with. Separate the wings from the body at the shoulder-joint. Next turn your attention to the head and neck. Push the skin back toward the head, after the manner of removing a kid glove from the finger, until the back part of the skull is laid bare; then with your knife detach the vertebræ (neck bone) from the head. This will sever all connection between the body and the skin. The dismembered, denuded carcass may be thrown aside and your attention turned to skinning the head, which member in an owl is so large in proportion to the neck that care must be used in drawing the skin of the neck over it, lest you stretch the skin. A great deal depends upon the delicacy of your touch, especially when you reach the eyes. Work slowly; cut the ears close to the skull; do not cut either the eyelid or the eyeball, but separate them carefully; then remove the eyes, which can be done by breaking the slender bones which separate the orbits (eye-holes) in the skull from the top of the mouth. Cut away all flesh from the neck; at the same time remove a small portion of the base of the skull. Through the opening thus made extract the brains with a small spoon or some similar instrument, after which draw the tongue through the same cavity. After removing all fleshy particles from the head and neck, and scraping out the eye-holes, paint them with arsenical soap and stuff them tightly with cotton. Be careful not to detach the skin from the bill, as the skull must be left in place. Coat the interior of the skull with arsenical soap and fill it with tow.

The wings and legs still remain intact. Push back the wings

to the first joint; lay the bones bare, removing all the meat. Paint with arsenical soap and return them to their places. Go through the same process with the legs and rump; and after all flesh and fatty matter have been removed, paint the whole interior of the skin thoroughly with arsenical soap, and you are ready to begin the operation of

Stuffing.

Take a piece of straight wire (size 20) equal in length to the measurement you made from root of tail to top of head; wind about it a bunch of excelsior (straw will answer as a substitute for excelsior shavings); secure this to the wire by repeated wrappings of stout thread, and mould the bundle into a shape resembling the bird's body; regulate the girth by the measurement you noted down for that purpose before you commenced the skinning process. When you have completed the artificial body there will, of course, be a portion of the wire still bare, which represents the neck. File the extremity of this wire to a sharp point, then force it diagonally up through the skull to the top, where it must be clinched; wrap the neck wire between the artificial body and the head with cotton batting (Fig. 149). Now draw the skin back so as to cover the artificial neck and body.

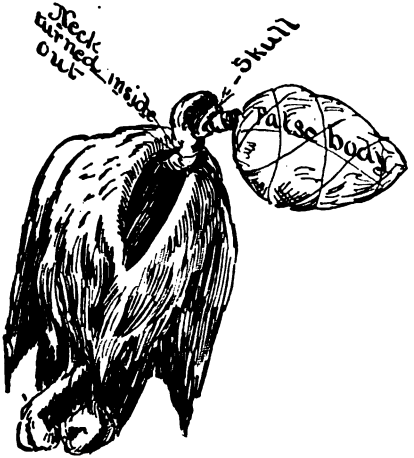


FIG. 149.—Owl-Skin and False Body.

The eyelids must be carefully pulled in place over the cotton in the eye-holes, or orbits; pull the eyelids up nicely, to

make the parts about the eye appear plump and natural. Push more cotton down the throat until it has a round, real look. For the legs use two pieces of wire, each sharpened at one end. The taxidermist must shove the wire through the ball of the foot and guide it with the other hand up along the side of the bones of the leg, the skin being turned back for that purpose (Fig. 150). This figure shows the leg with skin turned back, as it appears when the wire is pushed through.

FIG. 150.—Wiring the Leg.

Wind cotton around both wire and bone to the natural thickness of the thigh, and go through the same process with the other leg; then push the wires clear through the artificial body and bend the protruding ends into a hook form (Fig. 151). Taking hold at the part extending from the bottom of the foot, pull the wire of each leg down until the hooks fasten firmly into the body. The ends of the wires protruding from the foot are left to fasten the bird to its perch, which is done either by wrapping the wires around the perch or by thrusting them through holes made for the purpose and clinching the ends. With a few stitches sew up the hole in the breast. For small birds this is not necessary. After your owl is set up in

FIG. 151.—Showing how Leg-Wire is attached to False Body.

this manner, gather the wings up close to the body and fasten them there by thrusting two wires, one from each side, diagonally through the skin of the second joint.

If you wish the tail to be spread you must push a wire across the body through each feather.

Eyes can be made of white marbles painted yellow with black centres, but glass eyes are better and cost very little. To fix the eyes, put a touch of glue upon the cotton in each orbit and insert the glass eyes, being careful to place them properly under the eyelids; with a sharp needle pull the lids nicely in place.

The stuffing of the bird is now finished, and it may be placed upon the branch in some natural position (Fig. 147, page 233).

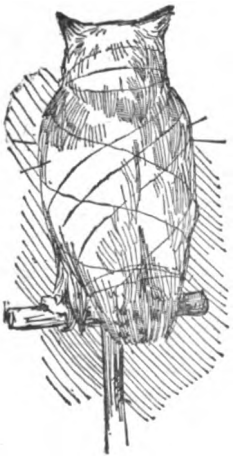


FIG. 152.

The attitude fixed, it only remains to put the feathers in their natural order as smoothly and regularly as possible, and to keep them in place by winding a thread over the body very loosely, beginning at the head and winding until all the feathers are secured (Fig. 152). The bird must be left in some dry place for several days. When it is perfectly dry the thread may be taken off and all protruding wires cut close to the body. The specimen is now ready for the parlor or library.

The above directions, with very little modification, will serve for any other bird. For practice, a chicken is the best subject, as it is easily obtained and large enough not to be readily damaged by the awkwardness of a beginner.

The more tools you have the better, but if my reader has carefully read the foregoing description he must have noticed that during the whole process of skinning and stuffing the owl

the only tools used were such as are within the reach of every boy—a penknife, a paper-cutter, small spoon (a mustard-spoon will answer), and a thread and needle. Arsenical soap is the only material used not likely to be easily procured. This preparation is of course very poisonous and should be so labelled. It can be procured of any taxidermist or made by any drug gist from the following recipe of Bécœur:

Arsenic in powder	2 pounds.
Camphor	5 ounces.
White soap	2 pounds.
Salt of tartar	12 ounces.
Powdered lime	4 ounces.

Mr. J. Wallace, the taxidermist, recommends the following recipe: "Dissolve ten pounds of finely cut, best white soap in warm water; add one pound of potash; thicken with pipe-clay and a little lime to give the preparation body; heat and stir well. When cooling add ten pounds of arsenic." Of course the young beginner will not need any such quantity as is represented in either of these recipes, but if he goes to the druggist that gentleman can make the soap in any quantity desired. The utmost care must be observed in handling this preparation and keeping it out of the reach of children and animals, although it is not very tempting in taste or looks and hence not as dangerous as other compounds might be.

A New Manner of Preserving Fish.

The boys at school used to say, "You cannot eat your apple and keep it." Being not only fond of fishing and fish, but also taking an interest in the study of ichthyology, the question with me has been, How can I eat my fish and still pre-

serve it for future reference? A few experiments and several failures suggested a plan which has proved partially successful.

Having caught a very large bass or trout that you would like to preserve as a trophy, or some odd-looking fish that you want to keep as a specimen, the following is the plan to adopt:

Place your fish upon a piece of paper of any kind you may have, or a piece of birch bark; spread out the fins and trace a careful and accurate outline; then with your pocket-knife remove the tail at a point just beyond its junction with the body of the fish; in the same manner cut off the fins, being careful not to injure them; a small portion of flesh will be attached to each; this must be removed with your knife. Put the fins in a safe place, and again taking your knife, insert the blade under the gill and cut up to the centre of the top of the head; split the head down in a line exactly on the top to the upper jaw; carefully cut through this and the lower jaw to where the gill commences underneath; this will sever the whole side of the head. Cut away all the flesh from the inside and remove all the bony structures possible without injuring the outside. The eyes can be removed so as to leave the outside skin or covering unbroken. Wash the half of the head clean and put that with the fins in your note-book, taking care to leave a leaf of paper between each, to prevent their adhering together.

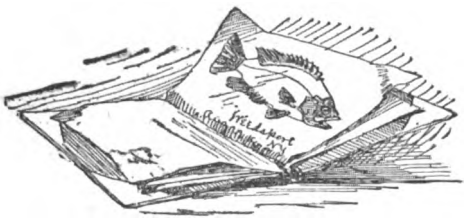


FIG. 153.—Portfolio of Fish.

When you reach home you can have the fish cooked, and while it is cooking trace the outline of the fish upon a clean sheet of white paper; take the fins, head and tail from your note-book, dampen them with a sponge or wet cloth, and with glue or mucilage fasten them in their proper places upon the

outline drawing, distended by means of pins; the latter may be removed after the glue or mucilage is dry; write in one corner the weight of the fish, the date upon which it was caught, and the name of the place where it was captured. You can then frame it or number the sheet and place it in a portfolio (Fig. 153). In the course of a season's fishing quite an interesting and valuable portfolio of fishes can be made. The writer has often caught fish whose names were unknown to him, and in this manner preserved them, or enough of them to identify the fish at some future period when he had time to look it up.

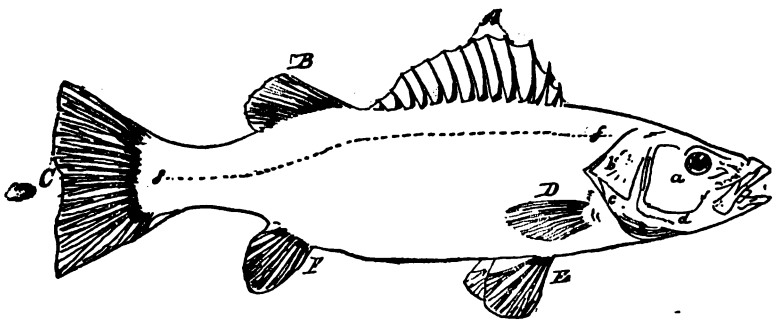


Diagram Showing the Parts of a Fish.—A, first dorsal fin; B, second dorsal fin; C, caudal fin; D, pectoral fin; E, ventral fin; F, anal fin; b, operculum or gill cover proper; a, preoperculum or fore-gill cover; d, interoperculum, or middle gill cover; c, suboperculum, or under gill cover; e, branchiostegous, or gill rays; f, lateral line.

Design for a Sketching Aquarium.

If the reader desire to try his artistic skill and attempt a colored drawing of a fish, he should do it from life. To see the fish as it really appears, a very simple contrivance can be made in the form of an aquarium, with wooden ends and glass sides; the wooden ends must have perpendicular grooves in them so

that an extra pane of glass can be used as a slide (Fig. 154). Place the live fish in the aquarium, and when he is on one side of it quickly slip the slide in so as to imprison the fish in such a narrow space that he is unable to flop or turn around, but must patiently keep his broadside to the artist until the picture is finished.

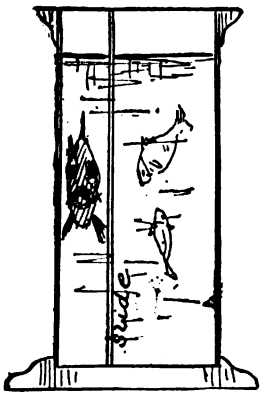
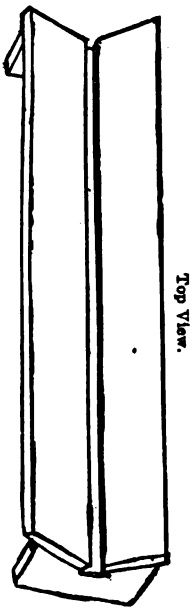


FIG. 154.—Cross Section of a Sketching Aquarium.

Preserving Insects.

Great care must be taken in killing insects, intended for the cabinet, and death should be produced without disfiguring them or rubbing off the down or scales that covers the bodies and wings of some specimens. A convenient and successful way to kill insects is to drop them into a wide-mouthed bottle, the bottom of which is lined with blotting-paper that has been previously saturated with ether, benzine, creosote or chloroform. When a butterfly, bug, or beetle is put into a bottle prepared in this manner, and the bottle tightly corked, the insect expires without a struggle, and hence without injuring itself. From the bottle the specimens may be taken and pinned upon a mounting-board, consisting of two strips of wood resting upon supports at



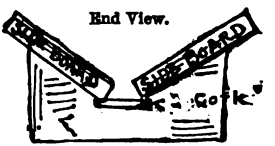


FIG. 155.—Mounting-Board.

each end, a space being left between the strips for the body of the insect. Under this space or crack a piece of cork is fastened (Fig. 155) in which to stick the point of the pin. After pinning the specimen to the mounting-board, spread the wings and

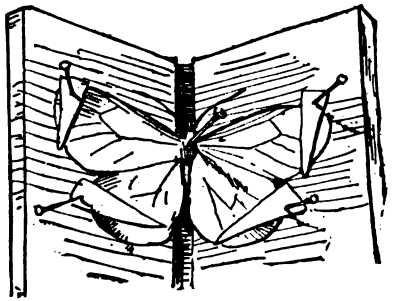
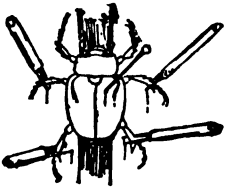
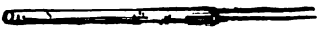


FIG. 156.—Butterfly pinned to Mounting-Board.

FIG. 157.



Beetle, with legs set.



Leg-pin.

legs out in a natural position, and if it be a butterfly or moth, fasten its wings in position with bits of paper and pins, as shown in Fig. 156. An ingenious and simple device for pinning the leg of an insect is illustrated by Fig. 157. It consists of two needles with their heads driven into a small pine stick.

Morse Insect Box.

Mr. E. S. Morse gives probably the best device for arranging an insect box for the cabinet. It consists of a light wooden frame with paper stretched upon the upper and under surface. Dampen the paper and glue it to the frame; when the paper dries it will contract and become as tight as a drum-head. Inside the box upon two sides fasten cleats, and let their top edges be about one-quarter of an inch above the bottom. Rest

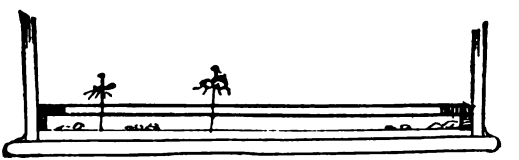


FIG. 158.—Cross Section of Morse Insect Box.

the paper-covered frame upon these cleats and secure it in position. The bottom of the box should be lined with soft pine to receive the points of the pins. The space under the frame can be dusted with snuff and camphor to keep out such insects as delight to feed upon the prepared specimens of their relatives. Fig. 158 shows a cross section of a box upon Mr. Morse's plan.

The Lawrence Breeding Box.

The best moths and butterflies are obtained by rearing the caterpillars in cages made for the purpose. I am indebted to Mr. Albert Lawrence for the accompanying plan of a larvæ box, invented and used by himself for several seasons (see Fig.

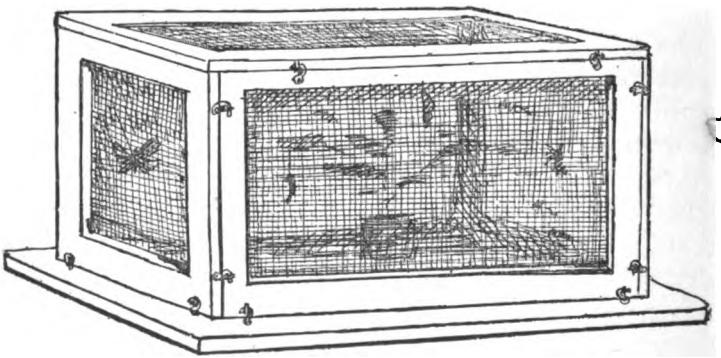


FIG. 159.—Mr. Albert Lawrence's Breeding Box.

159). The Lawrence box, as may be seen by the diagram, can be taken apart and packed away when not in use or during transportation.

The sides, ends, and top are wooden frames covered with wire netting; the bottom is a flat board. They are all joined by hooks and screw-eyes. To take them apart it is only necessary to unfasten the hooks.

Spiders

are very likely to lose their colors if placed in spirits, and if pinned and dried like beetles they will not only lose all color, but their bodies will shrivel up and change in form and proportion to such a degree as to make the specimens next to worthless. Mr. Ralph Hemingray, of Covington, Ky., sent the author some spider bottles manufactured under his direction of very thick, clear, white glass, three inches high by one and one-quarter inch broad, and three-quarters of an inch thick. These bottles are convenient in shape, and when a spider is put in one and the bottle filled with glycerine, the spider looks as if it might be imbedded in a solid block of crystal.

FIG. 160.—The Hemingray Bottle.

I have had some brightly colored garden spiders preserved in this manner for two years, and they have not only retained their original shape but color also. In the place of corks, pieces of elastic are stretched over the tops of the bottles; this allows the glycerine to expand or contract. Fig. 160 represents a drawing of one of these bottles with a spider in it. A case of specimens preserved in this manner makes not only an interesting cabinet, but a very pretty one. Although many persons have a horror of spiders, they lose all their nervousness when the insects are seen neatly labelled and enclosed in pretty glass bottles.

How to Make Beautiful or Comical Groups and Designs of Insects.

Many really beautiful, as well as some absurdly comical designs can be made of properly preserved insects by ingenious lads.

Butterflies may be made to have the appearance of hovering in mid-air by mounting them upon extremely fine wire.

Grasshoppers can be arranged in comical, human-like attitudes.

Beetles may be harnessed like horses to a tiny car made of the half of an English walnut-shell. A very pretty design can be made by seating a grasshopper in a delicate sea-shell of some kind, and glueing the shell to a bit of looking-glass; fine wires attached to the shell will answer the double purpose of a support and harness for a couple of flying beetles; a little moss glued around the sides so as to conceal the ragged edges of the glass will add greatly to the effect, and the whole will have the appearance of a fairy boat being drawn over the surface of the water by two flying beetles, guided by the long-legged imp in the shell.

Preserved insects are exceedingly brittle, the least touch will often break off a wing or leg or otherwise disfigure the specimen, hence it is necessary not only to be very careful in handling them, but to supply some sort of cover to protect them from accidents, dust, and injurious insects. Dome-shape glass-covers are best adapted for small groups or compositions, and these may be obtained from the dealers at moderate prices, or, if the young taxidermist has acquired sufficient skill to make his work valuable, he can readily trade off duplicate specimens for glass-covers, as many amateurs as well as some professionals do.

Marine Animals.

Starfish must be first placed in fresh water and allowed to remain there for several hours; they may then be removed and spread out upon a board, and held in position by pins or nails driven in the board alongside of the rays, but not into the creature. Put the board in a dry place out of the sun, and the air will absorb all the moisture in the specimens; the latter, as they dry, become hard and stiff.

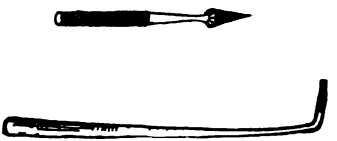
I have several starfish preserved in this simple manner, and

although no pickle or artificial preservative was used, they have kept in good condition for several years.

Small crabs may be dried in the same manner. The flesh must be extracted from the big pincers of the larger crabs and lobsters; this may be done by breaking off the points of the pincers and removing the meat with a crooked wire. The points of the claws should be saved and glued in place after the animal is dry. The smaller claws may be allowed to dry; small holes pierced in them will allow the air to enter and facilitate the drying process. The insides of both lobsters and large crabs must be removed from an opening made underneath. Wash them with cold water and inject carbolic acid and water into their extremities; place them upon a board to dry, with their legs spread out; after all moisture has evaporated, varnish them and fasten the bodies and legs of the specimens to a board with fine wires.

All soft-bodied animals, such as squids and slugs, can be preserved in spirits. Sea-urchins, such as are found upon our coast, may be dried like starfish, but it is best to remove the insides of the larger specimens.

With these suggestions, sufficient to help the young taxidermist, I will close this chapter. I have purposely avoided advising the use of expensive material or tools; where it was possible, I have not suggested the use of poisonous preservatives, but have given the most simple and safe methods of mounting specimens for the cabinet or for decorations.



Egg Blow-pipe and Drill.

CHAPTER XXVI.

EVERY BOY A DECORATIVE ARTIST.

Shadow Pictures—Photographic Paper—How to Enlarge or Reduce a Picture, etc.

ONE day while the author was sketching, a piece of drawing-paper happened to fall upon the ground in the bright sunlight. As the paper rested on the sward the shadows of the grass and weeds were cast upon it. How beautiful and graceful they were! Stooping down the writer passed his brush over the shadows; the result was a sort of half silhouette, an excellent suggestion for a bit of foreground or a decoration. If the thousands of amateur decorators that are daily engaged in daubing pictures of all manner of unnatural-looking plants upon china would only confine themselves to tracing in one color the simple shadows cast by plants in the sunlight, what graceful and pleasing designs Mother Nature would furnish

FIG. 161.—Shadow cast by a Dandelion.

them! How much more pleasant it would be to eat off dishes decorated in this manner than to be called upon to admire and eat from china covered with "finiky" little flowers or broad, meaningless daubs of color intended to represent something only known to the artist (?) who conceived the design. Any boy can make the most graceful designs by placing a piece of paper in such a position that the shadow of a flower or fern shall fall upon it. Then with a small paint brush and some ink he may carefully paint in the shadow just as it falls upon the paper. Fig. 161 shows a dandelion, a fac-simile of a sketch made in the manner just described. Fig. 162 is an anemone. Not only can beautiful designs be made, but valuable sets of botanical sketches can be obtained in this manner, as no skill is required with the brush; all that is necessary is to follow the shadow on the paper.

FIG. 162.—Shadow cast by an Anemone.

A wooden frame or stretcher might be used with a candle or lamp at night. By tacking the paper over the stretcher, then placing a pot or vase containing plants in front of the light and the stretcher in front of the plants, the shadows of the plants

will be thrown upon the paper and show through, so that they can be painted upon the opposite side of the paper without any danger of moving either the light or plants.

At most of the artists' material stores in New York there is to be found for sale a sensitive paper which changes color when exposed to the light. If a shadow be cast upon this paper by some object between it and the sunlight, the paper will grow lighter in color all around the shadow, and in a few moments the shadow is marked distinctly by the difference in tints. At this stage the paper, which is of a dark blue color, may be removed, and if it be held under a stream of water the parts that were covered by the shadow will become white and remain so. I have before me a photograph of a large dragon-fly, which shows all the beautiful network of veins in the wings of that insect traced in the most delicate white lines upon a background of dark blue. I allowed the dragon-fly to rest for a few moments upon a piece of sensitive paper and then quickly placed the paper under a hydrant, with the result described.

Photographic paper is not expensive, quite a large sized sheet costing only fifty cents. Many pretty experiments can be tried with this material.

How to Enlarge or Reduce by Squares.

Suppose you have a picture of a horse and want to enlarge it. First draw a line under its feet, and at right angles with this line draw another line in front of the horse's head; divide these lines into equal parts and then carefully rule lines across from these points so as to intersect each other at right angles, as illustrated by Fig. 163. When the horse is all enclosed in squares, take another piece of paper and make exactly the same number of large squares on the paper as there are smaller ones on the horse picture; number the squares on both as in

the diagrams (Fig. 163). If you will look at the top diagram you will see that the horse's head cuts off one corner of the upper left hand corner square; with your pencil make a line cutting off the same part of the corresponding large square; curve the line like the copy. By again referring to the horse picture you will notice that the line of the neck continued strikes exactly at the intersection of the lines 1 and 2; draw it so. The next point the line touches just above is the intersection of the lines 2 and 3; from this point the line of the back runs almost straight to the point on the tail at the intersection of the lines 2 and 6; thus, by finding and connecting the points of intersection you may reproduce the whole horse as illustrated by the diagram. In a similar manner a landscape, figure piece or a plan can be accurately enlarged by a boy who may have little or no talent for drawing, but who for some purpose wishes to reproduce a picture or plan. By making the squares on your drawing-paper exactly the same size as those upon the picture, you can draw a fac-simile of the picture, and by making the squares smaller you may reduce a picture. Remember these hints, for when I tell you how to make a puppet show, although a pattern for each puppet is drawn, there is not space in a book of this size to make all

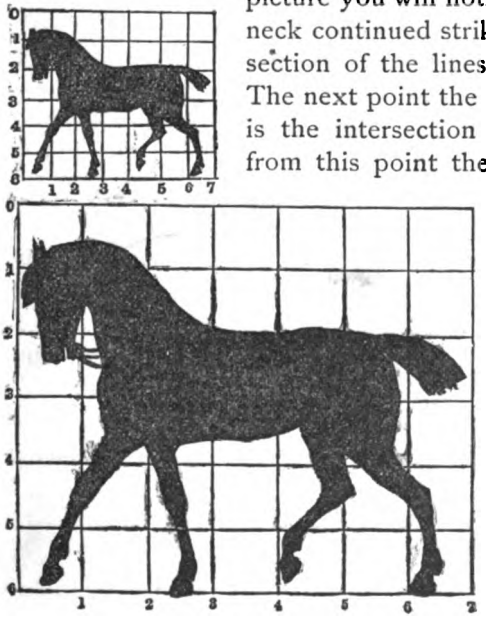
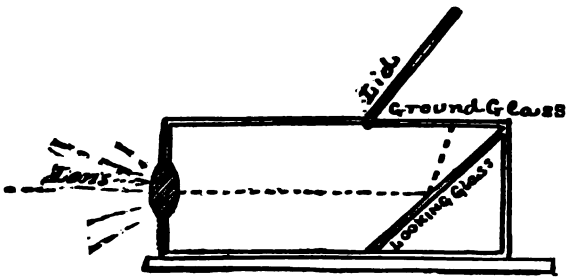


FIG. 163.—Enlargement by Squares.

the puppets large enough, and many or all may have to be enlarged.

How to Make a Camera for Drawing.

This instrument necessitates an outlay of from fifty cents to a dollar and a half for a lens; unless the reader is fortunate enough to already possess a double convex lens, or what is known among boys as a "burning-glass." A small mirror or piece of looking-glass, a small pane of common window glass, and an old soap or candle box, or some pine lumber of which to make a box, is all the material required.



Camera for Drawing.

Let the box be about eighteen inches long, nine inches deep, and twelve inches wide; fasten the lens in a hole cut for that purpose at one end of the box. A piece of looking-glass must be fixed at an angle of forty-five degrees at the opposite end of the box. The angle may be obtained in this manner: if from where the top of the glass rests against the end board, it measures nine inches to the bottom of the box, then the bottom of the glass should be nine inches from the end of the box.

Grind the surface of one side of the window-pane glass by rubbing it upon a flat stone or sand-paper. Make a lid to the top of the box, as shown in the illustration, and under the lid fasten the ground glass. Paint or blacken the inside of the box, and adjust the parts by experiment, so that when the lens is

turned toward any object, that object will be immediately reflected upon the piece of ground glass. No great difficulty need be anticipated by any one in the adjustment of the parts of a camera obscura, as it can be easily arrived at by trial.

If a piece of drawing-paper be placed over the ground glass, and the lens turned toward some object, that object will be reflected upon the glass and shown through the paper in all its natural colors, strong enough to be accurately traced and reproduced.

In this manner considerable amusement and instruction can be derived from a home-made camera obscura.

If one of these instruments be taken into a darkened room, and the lens allowed to point out through the window, everything that passes the house will be reflected upon the ground glass, making a sort of moving, colored, puppet show.

Winter.

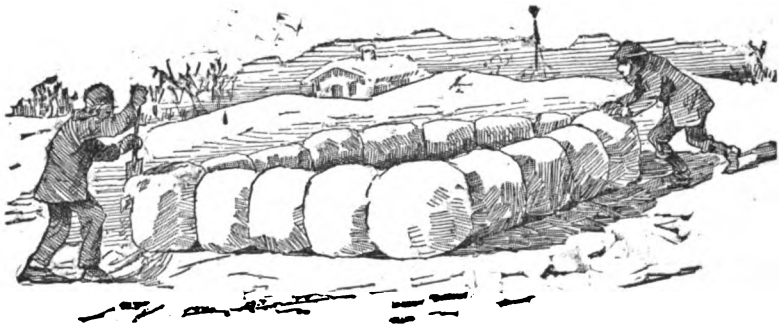


FIG. 164.—Snow-Fort commenced.

CHAPTER XXVII.

SNOWBALL WARFARE.

How to Build Snow-Forts—How to Make Shields and Ammunition Sleds.

COLD gray clouds have long since usurped the heavens and driven away the white, fleecy summer cumulus; the latter, like the birds, have gone to more congenial climes. For several weeks past heavy overcoats have been in demand.

The rowing season has closed; the baseball bats and lawn tennis rackets are stowed away, and the college boys have settled down to study and in-door gymnasium practice.

In the cities the car and stage drivers swing their arms about and beat their muffled chests in a vain effort to start the blood to circulating in their benumbed fingers. Each passenger, as he reads the morning paper, exhales two streams of mist from his nostrils. The horses puff larger streams of

steam and wear chest protectors. Everybody appears unhappy except the school-boy. The latter's cheeks glow with more than usual color and his eyes sparkle as if with inward merriment, for *he knows the signs*, and the dull, leaden sky to him is only a promise of a big snow storm and "lots of fun." The frost king has arrived and introduced jolly old Winter. Every boy knows that no season of the year can boast of more healthy out-door games, brimful of fun and excitement, than winter, and that there is no sport among winter games more exciting and amusing than snowball warfare. The interest and fun of the game is greatly enhanced if there be a fort to capture or defend.

How to Build the Fort.

All the boys must join in building the fort, selecting the highest point of the play-grounds, or, if the grounds be level, the corner of a wall or fence. Supposing the top of a mound has been selected as the place where the works are to be built, the first thing to do is to make out the plan of the foundation. The dimensions depend upon the number of boys. A circle twelve feet in diameter, or a square with sides of ten feet, will make a fort that will accommodate a company of ten boys. It is better to have the fort too small than too large. The chief engineer must set his men to rolling large snowballs; the smaller boys can commence them and the larger ones take the balls in hand when they have gained in size and become too heavy for the younger boys.

Make these balls of snow as large and dense as possible; then roll them in place upon the lines traced out for the foundation. We will suppose it to be a square. In this case, care must be taken to have the corners of the square opposite the most probable approach of the enemy. This will leave the smallest point possible exposed to the attack, and the inmates

of the fort can, without crowding each other, take good aim at the foe. After the four sides of the square are covered by large snowballs, as in Fig. 164, all hands must pack the snow about the bottom and fill up each crack and crevice until a solid wall is formed. Then with spades and shovels the walls should be trimmed down to a perpendicular on the inside, but slanting upon the outside, as shown in Fig. 165. The top of the wall may be two feet broad and the base four feet. When

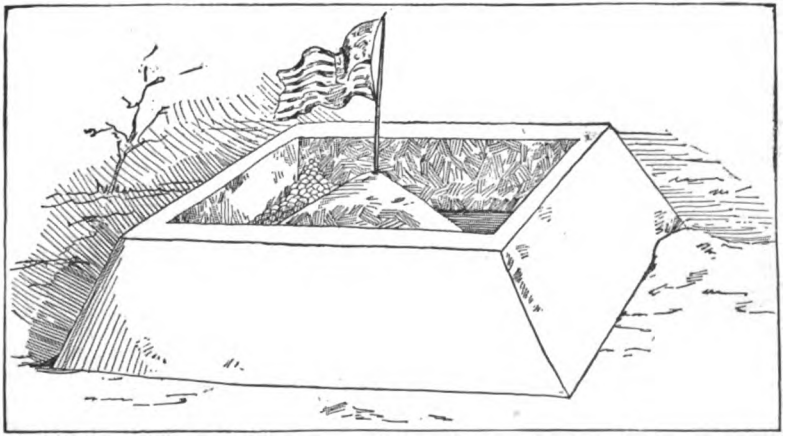


FIG. 165.—Snow Fort finished.

the wall is finished, prepare a mound of snow in the centre of the square for the flag-staff. This mound will be very useful as a reserve supply in case the ammunition gives out. A quantity of snowballs should next be piled up, inside the walls, at the four corners. This done, the fort is ready for its defenders, and it only remains to equip the attacking force.

The building of a fort generally uses up all the snow around it, making it necessary for the besieging party to carry their ammunition with them upon sleds made for that purpose.

The construction of these sleds is very simple, the materials

and tools necessary consisting of a flour-barrel, a saw, a hatchet, some shingle nails and an old pine board.

How to Make an Ammunition Sled.

To make the sled, begin by knocking the barrel apart, being careful not to split the head-boards, as they will be needed afterward. Pick out the four best staves, as nearly alike in breadth and curve as can be found, and saw two or three of the other staves in halves. Take two of the four staves first selected and nail the half staves across, as shown in Fig. 166. These must be nailed upon the convex, or outside, of the staves; this will be found impossible unless there is something solid under the point where the nail is to be driven, otherwise the spring of the stave, when struck, will throw the nail out, and your fingers will probably receive the blow from the hammer. To avoid this, place a block, or anything that is firm, under the point where the nail is to be driven, and there will then be found no difficulty in driving the nails home. When this is done you will have the top of your sled as shown in Fig. 166; on this you will need a box or bed to hold the snowballs; this you can make of two pieces of pine board and two staves, thus: Take a board about the same width as, or a little wider than, a barrel-stave; saw off two pieces equal in length to the width of the sled; set them upon their edges, reversing the top of the sled; place it across the two boards and nail it on securely. Then take two staves

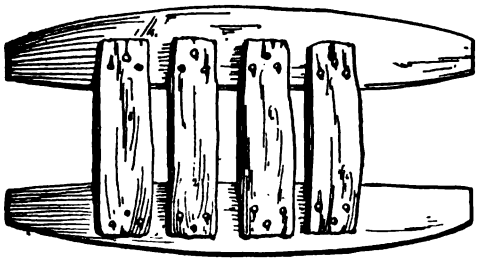


FIG. 166.—Top of Ammunition Sled.

and nail them on for side boards, and you have the top portion of your sled finished.

The two staves remaining of the four first selected are for runners. Fit on first one and then the other to the staves of the top. Nail-holes will probably be found near the ends of the staves where the nails were that held the barrel-head in; through these drive nails to fasten your runners; to do this you must rest them upon some support, as was done before; this will hold your sled together, but to make it stronger take four wedge-shaped blocks of wood and slide them in between the runners and the top, as shown in Fig. 167, and nail these firmly in place from above and below.

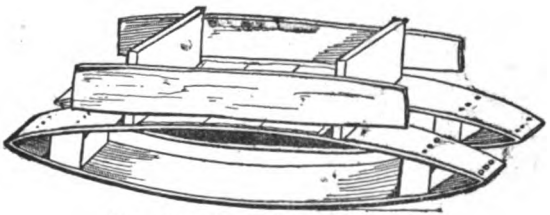


FIG. 167.—Ammunition Sled finished.

If all this has been properly done, you now have made a sled which it will be almost impossible to break; and, with a rope to pull by, one boy can haul snowballs enough for a dozen companions.

How to Make the Shield.

The shield is made from the head of a barrel. Lay the barrel-head upon some level surface, so that nails can be driven in without trouble.

From a strip of board half inch thick and two and one-half inches wide saw off two pieces long enough to fasten the parts of the barrel-head together, as you see them in Fig. 168. Fasten these strips on firmly with shingle nails.

Lay your left arm upon the shield, as shown, mark a place for the arm-strap just in front of elbow, and another for the

strap for the hand. From an old trunk-strap, or suitable piece of leather, cut two strips and nail them on your shield at points marked, being careful that the arm-strap is not too tight, as it should be loose enough for the arm to slip in and out with ease. This done, you have a shield behind which you may defy an army of unprotected boys.

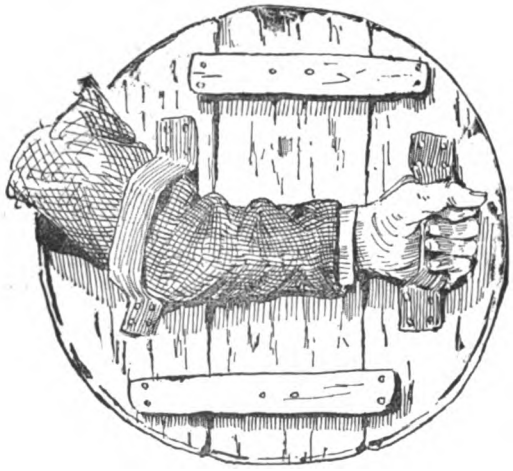


FIG. 168.

Rules of the Game.

The rules of warfare governing a snowball battle are as follows:

Two commanders, or captains, must be elected. If the forces engaged be very large, each captain may appoint one or two assistants, or lieutenants. These officers, after being elected and appointed, are to give all orders, and should be promptly obeyed by their respective commands. The captains decide, by lot, the choice of position.

In choosing sides, the captain who is commander of the fort has first choice, then the two captains name a boy, alternately, until two-thirds of the boys have been chosen. The defenders of the fort then retire to their stronghold, leaving the boys unchosen to join the attacking army, it being supposed that one-third behind fortifications are equal to two-thirds outside.

Only the attacking party is allowed shields and ammunition sleds.

At least thirty yards from the fort a camp must be established by the outsiders or attacking army, and stakes driven at the four corners to locate the camp. Imaginary lines from stake to stake mark its limits.

Each party will have its national colors, in addition to which the attacking party has a battle-flag which it carries with it in the assault.

The defenders of the fort must see to it that all damages to the fortifications are promptly repaired.

Any soldier from the fort who shall be carried off within the limits of the camp becomes a prisoner of war, and cannot leave the camp until rescued by his own comrades.

Any one of the attacking force pulled into the fort becomes a prisoner of war, and must remain in the fort until it is captured.

Prisoners of war cannot be made to fight against their own side, but they may be employed in making snowballs or repairing damages to fortifications.

Any deserter recaptured must suffer the penalty of having his face washed with snow, and being made to work with the prisoners of war.

When the outsiders, or attacking army, can replace the enemy's colors with their battle-flag, the fort is captured and the battle is won by the attacking party; all fighting must then immediately cease.

But if, in a sally, or, by any means, the soldiers of the fort can take the colors of the opposite party from the camp and bring them inside their fortifications, they have not only successfully defended their fort, but have defeated the attacking army; and this ends the battle, with double honors to the brave defenders.

No water-soaked or icy snow-balls are allowed. No honorable boy uses them, and any one caught in the ungentlemanly

act of throwing such "soakers" should be forever ruled out of the game.

No blows are allowed to be struck by the hand, or by anything but the regulation snowball, and, of course, no kicking is permitted.

The following sketch of a snow battle in which the author took part when a boy, will give an idea of the excitement and interest of the game:

A Snow Battle.

It was a year when the Indian summer had been prolonged into the winter. Christmas had come and gone and a new year begun, but not one flake of snow had fallen on the river bank or neighboring hills.

Such was the condition of things one January morning in a Kentucky town upon the banks of the Ohio River, where myself and some sixty other boys were gathered in a little frame school-house.

We had about made up our minds that old Jack Frost was a humbug, and winter a myth; but when the bell tapped for recess, the first boy out gave a shout which passed from mouth to mouth until it became a universal cheer as we reached the play-grounds, for floating airily down from a dull, leaden, gray sky came hundreds of white snow-flakes!

Winter had come! Jack Frost was no longer a humbug! Before the bell again recalled us to our study the ground was whitened with snow, and the school divided into two opposing armies. That night was a busy one—all hands set to work manufacturing ammunition sleds and shields for the coming battle. It was my fortune to be chosen as one of the garrison of the fort. There was not a boy late next morning—in fact, when the teachers arrived to open the school, they found all the scholars upon the play-grounds. rolling huge snowballs. All

night the snow had continued to fall, and it was now quite deep. When we went out at noon a beautifully modelled fort of snowy whiteness stood ready for us, and from a mound in the centre floated the battle-flag.

Our company took their places inside the fortifications.

We could see the enemy gathered around their captain at their camp some two hundred yards distant, their ammunition sleds loaded with well-made snowballs. The lieutenant bore their battle-flag.

Our teachers showed their interest by standing shivering with wet feet in the deep snow to watch the battle. At a blast from a tin horn on rushed the foe! They separated and came in two divisions, approaching us from the left and right.

"Now, boys," cried our captain, "be careful not to throw a ball until they are within range."

Then, calling the pluckiest among us, a flaxen-haired country boy, to his side, he whispered a word or two and pointed to the flag in the enemy's camp. The boy, who had been nicknamed "Daddy" on account of his old-looking face, slipped quietly over the rear wall of the fort, dodged behind a snow-drift and then behind a fence, and was lost to sight. Forward marched the enemy, their battle-flag borne in advance of the party to the right. Their captain was at the head of the division to the left.

Having engaged our attention on the two flanks, where we stood ready to receive them, as they neared us, by a quick and well-executed manœuvre, rushing obliquely toward each other, the two divisions unexpectedly joined, and advanced, shield to shield, with the ammunition sleds in the rear. It was in vain we pelted them with snowballs; on they came, encouraged by a cheer from the teachers and some spectators who by this time had gathered near the school-house.

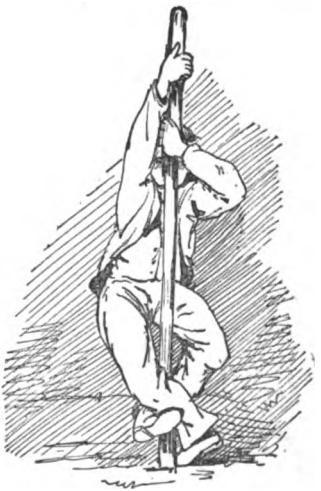
Three times had our noble captain been tumbled from his

perch upon the mound in the centre of the fort, when another burst of applause from the spectators announced some new development, and as we looked, we could see "Daddy" with the colors of the enemy's camp in his arms, his tow hair flying in the wind as he ran for dear life.

In an instant the line of the enemy was all in confusion; some ran to head off "Daddy," while others in their excitement stood and shouted. It was our turn now, and we pelted their broken ranks with snow until they looked like animated snow-men. Another shout, and we looked around to find our captain down and the hands of one of the besieging party almost upon our flag. It was the work of a second to pitch the intruder upon his back outside the fort. Then came the tug of war. A rush was made to capture our standard, several of our boys were pulled out of the fort and taken prisoners, and the capture of the fort seemed inevitable. Again and again a number of the enemy, among whom was their color-bearer, gained the top of our breastworks, and again and again were they tumbled off amid a shower of snowballs that forced them to retire to gain breath and clear their eyes from the snow. Once their lieutenant, with the red-bordered battle-flag, had actually succeeded in reaching the mound upon which stood our colors, when a combined attack that nearly resulted in his being made prisoner drove him from the fort to gather strength for another rush. "Daddy" was now a prisoner, and the recaptured flag again floated over the enemy's camp, when the school-bell called us, fresh and glowing with exercise and healthful excitement, to our lessons. The battle was left undecided, but our fort was soon captured by a force stronger than any our companions were able to bring against it, for a warm south wind sprang up from the lowlands down the river, and our fortification quickly yielded to its insidious attack, and the snow campaign was over.

How to Bind a Prisoner Without a Cord.

A gentleman who was much interested in the foregoing description of snowball warfare sends a sketch of the manner he and his playmates used to bind their prisoners taken in snow battles. The captive was taken to a post or smooth-trunked sapling and compelled to put his arms and legs around it as if he were about to climb. The right leg crossed the left leg, and the toe of the right shoe was pushed behind the post or tree trunk in the position shown by the illustration. After taking this position the prisoner was gently pushed down into a sitting position. It is next to impossible for a person so fixed to arise without help. The toe of the left shoe binds the right leg; the toe of the right shoe binds the post, and the arms can be only used to hold on by. When a friend reaches the captive he takes him by the arms and lifts him up. As soon as the prisoner assumes an upright position he can free himself without difficulty.



A Prisoner of War.

Company Rest.

The same gentleman who sent the above ingenious device also tells of some funny manœuvres the boys used to go through. For instance, during a lull in the battle, the commander would call out "Company rest!" One man then assumed a stooping position; the next man sat on the right

knee of the first man; a third man would sit upon the right knee of the second man and so on until a circle was formed, each fellow sitting in some other fellow's lap and yet no one sitting upon anything else. "Thus," says the correspondent, "we all were enabled to sit down without using the damp snow for a camp stool."

"Advance under Fire."

CHAPTER XXVIII.

SNOW-HOUSES AND STATUARY.

IN "the land of the midnight sun," the far arctic regions where Jack Frost rules supreme, where the glistening ice and thickly packed snow covers the landscape almost the whole year round, the hardy inhabitants live in huts built of frozen

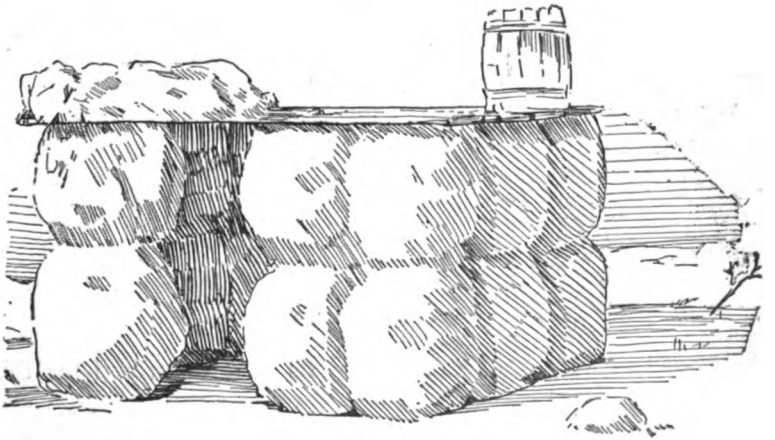


FIG. 169.—Showing the construction of a Snow-House.

blocks of snow. The interior of these icy dwellings are not, as might be supposed, uncomfortably cold, but, on the contrary, are quite warm and cosey. Boys who are inclined to doubt this may make the experiment for themselves. After the first good old-fashioned snow storm has covered the play-ground, roads, and house-tops, and while the merry jingle of the sleigh-

bells tinkles through the wintry air let them busy themselves rolling huge balls of snow after the manner described in the chapter on "Snowball Warfare," making the foundation of

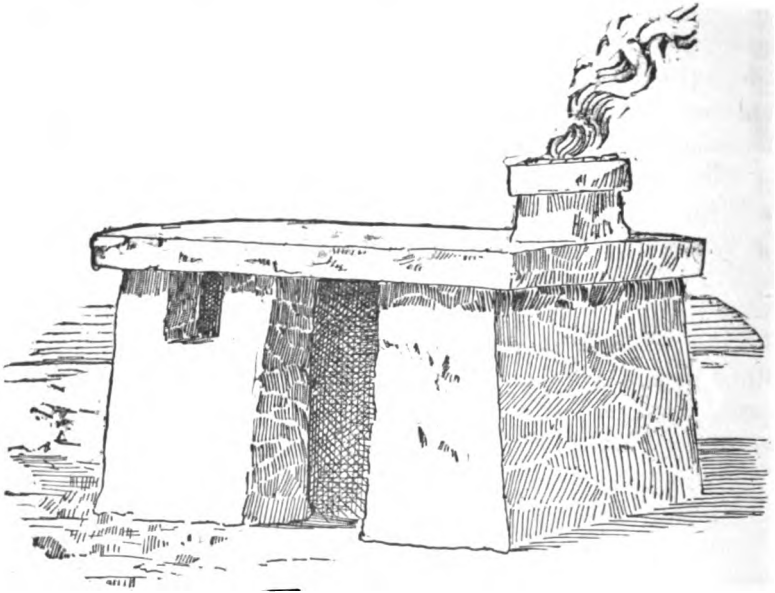


FIG. 170.—A Snow-House Finished.

the house exactly in the same way as that described for the snow-fort (page 258).

The roof is made of boards or planks covered with snow. A barrel placed over a hole in the roof, and surrounded by packed snow properly shaped, will make a very good chimney. A pane of glass can be set in the square hole made for a window; a heavy piece of carpet can be hung from the ceiling over the doorway, so as to act as a curtain; or if the young work-people choose to take trouble enough, they can put up a framework inside of the door-way and hang a

wooden door to it by leather or canvas hinges. An old stove, or a fire-place made near the wall under the chimney, adds a finish to the house that will be found quite snug and comfortable as long as the snow lasts. The fire inside, if the weather be cold, will not melt the walls. The pictures of the house (Figs. 169 and 170) show so well how it is constructed, and how it looks when it is done, that very little explanation is necessary.

The walls are made of large snow-balls properly placed, with snow packed between them to make the surfaces tolerably even, and then the whole shaved down with a spade, outside and inside. It will be found impossible to put one tier of balls upon the top of the others by lifting them in place, but this difficulty may be overcome by sliding the balls up an inclined plane made of a strong plank, one end of which must be placed upon the ground and the other allowed to rest upon the top of the first or foundation row of snowballs.

FIG. 171.—Making the Pig.

Snow Statuary.

The statuary may be of various kinds. It is very seldom

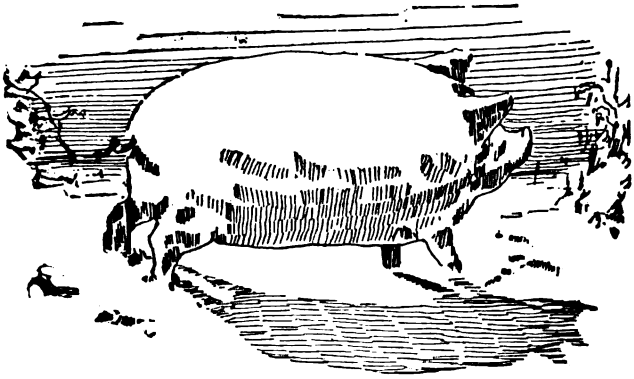


FIG. 172.—A Snow Pig.

that pigs are sculptured in marble or cast in bronze, and it would be well to make some of snow, so as to have statues not likely to be found elsewhere. An oblong mass of snow forms the body (Fig. 171); the legs, nose, and ears are made of sticks surrounded by snow, and a bit of rope nicely curled will make a very good tail. The various parts

FIG. 173.—Making "Frenchy."

can be shaped and carved according to the skill of the young artist. A number of pigs, of different sizes, will give a lively and social air to the yard of a snow-house. Fig. 172 shows a finished pig.

A statue of a Frenchman in an ulster is also rather uncommon, and is not hard to make. The foundation of the body, head, and legs consists of several large snowballs, as seen in Fig. 173, and the arms are made of smaller balls stuck on two sticks, which are inserted in the body at proper angles. When the whole figure has been "blocked out," as the artists say, it must be carved, with broad wooden knives or shingles, into the proper shape, as shown in Fig. 174. The moustache should be made of icicles, which may be stuck in the face.

FIG. 174.—Frenchy in his Ulster.

FIG. 175.—Carving the Owl.

Arctic owls, which are very large and white, can also be made of snow, in the manner shown in the adjoining pic-

ture. These figures can be placed on snow pedestals if they are small, but if they are monster owls, like those in the illustrations (Figs. 175 and 176), they must be placed upon the ground. In either position, if they are fashioned properly, they will look very wise and respectable.

FIG. 176.—An Arctic Owl.

When the snow is too dry to make a snowball it cannot be used to make statuary, but after a slight thaw or a fresh fall of snow it readily adheres upon a slight pressure, and can be formed or fashioned in almost any shape.

Many curious objects and figures may be carved out of solidly packed balls of snow. A lawn covered with a number of large snow figures presents a most grotesque appearance, and is sure to attract the attention of all passers-by. With practice not a little skill may be acquired by the young sculptor, and if the statuary be made of large proportions, they will sometimes last for weeks after the snow has disappeared from the ground and house-tops.

CHAPTER XXIX.

SLEDS, CHAIR-SLEIGHS, AND SNOW-SHOES.

THE construction of one of the simplest sleds is shown by Fig. 177 ; it consists of nothing more nor less than three pieces of board nailed upon two barrel-staves. The barrel-stave sled possesses the advantage of being so simple in design that a child might make one, and although this primitive sled can lay claim to neither grace nor beauty, it will be found useful in a variety of ways ; it may be used for coasting, or for transporting loads of snow when building snow houses, forts or figures.

FIG. 177.—Barrel-stave Sled.

If, instead of the long top board, a kitchen chair be fitted on, as shown in Fig. 178,

FIG. 178.—A Chair-Sleigh.

A Chair-Sleigh

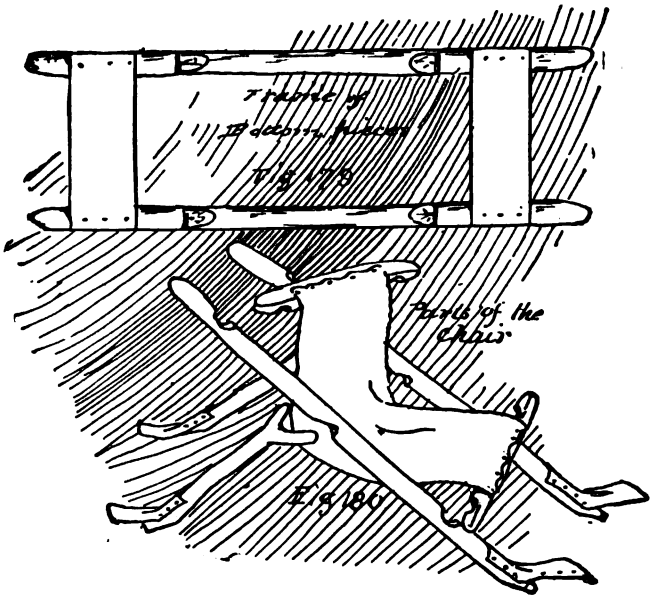
will be had. It is necessary to nail on four L-shaped blocks at a proper distance apart on the cross board to hold the chair in place (Fig. 178). Any boy who is fortunate enough to have a mother or sister who takes sufficient interest, and has the time to accompany him on his skating trips, will find a chair-sleigh quite a handy thing to possess, and when he moves from one part of

the ice to a distant portion of the pond or river he can skate behind the sleigh with his hands upon the back of the chair, and push his lady friend rapidly over the ice, adding much to her enjoyment as well as his own.

The cumbersome wooden kitchen chair is heavy to carry if the skating pond be far from home, but a

Folding Chair-Sleigh

may be made from a few sticks and pieces of leather for hinges. This chair is made upon the same principle as the one described



FIGS. 179 and 180.—Parts of Folding Chair.

in the chapter devoted to, "How to Camp Out." Figs. 179 and 180 show all the parts in detail as they would look before being joined together. The seat may be made of a piece of carpet, canvas, or any strong material, the hinges of leather. Fig.

181 shows the chair after it has been put together. The runners consist of skates, which may be strapped on or taken off at pleasure, without injuring the skates in the least. If the chair is to be carried it can be folded up. When the chair frame is lifted the forked sticks that support it will slip from the notches in the side bars and fall on to the runner bars; the chair frame can then be let down and the whole frame-work will form a flat, compact mass (Fig. 182), that can be easily carried by quite a small boy. By using light sticks, regular metal hinges, and a prettily worked cloth for the seat, a very light and beautiful chair-sleigh can be made that, with the skates removed, will make an ornamental parlor chair for summer, and when the ice again covers the surface of the water, it will be only necessary to strap on the skates, and the easy chair becomes trans-

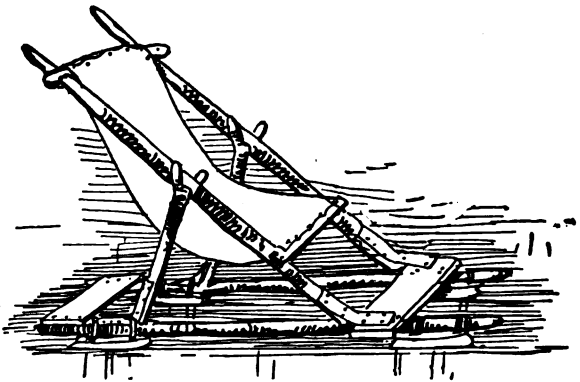


FIG. 181.—Folding Chair-Sleigh Ready for Use.

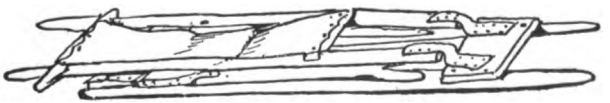


FIG. 182.—Folded Up.

formed into a chair-sleigh, to be pushed about over the glittering ice wherever its occupant may direct or the whim of the boy who forms the motive power may take him.

The Toboggan.

This sled, familiar to all who visit Canada or the Provinces during the winter months, is more like a mammoth snow-shoe than the ordinary sled, sleigh or jumper that we are accustomed to see. It is suitable for the deep snow and heavy drifts of the northern countries, where the runners of a common sleigh

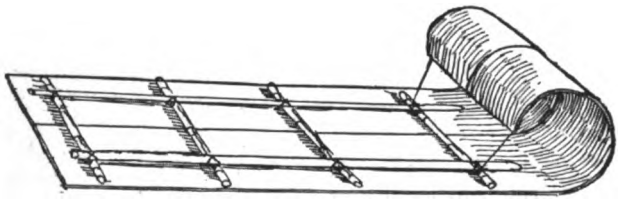


FIG. 183.—The Toboggan.

would be liable to break through the crust and bury themselves, thus impeding, if not altogether stopping, the vehicle. The toboggan presents a broad, smooth bottom to the snow, and glides over the crust.

To make one of these sleds you must procure two pieces of quarter-inch pine lumber eight or ten feet long and one foot wide. Place the two boards side by side and join them together by the means of round cross sticks; the latter are bound to the bottom board by thongs; the thongs pass through holes in the bottom boards on each side of the cross stick, and are made fast by a series of "hammock hitches" (see page 80, and Fig. 159, E). Where the thongs pass underneath the bottom board grooves are cut deep enough to prevent the cord from projecting; the grooves are quite necessary, for if the cords were allowed to project beyond the surface of the boards they would not only impede the progress of the toboggan, but the friction would soon wear out the thongs and the sled would come apart. On top of the cross sticks two side bars are lashed;

the front ends of the board are then curled over and held in position by two thongs made fast to the ends. Fig. 183 shows a finished toboggan drawn from one manufactured by the Indians in Canada.

Snow-Shoes or Skates.

The Norwegian ski is a snow-shoe, or rather a snow-skate, nine feet long, used by the Norwegians to glide down the mountains or hillsides when the latter are covered with snow.

Great fun can be had with a pair of snow-shoes made on the same principle as the Norwegian skate shoe, and it is little trouble to manufacture a pair from two barrel staves.

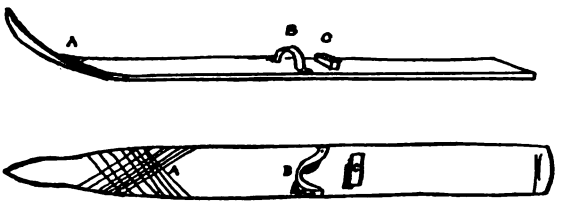


FIG. 184.—Top and Side View of Barrel-stave Skate.

After selecting a couple of straight-grained staves, score one end of each stave with grooves cut in the wood either with your knife or a small gouge, as shown by the lines at A, Fig. 184. Smear the end thickly with grease and hold it near a hot fire until you find that it can be bent into the form shown by the diagram (Fig. 184); bind it in position by a cord and let it remain so until the wood retains the curve imparted. Make two blocks, each one inch broad and high enough to fit under the heels of your shoes; fasten the blocks on to the snow-skates by screws (C, Fig. 184); at a proper distance in front of the block fasten two straps securely (B, Fig. 184). By slipping the toes of your shoes through the straps and allowing the hollow of the foot to rest over the blocks C, C, so that the

heels of your shoes bear against the blocks, you can keep the shoes on your feet, and, with the aid of a stick to steer by, go sliding down the coasting hill among the sleds and jumpers, creating as much fun for the others in your first attempts as you do for yourself; but with practice skill can be acquired in the use of snow-skates.

CHAPTER XXX.

HOW TO MAKE THE TOM THUMB ICE-BOAT AND LARGER CRAFT.

ALTHOUGH a full-rigged, delicately balanced ice-yacht looks like a very complicated piece of mechanism, when it is carefully examined the framework will be found to consist of two pieces crossing each other at right angles. The top of the cross is the bowsprit, the bottom of the cross the stern, and the sides the runners. At the intersection of the cross pieces the mast is stepped. The principle is simple enough, and with some sticks, two small pieces of inch lumber, three old skates, and two boards, a real little "Tom Thumb ice-yacht" can be built to hold a crew of one, and to be rigged like a catboat or with a jib and mainsail. The cross board may be made about 3 feet long and 6 inches wide. Make two runner blocks of inch lumber, and let them be each 6 inches long and 3 inches wide. With a bit and brace or a red-hot poker bore holes at proper distances apart for the straps of old-fashioned skates to pass through. One inch from each end of the cross board, fasten on the runner blocks securely with nails or screws (Fig. 185). For the centre plank use a board about 6 inches wide and 5 feet long. Nail the cross plank on to the centre plank in such a manner that a line drawn through the centre of the latter will intersect the cross board exactly at its middle. The planks must be at right angles to each other, forming a cross, the cen-

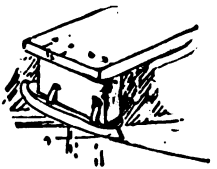


FIG. 185. — End of Cross-board, showing Runner-block and Skate.

tre piece extending about one foot beyond the cross piece; this end will be the bow of the ice-boat and the opposite end the stern. Bore a large hole in the stern for the rudder-post to pass through. The rudder-post may be made in a variety of forms; a simple and convenient one is shown by Fig. 186. Another hole must be made through the point where the centres of the cross and centre planks intersect for the mast. Fig. 187 shows a leg-of-mutton sail, but the young yachtsman may make a sail of any description that may suit his taste. By referring back to the chapter on "How to Rig and Sail Small Boats," he can find several simple kinds of sails illustrated. Fig. 188 shows the top view of an ice-boat a trifle larger than the one just described; the braces shown in the diagram are unnecessary on very small craft. To hold the mast more securely in larger yachts, a bench is made after the plan of Fig. 189; this will prevent the mast from being carried away under any ordinary circumstances, and also prevent it from swaying with every puff of wind. Where a seat is made as in Fig.

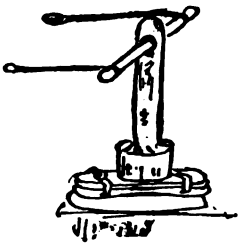


FIG. 186.—Rudder with Tiller-ropes.

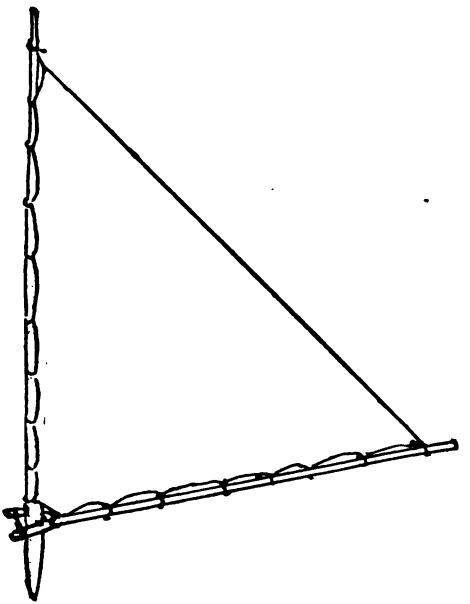


FIG. 187.—Leg-of-mutton Sail.

188, a wooden handle can be substituted for the tiller-ropes (Fig. 190).

The rudder is made of a skate; the latter is fastened by the screw at the heel and then strapped on a board nailed on to a

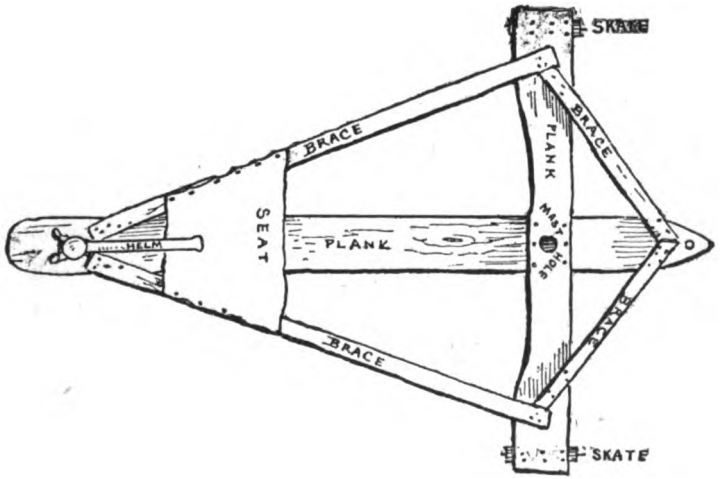


FIG. 188.—Top View of Ice-Boat.

club, shaped like a potato-masher; the small part of the club runs through a hole in the stern of the centre-board. A forked stick can be used for a tiller and must be fastened on to the rudder-post by running a pin or large wire through holes bored for the purpose in the rudder-post and the prongs of the forked stick. If the top of the rudder-post be squared, a tiller may be made of a stick with a square hole to fit over the end of the rudder-post, as shown in the illustration at the end of this chapter.

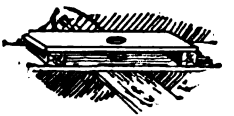


FIG. 189.—Mast Bench.

Perhaps some of my readers will invent more ingenious and simple steering apparatus than the ones given here; if

not, and the rudder-post and tiller seem to be a little too difficult, they may be omitted, and a stationary runner block substituted in their place. The boat must then be steered by the feet of the crew. To do this he should have on skates. If a

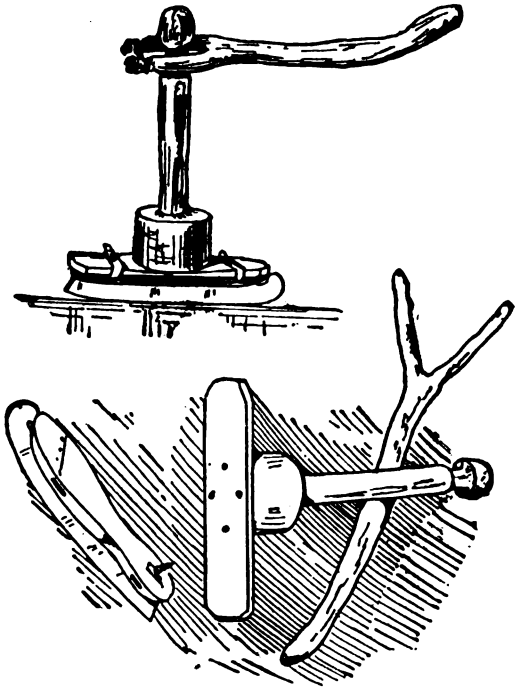
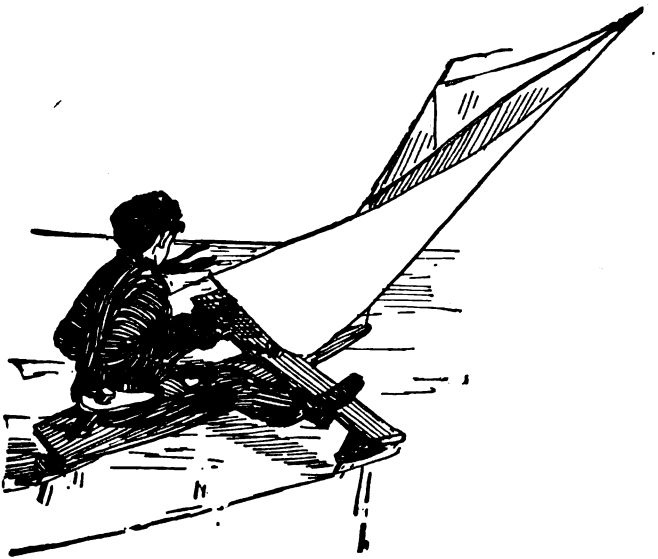


FIG. 190.—Steering Apparatus.

long handle be attached to the stern like the back to a sleigh-chair, the steersman with skates on can guide the boat with his feet by standing behind and holding on to the handle at the stern. With this rig, the boat can accommodate a passenger aboard, as the steersman does not occupy the boat itself but tends the sheets and steers while being towed behind. A

common sled may be fixed with holes in it so that a cross board can be attached by movable pegs, and with a mast stepped in the bow it will make tolerable speed and may be steered by a boy on skates.



A Tom Thumb and Crew.

CHAPTER XXXI.

THE WINGED SKATERS, AND HOW TO MAKE THE WINGS.

SKIMMING over the glassy surface of an ice-bound river or pond, propelled by the wintry blast blowing against artificial wings of cloth, is but a degree removed from flying. The friction of your skate runners upon the ice is so slight that it is not difficult to imagine that you have left the earth and are soaring in mid-air.

Every boy who has had any skating experience knows what hard work it is to skate against a stiff wind, and almost all who ever fastened skates to their feet must have enjoyed the luxury of sailing over the ice before the wind with a spread coat or open umbrella doing duty as a sail.

For some time back people in widely separated parts of the world have made more or less successful attempts at transforming themselves into animated ice-yachts, and in Canada, Norway, and other cold countries, men with sails rigged on their backs or shoulders have "tacked," "come about," and "luffed" themselves in a novel and highly entertaining style, but lately, for some reason or other, this sport has been allowed to almost die out, and we are now indebted to two or three writers for reintroducing skate-sailing to the public with original suggestions and improvements. Mr. Charles L. Norton, editor of *The American Canoeist*, was, I believe, the first to call the

attention of the public in general, and the boys particularly, to this delightful sport. In an article published in the *St. Nicholas Magazine*, entitled "Every Boy his Own Ice-Boat," Mr. Norton describes a new and original device, consisting of a double sail, which is so simple in construction, and yet so strong, light, and easy to manage, that it is sure to become a favorite rig with the boys, both large and small.

In another article entitled "White Wings," which appeared in *Harper's Weekly*, the same author describes a number of queer sails used by different people. Following in the footsteps of Mr. Norton, and adding to our information on this subject, comes T. F. Hammer with an interesting article published in the *Century Magazine*, in which this gentleman gives some personal experience as a winged skater and a detailed description of the Danish skate-sail.

Among the many reasons given by skate-sailors why this new and highly exhilarating pastime should come into general favor are these: skate-sailing can be practised and enjoyed on ice too rough for ordinary skating, and a light fall of snow that ruins the ice for the common skater improves it for the winged yachtsman.

Salt-water ice that is too soft for one to enjoy a skate upon affords a better foothold than smooth, hard, fresh-water ice, and is preferable on that account. Wherever you can skate there you may sail, and when the skating proper is ruined, it often happens that the qualities of the ice are improved for sailing. There is no record of a serious accident happening to any skate-sailor, although one may attain, literally, the speed of the wind, the higher the rate of speed the less danger there appears to be, for in falling a person will strike the ice at such an angle that he is merely sent sliding over the surface, and little or no damage is done.

Bat Wings.

After procuring a suitable piece of cloth, spread it out upon the floor and tack it there, then spread yourself out on the cloth with your arms extended at right angles to your body, and your feet spread apart. While in that position, have some one mark on the cloth the points where the crown of your head, your wrists, and ankles come. With a chalk or pencil connect these points by lines, and, allowing for the hem, cut the sail out according to the pattern made.

Turn the edges over and make a strong broad hem all around the sail, sew in straps or bands at the ankle, waist, wrists, and head. When the sail is to be used, adjust the head-band around the forehead, fasten the waist, wrist, and ankle straps, and the ship is rigged. By spreading the arms, the sail is set; when the arms are folded the sail is furled. It would become exceedingly tiresome to hold the arms outstretched from the sides for any length of time without support; to obviate this, a stick may be carried, which, when thrust behind the back, will make a support for the hands as they grasp it near the ends. The man-bat steers with his feet, using his legs and arms for sheet-lines. Skaters rigged up in this novel style present a most grotesque appearance as they flap their wings about in going through various evolutions.

The Norton Rig

is a double sail, and might be called a schooner rig. It is in many respects superior to the somewhat cumbersome single sails, the chief advantage being the fact that the crew can see in every direction, and thus avoid running foul of any other craft or skater. Another improvement is the double main spar which, without increasing the weight, affords a stronger support for the cross pieces, or fore and main masts. The main

spar may be made of spruce pine or bamboo. Cane fishing-poles are inexpensive, and can probably be readily obtained by most boys. Select two pieces, each about ten feet long, and bind the butt or large end of one to the small end of the other; lash the other ends firmly together in like manner, so that the two poles will lay side by side firmly bound at each end.

For the fore and main masts or cross yards, Mr. Norton recommends bamboo, five-eighths of an inch in diameter, but American cane will also answer for that purpose. Pick out two pieces five-eighths of an inch in diameter at the smallest ends,

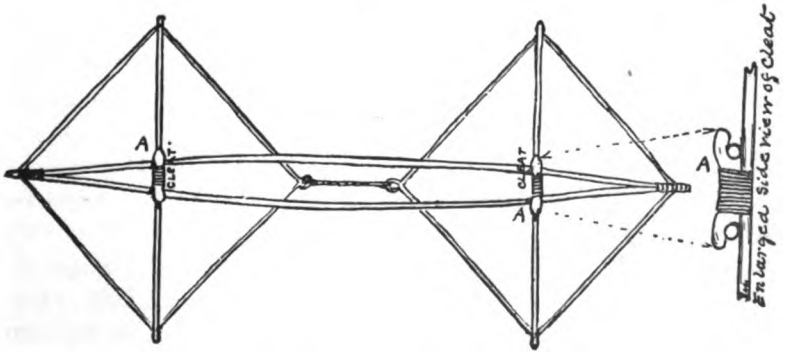


FIG. 191.—The Norton Rig.

and let each be four feet six inches long. Near the ends of the cross yards fasten metal buttons or knobs, and fasten similar knobs near the ends of the main spar. Make a small cleat for the middle of each cross spar (A, A, A, Fig. 191) and lash it firmly on.

Make the sails of the heaviest cotton sheeting, if it can be procured; if not, take ordinary sheeting and double it, or what cloth you can procure. Mark out the sails, making allowance for the hem, and let them measure four feet across the diagonal after the hem has been turned down; bind the sails with strong tape, and see that the corners particularly are made very strong.

Sew to the "clews" or corners small metal rings, or loops of strong cord, to fasten on the buttons at the ends of the spars.

Attach the sails to the cross spars by slipping the rings at the clews over the buttons at each end of the spars. Spring the main spar apart and slip the cleats of the cross spar between the two pieces, so that they fit as shown by Fig. 191. Fasten the outside clews to the buttons on the ends of the main spar and bind the two inside clews tightly together with a cord as shown in the diagram, and you are all ready to give the novel device a trial. Go to the nearest sheet of ice, put on your skates, and after seeing that they are securely fastened, take up the sails and let yourself go before the wind, steering with your feet. After practising awhile you can learn to tack, and go through all the manœuvres of a regular sail-boat.

A most beautiful "rig" is described by Mr. Norton, in which the main spar consists of four pieces of bamboo joined at the middle by brass fishing-rod ferrules. Brass tips are used for holding the small ends of the bamboo together at the ends of the main spar. This rig can be taken apart like a jointed fishing-rod, and, like it, put in a comparatively small case, occupying not much more space when the sails are rolled up than an old-fashioned cotton umbrella. Sails may be made of fancy striped cloth and brilliantly colored penants rigged to their corners; combine this with a suitable uniform, and the winged skater will present a most striking and dashing appearance as he goes flying over the ice.

The Norwegian Rig.

This is a very simple sail to make, as may be seen by referring to Fig. 192. The spars can be made of the same material as the ones described for the Norton rig. The Norwegian rig requires a crew of two, and in this particular differs from all the rest. The man at the bow grasps the main spar with one hand

just behind the fore cross yard, and with the other hand takes hold of the main spar behind him ; the helmsman must stand at

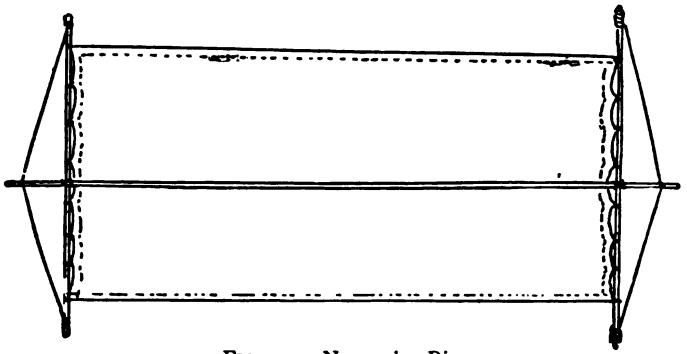


FIG. 192.—Norwegian Rig.

the stern or "aft" end of the sail, so that he can see to steer. The man in front must hold on and trust to Providence and the steersman. This is rather an awkward rig, but it has the advantage of carrying two instead of one, and is consequently in favor with people who like sociability.

The Danish Rig

consists of a mainmast and topmast. The latter can be let down when required. The diagram (Fig. 193) is made of dimensions suitable for a good-sized boy. The straps near the bottom of the topmast are for the purpose of binding the sail to the back of the crew, like a knapsack. The hand-sticks are only attached to the lower corners of the sails, the other ends are held by the crew, crossed

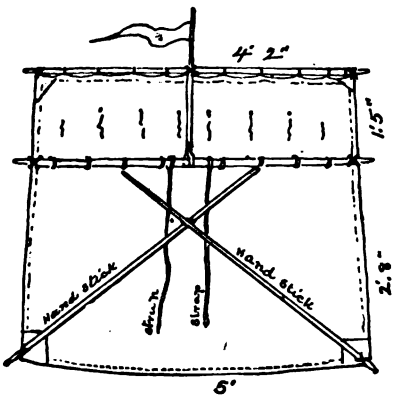


FIG. 193.—Danish Rig.

and used as sheet-lines are in an ordinary sail-boat. The spars may all be made of spruce, pine, cedar, bamboo, or Southern cane, and the sail of heavy cotton sheeting or strong cotton duck, of double thickness at the clews. In experimenting with this rig, it is best to choose a day when there is only a moderate wind, for the sail being bound to your body cannot be cast aside by simply letting go.

The mainsail and topsail are all of one piece of cloth. The topmast is fastened to the middle of the shoulder yard by a leather strap passing around the yard. The topmast is held in place by the wind blowing it against the head of the crew. By running a little into the wind the topsail will fall back and leave only the mainsail up, or if you loosen the cross knot at the upper part of the topmast you can roll the topsail down to the reefing points and lash it there. The steering is done with the feet of the crew. To learn to sail this or any other craft practice is needed. You might as well try to learn to swim from reading a book as to expect to become an expert sailor without going to sea.

FIG. 194.—English Rig.

The English Rig consists of a mast and two spars (Fig. 194); the bottom of the mast rests in straps fastened to one leg of the crew, who supports the sail by placing one arm around the mast, holding on to the top spar with the other hand. This makes quite a pretty craft, though,

like the Danish rig, the sail must be bound to the crew, which always appears objectionable from the fact that in case of accident there must be more danger of breaking the spars or tearing the sail than there is where the whole thing can be dropped in an instant. The English rig is on something of the same principle as

The Cape Vincent Rig,

which consists of a long spar and a sprit, the spar being in some cases twelve or fifteen feet in length; one seven feet long will make a sail large enough for a boy. The sprit is fastened at the bottom securely to the sail, and fits on to the main spar with a crotch, fork, or jaw. The sail being cut in the right shape

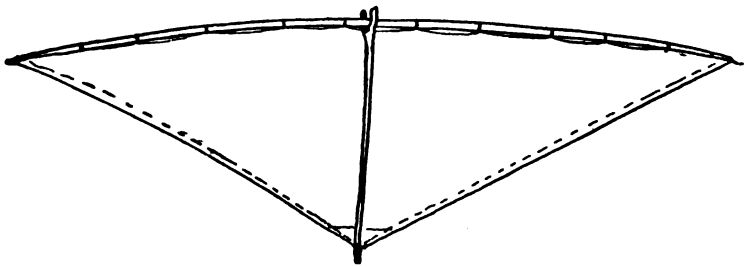


FIG. 195.—Cape Vincent Rig.

and proper proportions, and made fast to the long spar and to the end of the sprit, as soon as the latter is forced into place it will stretch the sail out flat, as in Fig. 195. A boy with one of these rigs on his shoulder makes a very rakish-looking craft. The spar is carried "as a soldier carries his rifle"—on the shoulder; the sprit, or small cross spar, is allowed to rest against the crew's back. According to one writer, who is supposed to have had experience, this rakish craft will not in the least belie its looks. In speaking of it he says: "I should say that on good, smooth ice, with a twenty-five or thirty-

mile wind, they went at the rate of eighty or *one hundred miles an hour.*" This sounds like an exaggeration, but when we remember that a good ice-yacht, well handled, can make a mile a minute or more, travelling much faster than the wind itself, the statement of the enthusiastic advocate of the Cape Vincent rig does not appear so improbable. In speaking of the speed attained by regular ice-yachts, Mr. Norton says:

"There is no apparent reason why a skate-sailor should not attain a like speed. Other things being equal, he has certain advantages over the ice-yacht. His steering gear is absolutely perfect, assuming, of course, that he is a thoroughly confident skater, and it is in intimate sympathy with the trim of his sail. This nice adjustment between rudder and sails is an important point. Again, there is no rigidity about the rig. Everything sways and gives under changing conditions of wind, and experience soon endows the skater with an instinct which teaches him to trim his sail so as to make every ounce of air-pressure tell to the best advantage."

A Country Rig.

The two forked sticks from which the framework of this sail is made must necessarily be nearly of the same dimensions. After their ends have been firmly lashed together, as shown by Fig. 196, a sail made of an old piece of carpet, awning, hay-cover, or any cloth that is strong enough or can be made strong enough by doubling, may be lashed on at the four prongs of the forks. This rig will convey a crew of

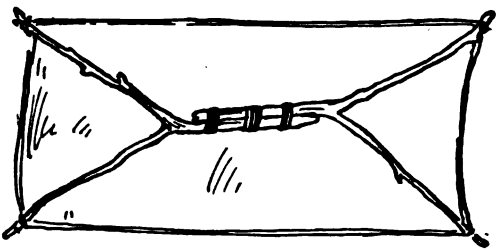


FIG. 196.—Country Rig.

two over the ice with as much speed as the more elaborate Norwegian sail (Fig. 192). The country sail may not be handsome, but it possesses the advantage of being easily constructed and costing little or nothing, except the work of cutting and trimming the spars and sail.

CHAPTER XXXII.

WINTER FISHING—SPEARING AND SNARING—FISHERMEN'S MOVABLE SHANTIES, ETC.

The pleasures of fishing are naturally and almost invariably connected in our minds with warm weather, particularly with Spring or the first coming of Summer, the bright freshness of bursting bud and new-opening wild blossom, and with those latter days in the Autumn over which the Summer King sheds his brightest glories. But in our northern and easterly States, when old Winter has spread his mantle of frost and snow over the face of Nature, and hermetically sealed all the lakes and ponds under covers of ice, as an agreeable addition to the fun of skating, hardy, red-cheeked boys cut round holes in the thick ice, and through them rig their lines for pickerel-fishing. A very simple but ingenious contrivance enables a single fisherman to attend to quite a number of lines if the holes be all made within sight of the fisherman,

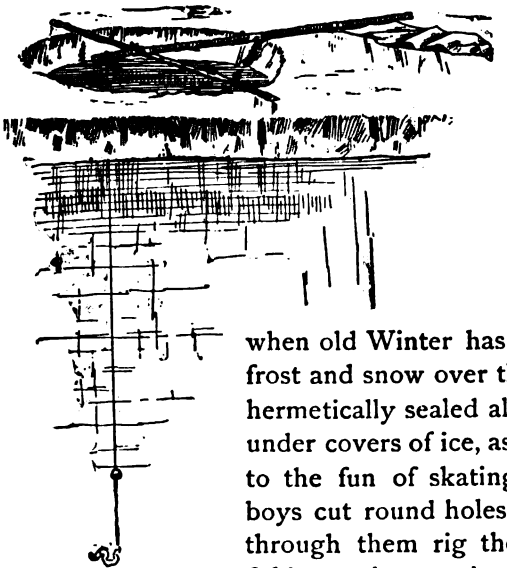


FIG. 197.—Flip-Up Set.

the fish itself will give the signal for the particular line that requires attention.

The construction of this automatic fishing-tackle is so simple that it may be made in a few moments by any one. The preceding illustration shows how it is arranged (Fig. 197). At the end of a light rod a foot or two in length is fastened a small signal flag; a piece of any bright-colored cloth answers the purpose. This rod is bound with strong string at right angles to a second stick, which is placed across the hole, lying some inches upon the ice at either side; the flag also rests on the ice, leaving a short piece of the flag-rod projecting over the cross stick; to this short end the line and hook are fastened. The hook is baited with a live minnow or other suitable bait and lowered through the hole. The tackle is then in readiness for the capture of a pickerel. When the fish is hooked his struggles keep the flag flying (Fig. 198).

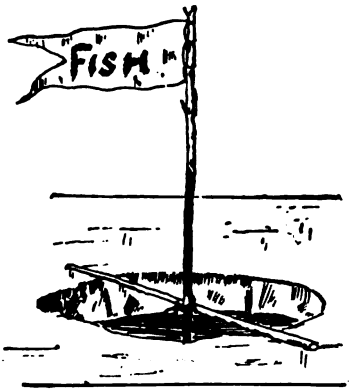


FIG. 198.—The Signal Flying.

Smelt Fishing and the Smelt Fisher's House.

From about December 20th until the middle or latter part of February the smelt fishing season is in its height along the coast of Maine. The fish are caught through holes in the ice. In the vicinity of Belfast clam worms are used for bait; the worms are found in the clam flats.

Notwithstanding the reputation for original inventions possessed by the inhabitants of the Eastern States, the "Down East" smelt fishermen of Maine have for years, while fishing through the ice, exposed themselves to the piercing winter winds,

apparently without once thinking of providing any other shelter than their heavy overcoats and perhaps a rude barricade of ice blocks and evergreen boughs. There is no telling how long this state of things might have continued, but during the winter of 1877–78* a single fisherman, more enterprising than his comrades, appeared upon the fishing grounds with a small canvas tent, inside of which he at once proceeded to make himself comfortable, and at the same time excite the envy of the unprotected, shivering fishermen scattered over the ice. The latter were not long in taking the hint, and the next season found the ice dotted all over with the little canvas houses of the fishermen. During the best of the season the smelt fishing grounds now have the appearance of Indian villages; the blue smoke curls up from the peaked roofed lodges and floats away on the frosty air, while the figures of men and boys passing to and fro on different errands might at a distance be easily mistaken for the aboriginal red Americans at their winter camp.

The framework of a smelt fisher's house consists of a light wooden frame about six feet square, with a sharp roof. After the frame is firmly fastened together it is put upon runners, furnished with a bench for the fisherman to sit upon, a stove to keep him warm, and a covering of light canvas to keep out the cold. The canvas is a better protection against sleet and frost if it has been covered with a coat of paint. Sometimes the houses are made large enough to accommodate more than one fisherman. Snugly ensconced beside a warm stove, with pipe in mouth, the old veterans spin their yarns, and, oblivious to the raging northwest winds, watch their lines, which are attached to a rack overhead and hang down, passing through a hole in the ice. The bait dangles about eight or ten feet under the water. When a fish bites, the motion of the line apprizes the fisherman of the fact, and he pulls it out, unhooks the fish and again drops

* According to the Belfast (Me.) Journal.

his line. In this manner one man will succeed in catching from ten to fifteen pounds in a day.

A gentleman who seems to be posted upon the subject of smelt fishing sends me the following device, which ought to have been included in the chapter on odd modes of fishing. My correspondent says: "During the fall months the smelt run in large schools up the creeks and streams emptying into the ocean, and are caught with seines or nets by professional fishermen for market. To be sure, no true sportsman could make use of such means for capturing game; still, as it is necessary to take these small fish in large numbers to make a respectable mess, some ingenious sportsman has evolved a fishing-tackle with which one can legitimately do wholesale fishing. To a line on an ordinary pole is attached an apparatus resembling an umbrella-frame without the handle; from the point of each bow hangs a line and hook (Fig. 199); in this way six or eight smelt may be taken in the time it would require to catch one with a single line."

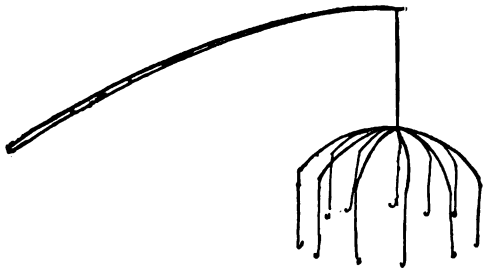


FIG. 199.—The Umbrella Smelt Tackle.

For boys who live inland where smelt fishing is out of the question, there are other fish whose gamy nature will impart more fun and excitement to their capture. Long rods would be out of place within the narrow limits of a little cloth-covered fishing box; but hand lines or short rod and reel may be used. When a short rod is used it is only for the purpose of facilitating the use of the reel, and the rod should not be over two and one-half feet long. Fish may also be snared or speared through holes in the ice by boys concealed in little

wooden shanties built for the purpose. This sport is much in vogue on some of the small lakes in the Northwest.

The Spearsman's Shanty.

The great drawback to spearing fish through holes in the ice, is the inability of the spearsman to see objects under water, and to keep the cold winds from chilling him through and through as he stands almost motionless watching for his game;

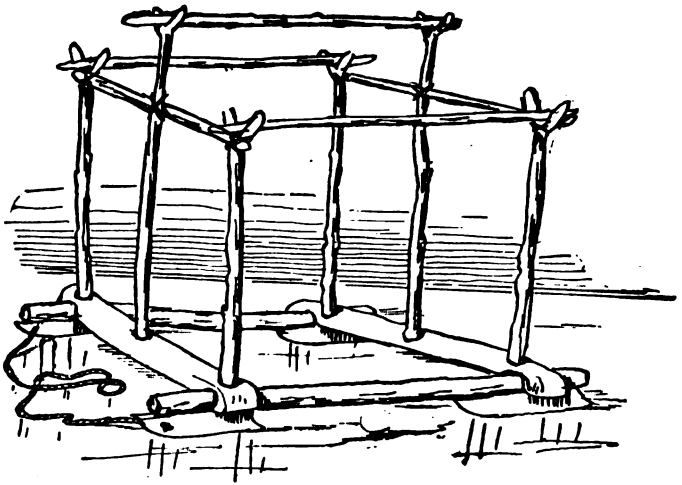


FIG. 200.—Framework for Spearman's Shanty.

but if the sportsman will supply himself with one of the little wooden shanties used by the fish spearers in the Northwest, he will overcome both these difficulties. The shanty, when the door is closed, is perfectly dark inside, having no other opening except a round hole, about a foot and a half in diameter, in the floor just over the hole in the ice. The only light seen by the fisherman is the bright, shining water, which glows like a full moon underneath him. As his eyes become accustomed to the peculiar condition of things, the nebulous objects first dis-

cernible in the luminous water resolve themselves into floating grasses and reeds; the bottom, even where the water is quite deep, becomes plainly visible, and every passing fish is distinctly seen by the spearsman, while he, being in total darkness, is invisible to the creatures below. This effect can be readily understood when one remembers that the ice, unless it be covered with snow, is transparent, and that the light shining through illuminates the water. It is as if you were standing outside of a house on a very dark night looking through a window into a brilliantly lighted room.

The fishermen's shanties are provided with small sheet-iron stoves, which require but very little fire to make the house warm enough for one to sit with his coat off. The stoves are provided with small pipes, which issue through the roof or side of the house. A bench, camp-stool, or chair complete the furniture.

Snaring Fish.

Catfish may be chummed for; that is, attracted by bait cut up and dropped through the hole in the ice. The bait will attract many other fish, which can be snared with a slip-noose made of fine copper or brass wire and attached to the end of a line. There is nothing alarming in the looks of this instrument, and a fish will not notice the snare until it finds the fatal noose tightly drawn about its body. It requires a little practice to snare fish successfully. I well remember my first attempt. A large "mud sucker" was discovered under an overhanging bank. Cautiously I crept to the edge of the stream, and with trembling, yet careful hand, I let the snare glide gently into the water. The fish did not move; by degrees I slipped the noose over the comical slippery head of the creature, and with a mighty jerk landed—not the fish, but my snare in the boughs of a tree that overhung the water. I was thunderstruck when I discovered that the fine wire of the snare had

cut the fish completely in halves, and as the muddy water, stirred up by the commotion beneath, rolled away down stream, I beheld one-half of the "mud sucker" with the puckering mouth still moving, and the other half with its tail flapping in the water beneath.

It requires experience to learn just how hard to pull on a snare to catch a fish and hold it without breaking the line or cutting the game.

Spearing Fish

is far more exciting and sportsmanlike than snaring them. The fish may be attracted by dead bait dropped through the hole in the ice, after the manner before described, or if it be pickerel you are after, a trolling spoon can be danced up and down, and round and round, until it attracts the attention of the fish. Some fishermen use a wooden minnow weighted at the bottom with lead and provided with fins and tail made of tin. Such a decoy, to be effective, should be decorated with a brilliant red stripe on each side, a white belly, and a bright green back. By means of a line fastened to the wooden fish it can be made to swim around under water in a most frisky and life-like manner, completely deceiving the unwary pickerel. The decoy must be kept out of reach when the fish dart at it, and at the same time the spear must be poised, ready to cast at the first opportunity. Often the unsuspicious pickerel will stop and remain for some moments motionless directly under the hole in the ice, apparently considering the best mode of capturing the lively and gaudy minnow that dances so temptingly near his hungry jaws. This is a golden opportunity for the young fisherman, and waiting only such time as it may require to take aim, the lance should be launched. A good fish spear is described on page 188 and illustrated by Fig. 121. As soon as a fish is speared it should be thrown upon

the ice outside the shanty and allowed to freeze. In this manner the meat is kept much sweeter and fresher than it is possible to preserve fish in warm weather, even for so short a time as it requires to carry the game home from the fishing grounds.

How to Build a Fishing House.

Fig. 200 shows the framework for a small fishing house; the posts and cross pieces are made of such sticks as can be found along the bank of any stream or lake. Fig. 201 shows

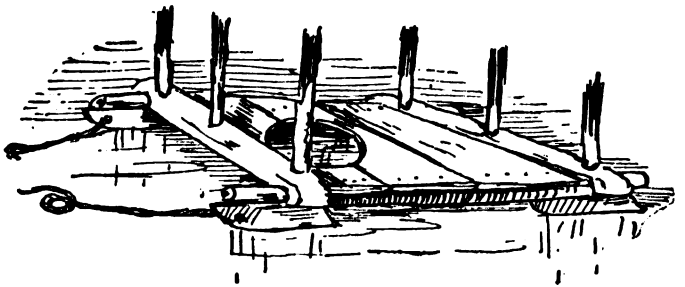


FIG. 201.—Floor and Runners of Spearsman's Shanty.

how the floor is made of planks, with a hole in the forward part to fish through. The whole frame may be covered with pieces of an old hay-cover, canvas, or what is better still, pieces of old oil-cloth, such as is used for dining-room or hall floors. If the framework be covered with any light cloth, the cloth should be tacked on and thickly coated with paint so as to admit no light. A frame like the one illustrated by Figs. 200 and 201 may be made, fitted up, and kept stored away until wanted for use. After hauling it out on the fishing grounds and cutting a hole through the ice, the frame can be covered with thick blankets, and without injuring the material the covering can be fastened by pins and strings over the framework and removed when the day's sport is finished. If, instead of rough forked sticks, regu-

lar square posts be used, the whole can be covered with quarter-inch pine lumber, thus making a light but serviceable shanty. If the light come in under the house, pack snow around it. If the snow cover the ice to such a thickness as to darken the water beneath, sweep a place clean around your shanty, and the light admitted through the clear ice will illuminate the water beneath your hut or tent. Fig. 202 shows another form of fisherman's hut, made upon the same principle as the cabin of the Crusoe raft (Figs. 70 and 71, pages 99 and 100). Select hickory or any other elastic saplings, taking care to have them all about the same size. After boring holes with an auger in the side bars of the floor frame, bend saplings over and force their ends into the holes as shown in the diagram. The floor can be laid in the same manner as illustrated by Fig. 201, and the whole frame covered with some opaque fabric, or cloth made opaque by a coating of paint. A very beautiful and light fishing house might be made with a bamboo frame that could be taken apart and packed away for the summer like a jointed fishing-rod.

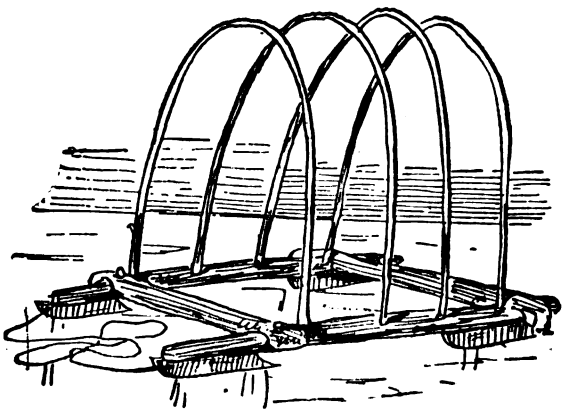


FIG. 202.—Crusoe Cabin Style.

CHAPTER XXXIII.

IN-DOOR AMUSEMENTS.

THERE will frequently occur gaps, in the long winter evenings, that are hard to fill up satisfactorily, hours when, tired of reading or study, a boy does not know what to do. Again, occasionally through the winter one's companions and friends are likely to drop in and spend an evening. The most accomplished host is at times at a loss to know how to entertain his company, after the old, worn, threadbare games have been repeated until they have become monotonous and tiresome.

To the filling of these gaps, and for the relief of the worried host, I propose to devote a limited space and chapter in explaining and suggesting some novelties in the way of in-door amusements.

Bric-à-brac, or the Tourist's Curiosities,

is a comparatively new game, which, in the hands of a smart boy or a fluent speaker, can be rendered entertaining, startling, or boisterously funny. The company, seated at a long table in a very dimly lighted room, must be particularly requested to keep their hands under the table, pay strict attention to the tourist, and maintain a solemn silence. The tourist, from the head of the table, commences his narrative something as follows:

"In the year 1867 I was travelling in Egypt, having been commissioned by a certain scientific association to procure for them as perfect a specimen of a mummy as I could find. I

made it my particular business to associate as much as possible with the native Arabs, whose ostensible business of guides and donkey masters is but a disguise, and, at the same time, a help to their real trade of grave robbers. Through my interpreter, I let it be known that I was willing to pay a good price for the mummy of some king or noble person—such mummies, being more carefully and skilfully embalmed, are in a much more perfect state of preservation. For some months I was fooled and fretted by these Arab swindlers and cheats, who would take me long distances to show some very common broken specimen. Finally, finding I would not be imposed upon, I received a call one night from a most villainous-looking native, who said for so much money he would introduce me to a certain Amed al Hamu, who could procure me what I wanted. To shorten a long story, I met Amed al Hamu, and after a week's dickering and bargaining made an appointment to meet him alone at his home—one could scarcely say house, for he lived in a sort of tomb cut out of the solid rock some twenty feet up a precipitous rock on the edge of the desert. At the appointed time he met me at the foot of the rock, and after cautiously looking to see if we were watched, led me to his cave. Passing through this, with light in hand we entered a narrow passage cut in the rock; through this we stooped and crawled for about a hundred yards; here the passage ended abruptly, as though unfinished. On one side, near the end, was a large crack or fissure, through which I squeezed myself after my guide, and stood upon the brink of a bottomless pit. From its hiding-place Amed al Hamu produced a rude specimen of rope-ladder, by the means of which we descended some ten feet into the pit; getting off on a ledge of rock I was ushered into a small cavern and found a really valuable mummy in an unusually fine mummy case, after showing which Amed offered to deliver it to me at some *fifty per cent. above* the price originally agreed

upon. We finally settled the bargain and started to return. As but one at a time could use the rope-ladder, I sent the Arab on first, thinking while he was ascending I might look around, for I felt certain that all those excavations were never made for a single mummy. In the hasty glance I took of the chamber nothing new could be seen, but remembering that the ladder was a very long one, when it came my turn I went down instead of up. Passing a ledge similar to the one just left, I continued down and discovered a narrow landing on the opposite side of the pit. By swinging the rope I reached it and got off. Stepping through a small doorway I stood in a large, spacious chamber; pieces of broken mummy cases and fragments of linen bandages strewed the floor; boxes filled with porcelain statuettes, precious vases of alabaster, jars of bronze and terra-cotta were piled against the walls. Standing upright and laid at length upon the floor were huge sarcophagi of painted wood. Mummy cases fashioned after the human form crowded the room. Evidently I was amidst the kings and rulers of Pharaonic Egypt. Examining one of the richest sarcophagi I discovered that it had been lately opened, and upon trial lifted the cover off easily; the mummy case inside was broken and half open. There was no doubt, from the fineness of the linen, that the occupant had been royal. It would be hard to say what my emotions were when I opened this mummy case; surprise and astonishment certainly predominated, for there, with bandages and wrappings half torn and cut off, was the most wonderfully preserved specimen ever seen or heard of. It was, or had been a thousand years ago, a princess of great beauty, and so perfectly was the form preserved that but for the color I should have said she slept!

"It was evident at a glance that the grave-robbing ghouls had here found a prize which they meant to keep a secret until they discovered the most advantageous way of disposing of it.

Upon closer examination I was shocked to discover that one hand of the beautiful mummy had been severed at the wrist, probably for the purpose of more easily obtaining the bracelet that had once encircled the arm. Pulling aside some of the bundled bandages, I discovered the little delicate, shapely hand. A terrific yell from the Arab above startled me so that I dropped the light, which was instantly extinguished, leaving me in total darkness. Thrusting the mummy hand into an inside pocket I groped my way out to the ledge, shouting help! murder! fire! at the top of my voice; in fact, so loud did I yell that the swarthy son of the desert ceased his shouting, and as he reached the ledge upon which I stood held his light aloft, and discovering me, with no light, standing upon the brink of the dark abyss, his villainous features relaxed into a smile, and, motioning me to proceed, he followed me up the ladder. After I had returned to my stopping-place and taken counsel with some friends, in spite of their advice I dispatched a messenger to Amed al Hamu, proposing to purchase some of the treasures that I knew were hidden in the but half-explored cave. The only answer I received was a message from the sheik, or chief of the village, stating that I had in some way 'incurred the ill will and animosity of the populace,' and had better therefore absent myself immediately, as he, the sheik, 'was powerless to protect.' It is hardly necessary for me to state that I acted upon this hint and left; I am free to acknowledge that I think more of my own body than any mummy that was ever embalmed. The beautifully shaped hand I still have as evidence of my adventure, and if you will kindly pass it to one another under the table each may feel its peculiar texture."

The tourist then takes from a basket at his side a kid glove, previously prepared by stuffing it with damp sand and allowing it to rest on ice for an hour or so. The guests should be repeatedly cautioned about dropping the specimen, otherwise the

peculiar cold, damp feeling of what seems to be the hand of a mummy will cause the nervous ones to throw it from them in a hurry. After this has made the circuit of the table, the tourist places it upon a waiter in front of him and proceeds to explain the capture of a very curious sea-urchin, which turns out to be a pincushion with the points of pins sticking out all over it. Next comes a piece of the Japanese weeping crystal from a cave in the centre of Simoda—simply a piece of ice; and so the game continues with as many queer specimens as the ingenuity of the tourist can invent. A glib talker can so excite the imagination of his hearers as to often make them believe for the time that the object they are handling under the table is genuine. When, after the game is over, the contents of the tourist's basket are exposed for the audience to examine by sight as well as touch, there is always a great laugh as each one recognizes some familiar object, which, with the help of a dark room and a vivid imagination, sent the chills down his back.

Mind-Reading.

This is more in the nature of a trick than a game, but as anything that creates surprise or approaches the wonderful always proves attractive and entertaining, I introduce this plan of reading the contents of a folded paper by laying it across the forehead. The mind-reader seats himself at a table at one end of the room; the audience must not approach nearer than five feet, and should be seated in a semicircle in front of him. Slips of paper, all the same size and shape, are then distributed among the audience, with the request that each one write thereon a short sentence, plainly and in English. While they are busy writing, the mind-reader, or medium, is preparing for the trial by first making sundry passes across his forehead, rubbing each arm slowly from shoulder to wrist, and then sitting calm and silent, staring at the wall. Each person folds his

piece of paper carefully, and they are all collected by some one, who, standing alongside the medium, presses the first paper folded on the medium's forehead, who with closed eyes immediately reads the contents out loud, and then verifies it by taking, opening, and re-reading it with his eyes open, and requests the writer to acknowledge it, after which the second paper is treated in a similar manner, thus continuing until every paper has been read and acknowledged. All this appears very wonderful and inexplicable to the uninitiated, but perfectly simple when explained. The party who collects the papers is the medium's confederate, and should be selected from among the guests some time before the game is proposed, and in another room be thoroughly drilled so as to make no mistakes. The confederate's part is very easy. It is simply to let the medium know what is to be written on his piece of paper, and be careful to leave that particular message for the last one to be read. On these two points depend the success of the experiment, for it makes no difference what the first message is. The medium reads out whatever the confederate was to write, and while pretending to verify it by re-reading with his eyes open, he really is fixing in his memory the lines in the first paper, which he reads out as the contents of the second message. The second is read as the third, and so on through them all. The confederate's message, which was read out as coming first, being the last, brings them out even.

A Literary Sketch Club

is a new idea, which has been tried and has proved very successful, the original club having prospered through three winters, and still boasts of some thirty enthusiastic members. The idea of the club is that each member illustrate the same subject (previously selected) in any way he thinks fit—the artists, if there be any present, by a drawing or painting on the subject;

a member who sings may select, adapt, or originate a song that will express his idea of the subject. Instrumental music may be made to tell the story; short sketches, in prose or poetry, original essays, or selections carefully made from good authors; in fact, there is scarcely any one who cannot illustrate the subject in some way that will add to the entertainment of the evening. I annex the Constitution of the original club, which I know from practical experience works well:

CONSTITUTION.

I. NAME.

The name of this society shall be the —— LITERARY SKETCH CLUB.

II. OFFICERS.

The officers of this club shall consist of a president, a secretary, an editor, and an associate editor.

The duties of president and secretary shall be such as usually pertain to such offices.

The editor shall have entire control of a paper to be issued by the club.

The duties of the associate editor shall be to assist the editor in the work of publishing the paper, and to take control of the paper in case of the illness or absence of the editor.

The election of officers shall take place at the first meeting held each season, their term of office to expire upon the next election day.

III. MEETINGS.

The regular meetings of the —— Literary Sketch Club shall be held once in every two weeks.

IV. Subjects for Illustration.

The subject to be illustrated must be selected by the member who is to next entertain the club, and announced by him at the meeting preceding the one to be held at his house.

V. Sketches.

A sketch illustrating the subject selected will be expected from each member present.

The said sketches may be essays, poems, songs, music, pictures, or any other method of illustration that may suggest itself. Original sketches are not absolutely required.

Contributions for the club paper must be sent to the editor; they may be anonymous.

VI. Election of New Members.

Candidates for membership may be proposed at any meeting and the election proceeded with, two black balls excluding the candidate from membership.

VII. Absence.

Absence from three consecutive regular meetings, without an acceptable excuse, will be considered equivalent to a resignation, and the absentee's name may be acted on accordingly.

VIII. Order of Business.

1. Roll call.
2. Reading of the minutes of the previous meeting.
3. Presentation of sketches.
4. Reading of the club paper.
5. Reports of committees.
6. Miscellaneous business.
7. Proposals and election of members.
8. Adjournment.

IX. Amendments to Constitution.

This Constitution can be amended only at a regular meeting by a two-thirds vote, due notice of intended amendment having been given at the previous regular meeting.

Printing Presses.

Little printing presses may be had at such reasonable prices that some member might have one; in that case the club paper, printed in due form, would prove a souvenir which would be prized and carefully kept by each member, especially should it contain an article by himself. In the original club the paper was carefully and neatly written in a blank-book, and in some instances illustrated by an artistic member.

CHAPTER XXXIV.

THE BOY'S OWN PHUNNYGRAPH,

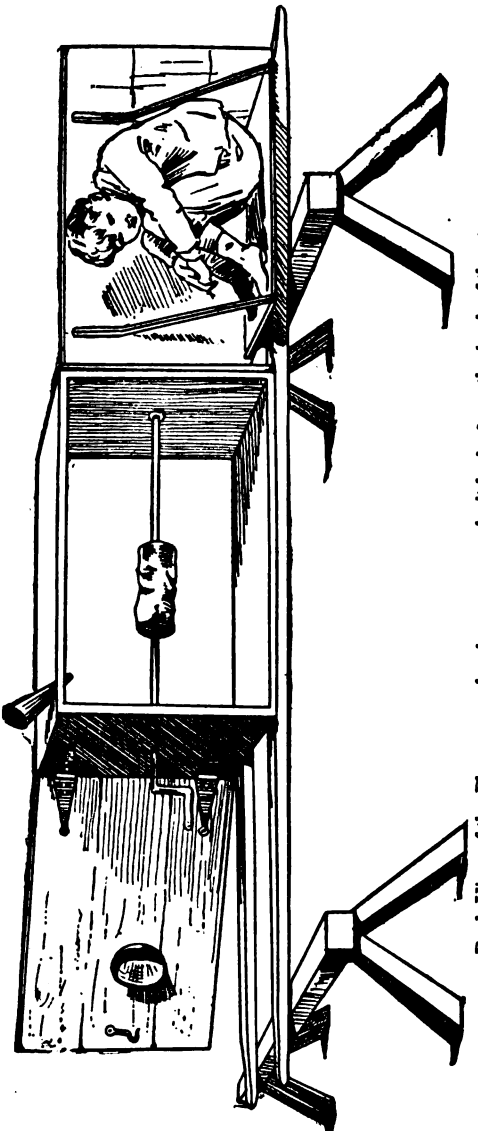
TO BE EXHIBITED

By Prof. Edd and Son.

IN winter-time, when a great part of a boy's fun must be found in-doors, it is a good thing to know how to get up amateur exhibitions of various kinds. In this way boys can have a good time while preparing the shows, and may also afford a great deal of pleasure to their companions and friends who make up the audiences.

One of the most entertaining parlor exhibitions which can be given at a moderate expense by a party of bright boys, accustomed to the use of carpenters' tools, is "The Boy's Own Phunnygraph," invented by the author, who once exhibited one at an amateur performance before an audience of five hundred people.

The first thing necessary in the construction of this very peculiar machine is a dry-goods box, large enough for a boy to sit inside of it without discomfort. The top must be firmly nailed on and the two sides taken off, thus leaving nothing but the top, bottom, and two ends of the box. The sides, each of which probably consists of two or three pieces of board, are to serve as doors, and therefore must be firmly fastened together by means of cleats or narrow strips of board nailed across them. One side of the box, which we shall call side A, must be



Back View of the Phunnygraph—doors open. As it looks from the back of the stage.

very strong, and will probably require three cleats. The other side, B, which is in front when the apparatus is in use, must now be fastened to the box by a pair of hinges strong enough to sustain its weight. There should be a hook on it, to keep it shut when necessary.

A shelf wide enough for a small-sized boy to sit upon must be attached to side A, and should be supported by iron braces. Strong leather straps will do if a blacksmith is not handy, but they must be very firmly fastened to the shelf and to the back door of the box, as we shall now call side A. As a small boy with a strong voice is to sit on this shelf, it would ruin the exhibition if the shelf were to break down, not to speak of the damage which might be done to the boy. Hence this back door must be fastened to the box by heavy gate or barn-door hinges.

Two strong wooden bars or handles must now be secured to the bottom of the box, and should project far enough at the ends of the box to allow a boy to stand between them, at each end, when the box is to be lifted or carried.

The rest of the necessary work is very easy. A crank, or turning handle (which will turn nothing), is to be fastened to one end of the box; and two holes—about two inches in diameter—are to be made, one in the front door and one in the top of the box. In each of these a tin or pasteboard horn is to be fastened—the one on top to be smaller than the other.

Then on the inside of the box a round stick—a broom-stick will answer—is to be placed on two notched blocks fastened to the ends of the box, so that it can be easily taken out of its place by the small boy, and put back again, when occasion requires. A tomato-can may be stuck on the broom-handle, so that it will look like a tin cylinder containing something or other of importance. This round stick, with its cylinder, is only for show, but it should not be omitted.

Nothing more is now necessary but a pair of wooden trestles, or horses, such as carpenters use, on which the box is to stand during the exhibition.

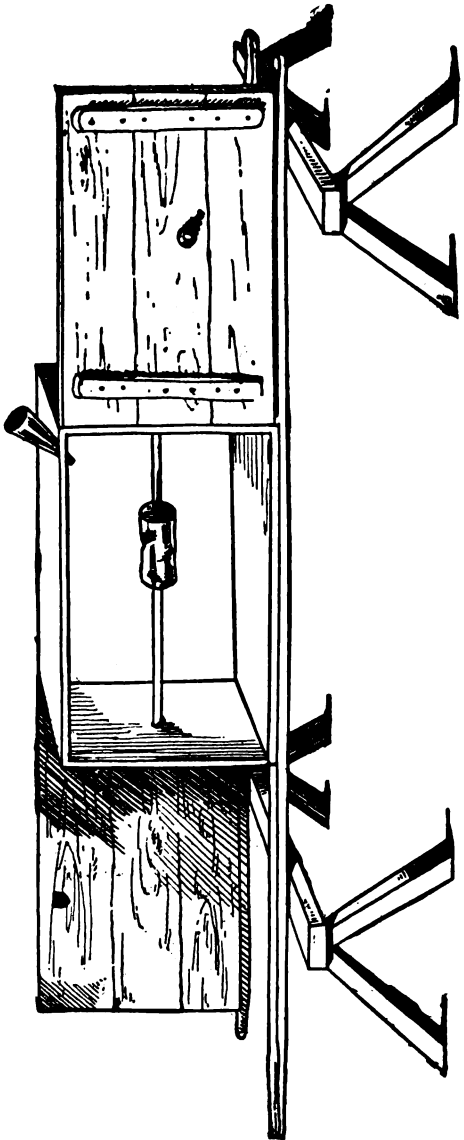
Having explained how to make this novel phonograph, I have only to tell you how it is to be used. It is evident, from what I have said, that there is to be a small boy in that box, and the fact is that he is the most important part of the whole machine; for this is only a piece of fun, intended to excite curiosity and amusement in the audience, who may, perhaps, imagine that there is a small boy somewhere about the apparatus, but who cannot see where he is.

The phunnygraph, which should stand in a room opening into that in which the audience is to assemble, or it may be behind a curtain, must be arranged in working order some minutes before the time fixed for the exhibition to commence.

The way to arrange it is as follows: The back door of the box must be opened and the small boy seated on the shelf. The door is closed, the boy going into the box as it shuts. The front door is also shut. If the broom-handle and tomato-can are in the boy's way, he can take them down and put them on one side.

The Professor—who is to exhibit the workings of the machine, and who should be a boy able to speak fluently and freely before an audience—must now come out and announce that the exhibition is about to begin. He should see that the wooden horses are so placed that the box will rest properly upon them, and should make all the little preparations which may be necessary. Then, after a few words of introduction, he may call for his phunnygraph, and the box will be borne in by two boys.

After the bearers have walked around the stage, so that both sides of the box may be seen by the audience, it must be



Front View of the Phunnygraph—door open. As it looks to the audience.

placed on its trestles, or stands, with the front door toward the company.

The Professor will then call attention to the fact that the persons present have seen each side of the box, and can see under and all around it, thus assuring themselves that it has no connection with anything outside of it, except the stands on which it rests. He will then proceed to open it, taking care to open the back door first. The small boy swings back with the door, which conceals him from the audience as it stands open. As soon as the Professor announces that he is about to open the box, the small boy must put the broom-stick in its place if he has taken it down. Then the Professor throws open the front door and shows that there is nothing in the box but the rod and cylinder, which seem to be attached to the crank. What machinery may be concealed in that little tin cylinder, he does not feel called upon to say.

After a few minutes for a general observation of the inside of the box, he closes it, being very careful to shut the front door first. Then the small boy takes down the broom-stick, puts it out of his way, and proceeds to make himself comfortable and ready for business.

The Professor now begins to exhibit the phunnygraph by speaking into the horn at the top of the box. He generally commences with a short sentence, pronouncing each word loudly and clearly, so that every one can hear it. He gives the crank a few turns and calls upon the audience to be very quiet and listen, and then, in a very few moments, the same words that he used are repeated from the horn in the front of the box, the small boy within imitating, as nearly as possible, the voice and tone of the Professor.

The exhibition may go on as long as the audience continues to be interested and amused. All sorts of things may be spoken into the box, which, after a few turns of the crank, will be re-

peated from the mouth-piece or horn in the front door. Various sounds may be reproduced by means of this machine, and an ingenious Professor and a smart small boy can make a deal of fun.

A startling final effect may be produced if, after the Professor has crowed into the upper horn, the boy inside can manage, unperceived—say by means of a small sliding-panel—to throw out a live, strong-voiced rooster.

But it must not be supposed that an exhibition of this kind will be successful without a good deal of careful preparation and several rehearsals. Every one should be perfectly familiar with his duty before a performance in front of an audience is attempted. The box-doors should work perfectly, the small boy should be able to sit on his shelf in such a way that his head will never stick up when the back door is open, and he should practice putting up the broom-stick when the Professor announces that the box is to be opened. By the way, if the box is opened several times during the performance to oil the rod, or to do some little thing to the cylinder, it will help to excite the curiosity of some of the audience; but the Professor must not forget that the front door must never be open when the back door is shut. The boys who carry the box should also carefully practice their business, so as to set the box down properly on its supports, and to see that it is firmly placed. It may be necessary for one or both of them to sit on the front handles when the back door, with the boy on it, is swung back, so as to balance his weight and prevent an upset. But experiment will show whether this is necessary or not.

As to the business of the Professor and the small boy, that, of course, must be carefully studied. It will not do to rely on inspiration for the funny things which must be said by the Professor, and imitated by the boy in the box. The Professor may bark like a dog, crow like a cock, or make any curious

sound he pleases, provided he knows, from practise at rehearsal, that the small boy can imitate him.

The cost of the box, hinges, braces, etc., will probably be between two and three dollars. If the box is painted, or covered with cheap muslin, it will look much more mysterious and scientific.

CHAPTER XXXV.

HOW TO MAKE PUPPETS AND A PUPPET-SHOW.

THE puppet-show is certainly an old institution; and, for aught I know, the shadow-pantomime may be equally ancient. But the puppet-show here described originated, so far as I am aware, within our family circle, having gradually evolved itself from a simple sheet of paper hung on the back of a chair, with a light placed on the seat of the chair behind the paper.

The puppets (not the most graceful and artistic) originally were impaled upon broom-straws, and by this means their shadows were made to jump and dance around in the most lively manner, to the intense delight of a juvenile audience. As these juveniles advanced in years and knowledge, they developed a certain facility with pencil and scissors; the rudimentary paper animals and fairies gradually assumed more possible forms; the chair-back was replaced by a wooden soap or candle-box with the bottom knocked out; and the sheet of paper gave way to a piece of white muslin. Thus, step by step, grew up the puppet-show, from which so much pleasure and amusement have been derived by the writer and his young friends that he now considers it not only a pleasure, but his duty, to tell his readers how to make one like it for themselves.

The construction of properties and actors, and the manipulation of the puppets at an exhibition, are by no means the least of the fun. To start the readers fairly in their career of stage-managers, this chapter tells how to build the theatre,

make the actors, and the next chapter gives an original adaptation of an old story, prepared especially for a puppet-show.

How to Make the Stage.

Among the rubbish of the lumber-room, or attic, you can hardly fail to find an old frame of some kind—one formerly used for a picture or old-fashioned mirror would be just the thing. Should your attic contain no frames, very little skill with carpenters' tools is required to manufacture a strong wooden stretcher. It need not be ornamental, but should be neat and tidy in appearance, and about two feet long by eighteen inches high.

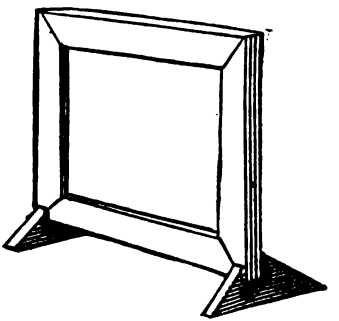


FIG. 203.—Wooden Frame for Puppet-Show.

On the back of this tack a piece of white muslin, being careful to have it stretched perfectly tight, like a drum-head. The cloth should have no seams nor holes in it to mar the plain surface.

A simple way to support the frame in an upright position is to make a pair of "shoes," of triangular pieces of wood. In the top of each shoe a rectangular notch should be cut, deep enough to hold the frame firmly. Fig. 203 shows a wooden frame, and the manner in which the shoes should be made.

The Scenery

can be cut out of card-board. Very natural-looking trees may be made of sticks with bunches of pressed moss pasted upon the ends. Pressed maiden-hair fern makes splendid tropical foliage, and tissue or any other thin paper may be used for still water. Thin paper allows the light to pass partially

through, and the shadow that the spectator sees is lighter than the silhouette scenery around, and hence has a sort of translucent, watery look. Scenery of all kinds should be placed flat against the cloth when in use.

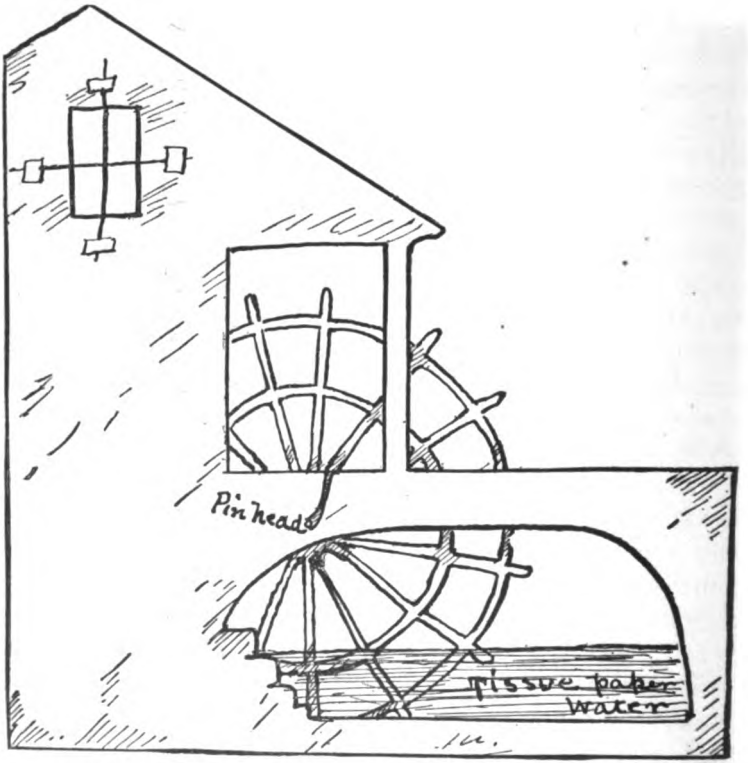


FIG. 204.—Diagram of the Old Mill.

And now that you have a general idea how the show is worked, I will confine my remarks for the present to the play in hand. It is a version of the old story of "Puss-in-Boots," and there will be given here patterns for all the puppets neces-

sary, although in the court scene you can introduce as many more as you like.

The first scene is

The Old Mill.

This scene should be made of such a length that, with the bridge, it will just fit in the frame. Take the measurement of the inside of the frame. Then take a stiff piece of card-board of the requisite length, and with a pencil carefully copy the illustration (Fig. 204), omitting the wheel. Lay the card-board flat upon a pine board or old kitchen table, and with a sharp knife (the file-blade is the best) follow the lines you have drawn. Cut out the spaces where the water is marked, and paste tissue-paper in their place. Take another piece of card-board and cut out a wheel; in the centre of this cut a small square hole, through which push the end of a stick, as in Fig. 205. Drive a pin into the end of the stick, allowing it to protrude far enough to fit easily into a slot cut for that purpose in the bridge where it comes under the mill (see Fig. 204). The wheel can then be made to turn at pleasure by twirling between the fingers the stick to which the wheel is attached.

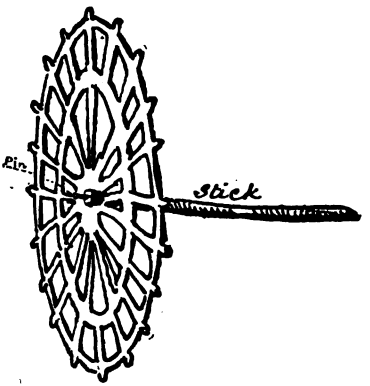


Fig. 205.—The Mill Wheel with handle attached.

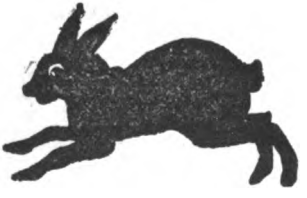
Puss.

To make puss, take a piece of tracing-paper and carefully trace with a soft pencil the outlines of the cat, from the illustration here given. Tack the four corners of the tracing re-

versed (that is, with the tracing under) on a piece of card-board. Any business card will answer for this purpose. Now, by going over the lines (which will show through the tracing-paper) with a hard pencil, you will find it will leave a sufficiently strong impression on the card to guide you in cutting out the puppet.

Puss as he first appears.

The Bag and Puss-in-Boots.



Live Rabbit.

Dead Rabbit.

Almost all puppets can be made in the same way. Puss as he first appears, the rabbit, rat, and bag, should be impaled upon the end of a broom-straw; but the remaining puppets should each have a stick or straw attached to one leg, or some other suitable place, just as the stick is pasted to the donkey's leg as represented in Fig. 206.

CORSANDO AND THE DONKEY

are made of two separate pieces, as indicated in Fig. 206. The dotted line shows the continuation of the outline of the forward piece. Cut out the two pieces in accordance with the diagram, and then place the tail-piece over the head-piece, and at the point marked "knot," make a pin-hole through both pieces of the puppet. Tie one end of a piece of heavy thread into a good hard knot; put the other end of the thread through the holes just made, draw the knotted end close up against the puppet, and then tie another knot upon the opposite side, snug against the cardboard; cut off the remaining end of the thread. Having done this, tie a piece of fine thread to the point near the knee of Corsando, and fasten a stick to the foreleg of the donkey, as shown in Fig. 206. Paste a straw in one of Corsando's hands for a whip, and two pieces of string in the other hand for a halter or

FIG. 206.—Corsando on his Donkey.

bridle. By holding in one hand the stick attached to the leg of the donkey, and gently pulling the thread, marked "string" in the diagram, the donkey can be made to kick up in a most natural and mirth-provoking manner.

THE ROYAL COACH.

When you make the king and princess in their coach, by

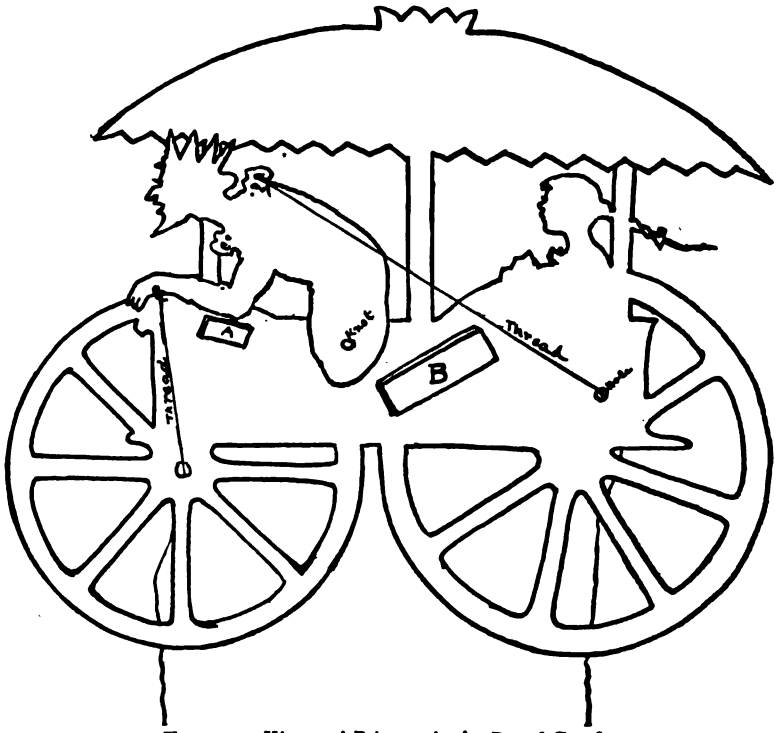


FIG. 207.—King and Princess in the Royal Coach.

cutting out the king separately and fastening the lower end of his body to the coach in the manner described for joining the

two parts of the donkey, the king can in this manner be made to sit upright, or to fall forward and look out in the attitude shown by Fig. 207, which explains the construction perfectly, A and B being two small blocks pasted on to the card-board

FIG. 208.—Leader, or First Horse, of Royal Coach.

for the king's arm or body to rest on. Fig. 208 shows the first horse of the royal coach ; the second horse is a duplicate of the first, minus the rider. Fasten the horses and coach together by pasting a long flat stick extending across from horse to horse, and to the coach, where the traces would be.

CARABAS.

Fig. 209 shows Carabas in a *bathing suit.*
Fig. 210 shows the same gentleman in court dress.

FIG. 209.—Carabas in *Bathing Suit.*

FIG. 210.—Carabas in Court Dress.

How to Work the Puppets.

To make puss carry the bag, the operator will have to use both hands, holding in one hand the stick attached to puss, and in the other the straw attached to the bag. Then, by keeping the bag close against pussy's paws, it will appear to the audience as if he were holding the bag. In the same manner he is made to carry the dead rabbit to the king. When the rabbit seems to hop into the bag, he in reality hops behind it, and then drops below the stage.

The operator must remember never to allow his hands

to pass between the light and the cloth, as the shadow of an immense hand upon the cloth would ruin the whole effect. All the puppets for each scene should be carefully selected before the curtain rises, and so placed that the operator can at once lay his hand upon the one wanted. There must be no talking behind the scenes, and the puppets should be kept moving in as life-like a manner as possible while their speeches are being read for them. Several rehearsals are necessary to make the show pass off successfully.

Stage Effects.

One would naturally suppose that with only a candle and a cloth screen for a stage, and some puppets cut out of card or pasteboard for actors, that the stage effects would be very limited, and consequently the plays stiff and uninteresting; this is, however, not true; any of the familiar old fairy tales may, with a little alteration, be arranged for a puppet-show and put upon the stage in such a manner as to amuse and interest an audience of young and old people. Jointed puppets, by the aid of movable lights, sticks, and strings, may be made to go through the most surprising contortions and manœuvres.

Boys that have a talent for drawing will find an unlimited amount of amusement in drawing and cutting out the puppets; but for those boys who have neither a talent nor a taste for the use of the pencil, original puppets are necessarily out of the question. All the characters of any play can be made by selecting appropriate figures of animals and men from illustrated books and papers, and enlarging or reducing them after the manner described in Chapter XXVI., page 250. In this manner the puppets given in this chapter may be enlarged to almost any required proportions.

At a Sunday-school entertainment, given in Brooklyn last winter, the following play of "Puss-in-Boots" was produced by

pasteboard actors a foot high, to the great delight of a large and enthusiastic audience of mixed young and old folks.

How to Make a Magical Dance.

Have one or two jointed figures appear and commence to dance, and while they are capering around, let another light be brought in; immediately there will be two figures for every one that first appeared upon the scene. Each light casts a shadow, and the shadows are all that is visible to the audience, so to them the puppets appear to fall into doubles in the most unaccountable manner. If the puppets are kept stationary, and the two lights moved backward and forward, the puppets will appear to move around, pass and repass each other; thus, with two or three lights moving behind the screen, two or three puppets can be transformed into a crowd that will be in constant motion.

How to Make a Sea Scene.

Cut two duplicate pieces of pasteboard in the form of waves (see Fig. 211). Let each piece be a little longer than the

FIG. 211.—Pasteboard Waves.

frame of the puppet-show stage. When the light throws the shadow of one of these pieces of pasteboard upon the muslin screen, it looks like a simple row of scallops; but when the two pieces are moved backward and forward, it gives motion to the shadows, and they have the appearance of rolling waves; a pasteboard ship rocking upon the waves will add to the effect. A lighthouse can be cut out of pasteboard and placed upon a pasteboard rock at one side; thunder may be imitated by roll-

ing croquet balls over the top of a wooden table, and lightning represented by small flashes of gunpowder.

If the puppet ship be held at first some distance from the screen the shadow will be large, and if the puppet slowly approach the screen it will decrease in size and have the appearance of gradually sailing away. In this manner the hero and heroine may be made to escape aboard a vessel from the irate and stern parents. Many other scenes can be produced with very simple means that will suggest themselves to the young showmen after a few experiments with the puppet-show. Colored lights used very sparingly often come in with telling effect. A phantom ship can be made to follow the real one by having another light some distance off; one light will cast a heavy shadow and the other a faint one, which will move as the light moves; move the light up and down, and the ship and waves follow and keep time with the light. Many other effects I used to produce in my puppet-shows that at present escape my memory, but no doubt the reader will think of them himself if he becomes interested enough to make a puppet-show for the entertainment of himself and friends, Christmas or New Year's eve; in which case Old St. Nicholas, with his sleigh drawn by deer and loaded with toys, must form part of the show.

Miller.

Carabas (not yet a Marquis).

CHAPTER XXXVI.

PUSS-IN-BOOTS.

Dramatized and Adapted for a Puppet-Show.

PUSS-IN-BOOTS.

PUPPETS: CARABAS, afterward the MARQUIS; his oldest brother, the MILLER; CORSANDO, his next older brother; PUSS-IN-BOOTS; WOLFGANG, the Ogre; KING; PRINCESS; KING'S SERVANTS; DONKEY; RABBIT; BAG; RAT. Also, if desired, COURTIERS.

Act I. Scene 1.

SCENE: Landscape with tree, bridge, and mill at one side. CORSANDO discovered riding the DONKEY backward and forward over the bridge. MILLER and CARABAS emerge from the mill and stop under tree.

MILLER: Come, come, brother Carabas, don't be downcast!
You know, as the youngest, you must be the last.

Our father, of course, left to me the old mill,
And the ass to Corsando, for so reads the will;
And he had nothing else but our big pussy-cat,
Which is all he could give you. A fool can see that!
Yet Dick Whittington once the Lord Mayor became,
And his start and yours are precisely the same.
But see! I am wasting my time from the mill,
For while I am talking the wheels are all still.
I have nothing to give you—be that understood.
So farewell, my brother! May your fortune be good.

[Exit MILLER into mill, when wheel begins to turn. CORSANDO approaches, and stopping the DONKEY in front of CARABAS, addresses him.]

CORSANDO: Now, dear brother Carabas, take my advice:
Go hire out your cat to catch other men's mice.

[CORSANDO turns to leave; PUSS comes out and gives the DONKEY a scratch, causing him to kick wildly as he goes off.]

CARABAS: O Fortune, befriend me! what now shall I do?
Come, Pussy, stay by me—I depend upon you.
You are all that I have, but can do me no good,
Unless I should kill you and cook you for food.

PUSS: Meow! Meow! Kill me not, my good master, I pray—
Have mercy upon me! Now list what I say:
I'm no common cat,
I assure you of that!
In the top of the mill, where the solemn owl hoots,
You will find, if you look, an old pair of top-boots.
Bring them to me,
With the bag you will see
Under the mill, by the roots of yon tree.

CARABAS: Well, Puss, what you ask for I will not refuse,
Since I have all to gain and have nothing to lose.

[Exit into the mill.

[PUSS stands a moment as if to think, then capers up and down the stage and speaks.]

PUSS: A rat? Bah! what's that?
Sir Whittington's cat
Would have grown very fat
Had she lived upon such prey
All the time, day after day,
Till she made a Lord Mayor of her master!
But mine shall gain a name
Through much sweeter game,
And not only climb higher but faster!

[Exit.

[Shift the scene by removing the light and, while the stage is dark, removing the mill and in its place setting up some trees.]

Act I. Scene II.

SCENE: Woods. Enter PUSS-IN-BOOTS, carrying BAG.

PUSS: Mey-o-w! m-e-y-o-w!
Were it not for these boots I should sure have pegged out;
But if I'm not mistaken, there's game hereabout,
For I scent in the air
A squirrel or hare.
I wonder now whether he's lean, lank, or stout?
But I know a habit
Of the shy little rabbit:
He'll enter this bag, and then, my! won't I grab it?

[Arranges BAG and hides; RABBIT comes out, and after running away several times, enters the BAG, when PUSS pounces upon it.]

PUSS: To the King in a moment I'll take you, my dear,
For he's e'en over-fond of fat rabbits, I hear.
An' I once gain his ear
I see my way clear;
For I'll tell him a story both wondrous and queer.
And then my poor master'll have nothing to fear—
If he acts as I bid him, good fortune is near!

[Curtain.]

Act II. Scene I.

SCENE: King's Palace. KING discovered standing behind a throne. PRINCESS and attendants standing around. A loud "meow!" heard without. KING and COURT start. Enter PUSS, with RABBIT in his paws.

PUSS: Meow! My great liege, may your Majesty please
To smile on a slave who thus here, on his knees,
A humble offering
From Carabas doth bring.
And, Sire, my master further bade me say,
If it please his gracious King, he will gladly send each day
The choicest game that in his coverts he can find;
And your kind acceptance of it still closelier will bind
A hand and a heart as loyal and true
As e'er swore allegiance, O King, unto you!

KING: Your master has a happy way
Of sending gifts. Thus to him say,
That we accept his offer kind,
And some good day, perhaps, may find
A way to thank him which will prove
We value most our subjects' love.
Carabas, is your master's name?
What rank or title doth he claim?
Shall we among the high or low
Look for your lord, who loves us so?

PUSS: A marquis is my master, Sire;
In wealth and honor none are higher.

The King: "Your master has a happy way of sending gifts."

[Aside.

(Cats must have a conscience callous
Who work their way into a palace!)
Now, if it please your Majesty,
I will return, and eagerly
To my marquis-master bring
This kind message from his King.

[Exit, bowing. Curtain.]

Act II. Scene II.

SCENE: High-road; one or two trees. CARABAS and PUSS-IN-BOOTS discovered.

PUSS: Meow! my good master, have patience, I pray.

CARABAS: Patience to doctors! I'm hungry, I say!

PUSS: All will go well if you mind me to-day,
And while the sun shines we must surely make hay.

CARABAS: Carry your hay to Jericho!
Who can *eat hay*, I'd like to know!

PUSS: Meow! my good master, your help I implore,
And while I help fortune, you open the door.

CARABAS: No house do I own, so where is the door?—
Ah! Pussy, forgive me, I'll grumble no more,
But help all I can in your nice little plan;
For I know you have brains, Puss, as well as a man.

The Princess.

PUSS: Meow! my good master, e'en though you froze,
You must bathe in yon river!

[Exit CARABAS.]

And now for his clothes!
The King's coach is coming, and I've laid a scheme—
Though of that, I am sure, the King doesn't dream.
The coach is in sight! Now, may I be blessed
If I don't wish my master was wholly undressed!

[Loud cries without.]

There! now hear him screaming—the water is cold;
I'll go bury his clothes, for they need it! they're old.

[Exit PUSS, who soon returns. As he re-enters, the KING'S coach appears.]

PUSS: Meow! my good master! Alas for him!
Help! fire! murder! My master can't swim.

[Runs to coach.]

Servant with boat-hook. "Ho, slaves! to the rescue!"

Help! help! gracious King, or Lord Carabas drowns!
KING: Ho, slaves! To the rescue! A hundred gold crowns

Will we give to the man who saves Carabas' life!

[SERVANTS rush across the stage. KING continues, aside:]

My daughter shall soon make the marquis a wife.

PUSS (aside): Mighty keen are a cat's ears!
Who knows all that Pussy hears!
This is better than I hoped for, by a heap.
What a very lucky thing
The blessed, kind old King
Doesn't know this shallow river isn't deep!

[Exit PUSS, running after SERVANTS. PUSS immediately returns, crying:]

O King! what a combobbery!
There's been an awful robbery,
And no clothing for the marquis can we find.

KING: That is no great disaster,
For tell your worthy master
We always pack an extra suit behind.
If we can trust our eyes,
He's just about our size.
So, while in yonder grove we take a rest,
Your master'll not encroach;
Tell him to use our coach,
And not to haste, but drive up when he's dressed.

[Exit coach, backing out, the DRIVER crying:]

Whoa! Back! Back! No room to turn here!
Whoa! Back! Back!

[Enter CARABAS, in bathing suit. PUSS runs after him.]

PUSS: Meow! my good master!
I couldn't do it faster.
But I've now a costly suit, and just your size.
In the King's coach you're to ride,
With the Princess by your side;

Make love to her, and praise her beauteous eyes.
And, master, list to me!
Whate'er you hear or see,
Be very sure you never show surprise.

[Curtain.]

Act III. Scene I.

SCENE: Interior of Ogre's castle. PUSS-IN-BOOTS discovered.

Wolfgang: "Blood and thunder!!"

PUSS: I'm here at last!
Much danger's past;
But such long tramps my liking hardly suits;
'Twas wisdom when I guessed
That it was surely best
To secure these blessed, helpful old top-boots.
I was made to understand
That all this beauteous land
Belonged to this man-eating old Wolfgang;
But as down the road I sped,
To each laborer I said:
Your life upon your answer now doth hang.
When the sovereign comes this way,
When he questions, you, straightway,
"This land belongs to Carabas," must say.

[Awful growling and noise heard, and WOLFGANG enters.]

WOLFGANG: Blood and thunder!
Who, I wonder,

Sent me such a tempting pussy-cat for dinner?
I can't under-
Stand the blunder;
But I'm glad, my pussy-cat, that you're no thinner.

PUSS: M-e-o-w! My brother Wolfgang (ah, how rich!)
I wouldn't have believed
You so easily deceived.
Know that I am Catoscratch, the witch.

WOLFGANG: Rattledy bang!
Snake and fang!
So you're a witch, all skilled in herbs and roots!
My power is no less,
But I must confess
That I ne'er before this saw a cat in boots!

PUSS: Meow! my brother, speak not of my skill:
'Tis true I can change to a cat, but no more,
While fame says that you can assume at your will
Any form that you please, be it higher or lower.
Many a league,
With much fatigue,
From a country of ice and snow,
On my broomstick steed
Have I come, with speed,
These great wonders to see and know.

WOLFGANG: Cuts and slashes!
Blood in splashes!
Who dares doubt what I can do?
Now tell me, old witch,
Of the many forms, which
Shall I take to prove this to you?

PUSS: Meow! my great Wolfgang, it seems to me that
Of all 'twould be hardest to turn to a rat!

[WOLFGANG must be drawn backward toward the light. This will cause his shadow to grow to immense proportions. After slowly lifting him over the candle, take up the RAT and just as slowly put it over the light, and move the puppet up until it touches the cloth. The audience will see WOLFGANG swell up to a shapeless mass, and then, apparently, reduce himself to a tiny rat. PUSS must then be made to pounce upon the RAT, and by passing the RAT behind PUSS, and then letting it drop, it will look to the audience as if PUSS swallowed the RAT whole.]

PUSS: Bah! Ugh! Spat!
What a horrid rat!

[Struts up and down the stage.]

Well, I think for a cat I'm pretty plucky!
Now I'll go and bring
The Princes and the King
To the castle of Lord Carabas, The Lucky!

[PUSS, dancing frantically, laughing and purring, nearly tumbles against the KING, CARABAS, and the PRINCESS, as they enter.]

PUSS: Pardon, most gracious Sire, pardon, great King!
That your humble servant should do such a thing;
It's because I'm delighted,
More than if I had been knighted,
That the marquis, my master, should entertain the King.

KING: A truly faithful servant you must be, Pussy.
When the marquis can spare you, come to me, Pussy.
We'll see that you're not slighted;
Even now you shall be knighted—
Sir Thomas Cat de Boots your name shall be, Pussy.

KING (continuing to CARABAS):
This castle, marquis brave,
Beats the very best we have.

CARABAS: Most gracious Sire, there's not a thing
Belongs to me ——

[PUSS rushes frantically to CARABAS, and whispers in his ear; then returns.]

CARABAS: But to my King.
For my life and all I have to thee I owe.
KING: My Carabas, we're pleased;
Our mind is cheered and eased,
For we feared that this great castle held a foe.
'Tis a princely home, 'tis true,
And we'll make a prince of you.
You shall wed my charming daughter, ere we go.
PUSS: M-e-o-w! M-e-o-w! M-e-o-w!
What would say his brothers now,
If they saw Lord Marquis Carabas the Great?
And until the last horn toots
(With Sir Thomas Cat de Boots),
He shall occupy his present high estate!

[All dance. Curtain.]

"A rat? Bah! what's that?"

CHAPTER XXXVII.

HOW TO MAKE A MAGIC LANTERN—A KALEIDOSCOPE—A FORTUNE-TELLER'S BOX, ETC.

UPON opening his eyes late one summer morning the author was very much startled and astonished at an apparition he beheld upon the wall. He saw at one side of the room, in a waving circle of light, a horrible, gaping monster that was about to make a mouthful of a wriggling, big-headed creature, as large as a cat. Upon turning over in bed and facing the window, the cause of this strange phenomenon was seen. The "gaping monster" proved to be a tiny gar, and the wriggler nothing more nor less than a tadpole. The curtains of the window had fallen down upon each side of a glass globe in which some aquarium pets were quarrelling. A ray of the morning sun had found its way into the darkened room through the fish globe, and by some unaccountable means transformed the globe into a sort of magic lantern lens and slide, throwing the magnified reflections of the inmates of the aquarium upon the wall. The gradual change in the position of the sun caused the vision to fade away in a few moments, and the writer has never since been able to arrange the light so as to reproduce the same effect. Fortunately, however, some one else has discovered the principle, and from it evolved a simple magic lantern, which any boy can make for himself; an account of this invention lately appeared in the *Scientific American*, and the editors of that paper have kindly consented to allow the description to be used for the benefit of the "American Boys."

All that is required for this apparatus is an ordinary wooden packing-box, A (Fig. 212), a kerosene hand-lamp, B, with an Argand burner, a small fish globe, C, and a burning-glass or magnifying-glass (a common double or plano-convex lens), D. In one end of the box, A, cut a round hole, E, large enough to admit a portion of the globe, C, suspended within the box, A, with the lamp, B, close to it. The globe is filled with water, from which the air has been expelled by boiling.

Now moisten the surface of a piece of common window-glass with a strong solution of common table salt, dissolved in

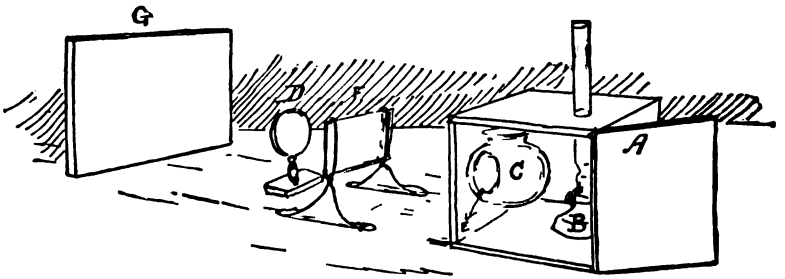


FIG. 212.—A Magic Lantern.

water, and place it vertically in a little stand made of wire, as shown at F, so that the light from the lamp, B, will be focused on it by the globe, which in this case answers as the condenser. The image of the glass will then be projected on the wall or screen of white cloth, G, providing the lens, D, is so placed in the path of the rays of light as to focus on the wall or screen. In a few minutes the salt solution on the surface of the glass, F, will begin to crystallize, and as each group of crystals takes beautiful forms, its image will be projected on the wall or screen, G, and will grow, as if by magic, into a beautiful forest of fern-like trees; it will continue to grow as long as there is any solution on the glass to crystallize. Then by adding a few drops of any transparent color to the water in the globe, the

image on the screen will be illumined by shades of colored light. If the room in which the experiment is performed be very cold, frost crystals can be made by breathing on the glass, F. Many other experiments will suggest themselves, and when tried will be found both entertaining and instructive.

A Home-made Kaleidoscope.

At all glaziers' shops there are heaps of broken glass, composed of fragments of what were once long strips, cut with the diamond from pieces of window-pane, when fitting them for the sash. If you secure three of these strips of the same size, and tie them together in the form shown by Fig. 213, the strings will keep the glass in position. Cut a piece of semi-transparent writing-paper in the form shown by Fig. 214, so that it will fit on one end of the prism. With mucilage or paste fasten the overlapping edges to the glass; then with dark or opaque paper make another piece to fit upon the opposite end of the kaleidoscope; the opaque end-piece should have a round hole in its centre about the size of a silver twenty-cent piece —this is for the observer's eye. All that now remains to be done is to cover the sides of the apparatus with the same paper used for the eye-piece, and the kaleidoscope is finished.

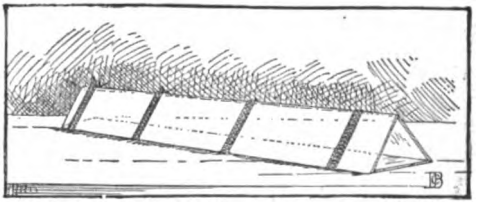


FIG. 213.—Kaleidoscope.

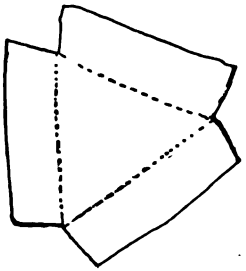


FIG. 214.—End Piece of Kaleidoscope.

Drop a few bits of colored glass, beads or transparent pebbles in and turn the writing-paper end to the light; place your

eye at the hole cut for that purpose in the opaque paper end, and as you look keep the prism slowly turning; the reflection in the glass will make the objects within take all manner of ever-changing, odd, and beautiful forms. A kaleidoscope made in the manner described is as serviceable and produces as good results as one for which you would have to pay several dollars at a store. One of the home-made ones can be manufactured in ten minutes if the pieces of glass be of the same length, and need no trimming to make them even.

The Fortune-Teller's Box.

There exists in all countries a class of people who make their living out of the proceeds derived from tricks and deceptions practised upon the ignorant, credulous, or superstitious portion of the population.

In the by-streets of almost any large city may be seen signs posted up on dingy-looking houses, which, if they were to be believed, would lead us to think that the gifted race that live in these dwellings can, by the aid of spirits, fairies, or by the signs in the heavens, give accurate information of all past or future events.

Some of these so-called mediums make such bungling attempts at magic and necromancy that it is a wonder that they are able to deceive any one. Others, however, perform some really wonderful tricks.

With a little trouble and no expense any boy may fit himself out as a fortune-teller, and have an unlimited amount of fun with his friends, who may be mystified and puzzled by simple contrivances, which, if explained to them, would be immediately understood. The professional fortune-teller will take persons into a dimly lighted room and ask if they wish to see their future wives or husbands, as the case may be; of course they do. The witch then leads them up to a table, which

has an apparatus on top arranged so as to allow the dupes to peer in for a sight of their lover. When they really see what appear to be live, moving figures inside the tube, they go their ways rejoicing, fully convinced that there is truth in magic.

One of these fortune-teller boxes can be made of any old wooden box. Such as is used for soap or candles is generally about the proper dimensions.

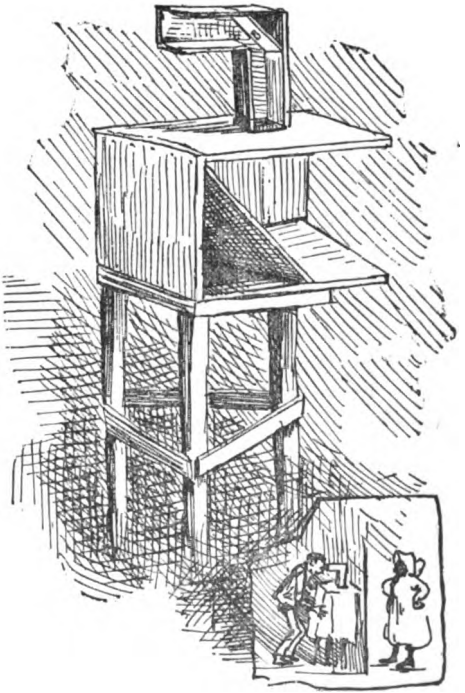


FIG. 215.—Construction of Fortune-Teller's Box.

Knock one end of the box out, and cut a square hole in the lid in which to fit an inverted L-shaped apparatus. The L should be open at both ends, but tightly closed upon the four sides. A small mirror must be fitted in the L at the angle (see B, Fig. 215), and the L fitted in the square hole in the top of the wooden box in such a manner that any image cast upon the large looking-glass, A, in the wooden box, will be again reflected in the smaller mirror, B, at the angle in the L, and from thence to the observer's eye when placed at the open end of the L. This can best be arranged by experiment. The open end of the wooden box must fit closely in a square hole cut in the parti-

tion or curtain that separates the young magician's apartment from a room or closet occupied by an accomplice. Cover the box with a cloth which has a square hole in it, and fits snugly around the bottom of the L, covering and concealing the suspicious-looking, large box beneath. If the work has been neatly done, the machine will look like an ordinary table or stand with an innocent-looking peep-box on top of it.

Secure some friend for an accomplice, whom you know to possess a ready wit and a knack for "making himself up," with the aid of burnt cork and a few old clothes, so as to take any comic character that the occasion may require, with only a few moments' notice.

Supply him with what wardrobe he may require, burnt corks, flour, etc., and then fix up the programme between you, so that the boy behind the screen will know just what to do, from listening to what is going on in front, at the fortune-teller's box.

When all is arranged, the fortune-teller may announce to what friends or visitors he may have, that, owing to the conjunction of certain planets, he is enabled to entertain them by showing to all who have any desire or curiosity to see such wonders, glimpses of the past and future, and to prove it, if any of the company would like to behold a life-like, moving image of a future wife or husband, he (the fortune-teller) can bring up the image in a magic telescope, which was obtained from a direct descendant of Aladdin. The young magician must, by preconcerted arrangement, bring a man or boy out for a first peep. At a private signal of a word or exclamation, the accomplice steps in front of the open end of the wooden box behind the partition, dressed as an old colored lady. The image is at once reflected upon the mirror at A, and from that to B, thence to the observer's eye. After the latter has had a good look, the rest of the company may be asked to take a peep and see their

fortunate (?) friend's choice for a wife. When they see the old colored lady there will be a great laugh, in which the boy upon whom the joke has been played will join with all the greater zest, because he knows he will soon have a chance to laugh at some one else. The fortune-teller must guard with zealous care the secret of the box, and must discourage any too curious persons from handling or examining the apparatus. A li tle mystery is necessary to keep up the fun.

The Magic Cask.

After the fortune-teller has amused his friends sufficiently with his magic telescope, he may end the *séance* by inviting the company to another room and bidding them remain at the door while he examines something at the other end of the apartment—the something is covered with a cloth. Upon reaching the object, the magician must turn suddenly and face the guests in the doorway, and, in vehement language, accuse them of doubting the reality of the visions he has conjured up for them, stating that he overheard some among them say that it was nothing but a trick. Rather than be accused of such deception, he, the great wizard, prefers to perish! At this part the conjurer must quickly remove the cloth concealing the object in the corner, and disclose a barrel, marked in large letters, Gunpowder! Striking a match, the seemingly desperate wizard applies it to a fuse that hangs from the bung of the barrel, and, assuming a tragic attitude, awaits

FIG. 216.—The Magic Cask.

the result. The guests will be uncertain what to do, and, half in doubt whether to laugh or run, they will probably stand their ground, but anxiously watch the fuse as the light creeps up toward the bung of the terrible cask of gunpowder. When the fire reaches the barrel there is an instant of suspense; then some one in the secret lets an extension-table leaf fall upon the floor in the hall or adjoining room, startling the guests and making a loud noise; instantly the staves of the barrel fly apart and fall upon all sides of the head, radiating out like the petals of a sunflower, from the centre of which the fortune-teller's accomplice steps forth and greets the company.

How the Barrel is Made.

Any cask or barrel large enough to hold a boy in a crouching position will do to manufacture a magic barrel from. To make one of these trick-boxes requires no particular skill. It is necessary to remove one head for the top, and, after joining the parts of the other head firmly together by cleats nailed upon the inside (see Fig. 168.—Snow-ball Warfare), burn a hole with a red-hot poker through each stave near the bottom, then burn corresponding holes through the bottom head; make the staves fast to the bottom by tying them with pieces of heavy twine. Around the top of the staves of the barrel tie another piece of twine; remove all the hoops, and all that will hold the staves together will be the twine at the top (see Fig. 216); as soon as that is severed, the staves will fall asunder. Inside the barrel the accomplice crouches with open pen-knife in hand, and at the proper time he cuts the string by passing the blade of his knife between two staves. Left without support the barrel staves fall, exposing the gentleman within to the frightened spectators, who, when they discover that there really was no gunpowder in the cask, will welcome the new-comer most heartily.

In amateur theatricals the magic cask can be brought in very

effectively with the aid of a red light and appropriate ceremony. The audience may be led to expect a most terrible explosion, and with bated breath watch the fuse as the light slowly creeps up nearer and nearer to the bung of the cask. When the time comes as much noise must be made as possible; then, as the staves fall on all sides and spread out like a sunflower, a red light suddenly thrown upon a boy dressed like a scarlet imp, makes a pretty as well as a mirth-provoking transformation scene.

Before exhibiting it, the barrel should be tried to see that it works properly, and the boy in the barrel should rehearse his part, and not forget to have a sharp-bladed knife ready to cut the cord at the given signal, otherwise the whole scene will fall very flat.

CHAPTER XXXVIII.

HOW TO MAKE THE DANCING FAIRIES, THE BATHER, AND THE ORATOR.

THE guests are led to a room, which is discovered to be dimly lighted and apparently unoccupied; they are then told that it is the fairies' night, and that although the little people are incapable of appearing in their natural form so as to be discernible, yet on certain nights of the year the fairies are willing to enter into and animate artificial figures made for their use. While talking in this style, the performer must borrow three or four pocket-handkerchiefs from the guests, and, after bidding the latter be seated, proceed to make the handkerchiefs up into little figures.

How to Make a Handkerchief Doll.

Roll up both edges of the handkerchief, as shown by Fig. 217. Fold the end A over toward the end B, as shown by Fig. 218. Next draw the end B up between the corners of A until the handkerchief takes the form illustrated by Fig. 219. Bring the ends of B under C, and tie them in a simple knot, allowing the ends to project as in Fig. 221, which shows the back. The handkerchief now has the appearance of a little white man (Fig. 220—front view).

After the handkerchief men are finished, the company must be requested to stand or sit where they are, near the door, and on no account to move for fear of frightening the little people. Carrying the handkerchief dolls to the middle of the room, under

the chandelier, and making some passes over them, the magician leaves the figures sitting upright upon the floor. One of the company may be then asked to play upon the piano. No sooner does the first note struck upon the instrument sound through the room, than signs of life become noticeable among the handkerchief figures; they move, and, one by one, rise and stand. As the music becomes lively the handkerchiefs lose

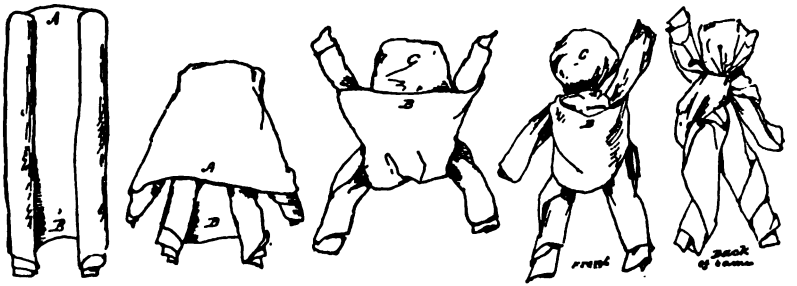


FIG. 217. FIG. 218. FIG. 219. FIG. 220. FIG. 221.

Evolutions of the Handkerchief.

their diffidence and dance about in a very active manner. After the dance is over the handkerchiefs are returned to the owners and the room vacated, to give the *fairies* an opportunity to rest, and the *children*, that have, during the performance, been hiding behind the furniture, an opportunity to make their escape unobserved. The children are as necessary as the handkerchief dolls, for it is by means of silken threads in the hands of the little folks that the fairies are made to dance and move about. For each handkerchief there is a piece of thread long enough to reach over the chandelier down to the floor. Each piece of thread terminates in a hook made of a crooked pin. While the magician is making the customary passes, he deftly hooks the figures on to the pins. Old and worldly wise people have been completely mystified by this simple little trick.

In any attempt at magic or fortune-telling, the success of the experiment depends more upon the manner in which the deceptions are performed than upon the tricks themselves. The magician or fortune-teller must be a person not liable to become flustered and confused at any little mishap. A boy with a cool head and ready invention can smooth over the most palpable mistakes and make his audience believe them all in the programme.

FIG. 222.—First position of Handkerchief.

The Bather

is sure to produce a laugh whenever exhibited by a clever person. The preparations must be made in an apparently careless manner, so as not to attract attention. Tie a simple knot in the end of a handkerchief and let it rest against the knuckles of the left hand, while the rest of the handkerchief dangles below, as in Fig. 222; do this as if you were only absent-mindedly playing with your pocket-handkerchief. Wrap the handkerchief around your two first fingers, as in Fig. 223; then; as if you had just thought of it, ask the company if they ever noticed how becoming the bathing costumes are to most people, adding, that to you a bather running down the beach always looks like this—here you make the little figure run rapidly along your lap or the table-top toward the company (Fig. 223). The ends of the fingers

FIG. 223.—The Bather.

protruding from below the white handkerchief look exceedingly comical, while the knot on top will be at once recognized as the bather's head, done up in a handkerchief or towel to keep the salt water out of the hair. If among the company there be any who are familiar with the scenes at seaside summer resorts, they will be convulsed with laughter. Some people can entertain a company for a whole hour with nothing but a glib tongue and a pocket-handkerchief.

FIG. 224.—The Orator.

The Orator.

This comical little toy can be made by a boy who has really no knowledge of drawing.

From some colored chromo or illustrated paper cut out an appropriate face and paste it on a piece of card-board, as in the accompanying illustration (Fig. 224). Where the arms are to be, cut two holes large enough to admit two fingers of your hand. From a piece of dark cloth cut two pieces shaped like the front of a coat and paste them on in the proper place (Fig. 224). Cut another triangular piece of cloth for the vest; let it be red or some bright color. Paste the vest on as shown by the diagram;

make a collar by drawing the outlines as in the illustration and leaving it white between them; any bit of bright ribbon will do for the necktie. Draw a couple of straight lines beneath the figure to represent the top to a speaker's stand. From the same material that is used for the coat cut two pieces of cloth, of the shape shown by Fig. 225, A, for the sleeves. Let them be of such length that when the top edge is folded back the distance of the vertical cuts shown on the diagram, and the sleeve wrapped around the fore-finger, the end of the finger will protrude the length of the nail. Sew or paste the edges of the sleeves together and put the slit ends (A, Fig. 225) through the arm-holes cut in the card-board; bend back the slits and paste them upon the back of the card-board. Make the cuffs of white paper (Fig. 225, B), and fasten them inside the sleeves by a few stitches of thread.

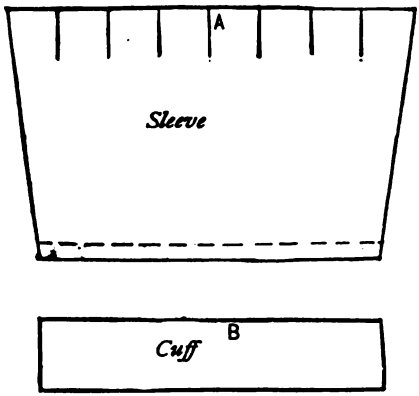


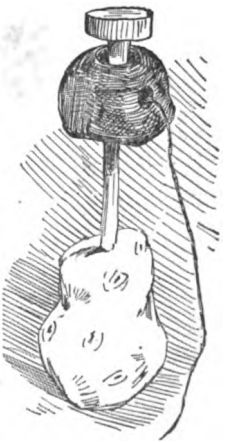
FIG. 225.—Pattern of Sleeve and Cuff.

The orator is now finished and ready to deliver his oration. Hold the card up in front of you and thrust your first two fingers through the sleeves. The flesh-colored tips of your fingers peeping from beneath the white cuff look like little fists, and when the fingers are moved around in mimic gestures, the effect is comical beyond measure and will create a laugh wherever exhibited. If the picture-head of some well-known public man can be procured, it will add greatly to the effect produced upon the audience. A comical speech should be prepared and recited with accompanying movements of the arms (fingers). The little man can be made to scratch his nose, roll up his sleeves, and go through many other movements in a most natural and life-like manner.

CHAPTER XXXIX.

HOW TO MAKE VARIOUS AND DIVERS WHIRLIGIGS.

WHO can watch machinery of any kind in motion, without experiencing an indefinable sort of pleasure? No matter how simple the contrivance may be, if it move it immediately interests us. This instinct, if I may so call it, that prompts us to watch and play with machinery is implanted in the brain of the lower animals as well as of man. I think no one can doubt that a kitten or a dog enjoys chasing a ball, and enters into the sport with as much zest as a college-boy does his game of football. It is this same indefinable desire for observing and experimenting with moving objects that prompts us to throw stones for the purpose of seeing them skip over the surface of the water, and to this instinct must be attributed the pleasure experienced by the school-boy with his



The Potato Mill.

Potato Mill,

which consists of simply a stick, a potato, a buckeye, or a horse-chestnut, and a string. The stick is whittled into the form shown in the illustration; a string is fastened to the stick about one-half inch below the knob on the top. The buckeye has a

large hole bored through the middle, and a small hole bored through one side, to the middle hole; the string from the stick passes through the hole in the side of the buckeye; the end of the stick is sharpened and thrust into a potato.

If the string be wound around the stick, and the buckeye held between the thumb and forefinger, the stick and potato may be made to spin rapidly by alternately pulling the string and allowing it to slacken; the motion imparted by the first pull continues long enough to wind the string in the opposite direction, and thus, for an indefinite time, or until the string wears out by friction, the potato mill may be kept buzzing at a great rate.

Another machine the boys used to be very fond of was called

A Saw-Mill;

it was generally made out of the top of a tin blacking-box, with the rim knocked off and the edge cut into notches like a saw. Two strings passing through two holes near the centre gave a revolving motion to the "buzzer" (Fig. 226 shows a saw-mill).

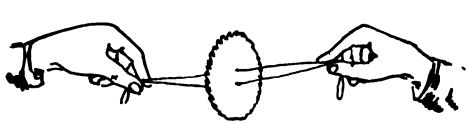


FIG. 226.—A Saw-Mill.

By holding the strings so that the wheel hangs loosely in the middle, and swinging the wheel or "buzzer" around and around until the string becomes tightly twisted, the machine is wound up. As with the potato mill, the revolving motion is imparted by alternately pulling and allowing the string to slacken, only in this case you must hold one end of the string in each hand (Fig. 226). When the boys can make a buzzer actually saw into a piece of board or shingle by allowing the edge of the wheel to strike the wood, the saw-mill is pronounced a success, and its value increased.

Very pretty and amusing toys may be made on the same principle as the saw or potato mills described. One of these little machines, a very fascinating one, is sold upon the streets of New York by the novelty peddlers. As the writer was passing along Broadway the other day, he saw an old acquaintance, known to almost all New Yorkers by the name of "Little Charlie." Little Charlie is not a small man, as his name might imply, but a large, good-natured, red-faced peddler, who stands all day long at the street corners. During the winter he sells small india-rubber dolls, crying out to the passers-by: "Well! well! well! Little Charlie! double him up! double him up!" He doubles the little india-rubber dolls up in a comical manner to attract customers. The torrid summer heat is too much for the india-rubber dolls, and makes them sticky, so that they are laid aside during the hot weather, and Little Charlie, with the perspiration streaming from his face, no longer calls out in his accustomed manner, but stands silently twirling his summer novelty, trusting to the ever-changing colors of the toy to attract purchasers. One was bought that it might be introduced among the other whirligigs in this chapter.

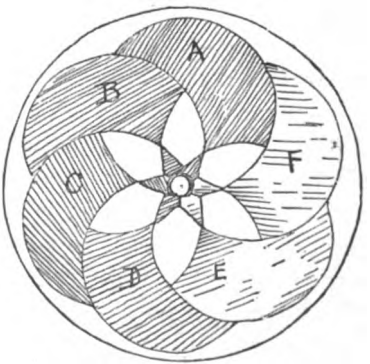


FIG. 227.—A disk of the Rainbow Whirligig.

The Rainbow Whirligig.

If you have a pair of dividers, make a circle upon a piece of card-board about two inches in diameter; inside this circle make six other circles (Fig. 227). A pair of scissors can be made to do the duty of a pair of dividers by spreading them apart the required distance and thrusting the points through a card to hold them in position (Fig.

228). Make a duplicate figure or disk and paint the parts of the inside circles, shaded in the diagram, different colors; for instance, A and D may be made blue, B and E green, C and F red. The points of the star in the centre made by the intersection of the circumference of the circles should be painted the same color as the parts of the circle adjoining. Upon the second disk paint A and D blue, B and E yellow, C and F red.

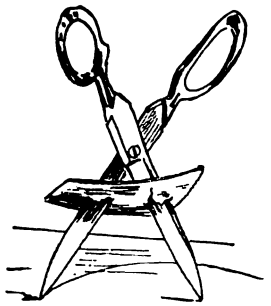


FIG. 228.—A Pair of Dividers.

Cut a piece of one-quarter inch pine into a square, with sides of about two and one-quarter inches in length; cut off the corners as shown by I, Fig. 229. In a hole in the centre of I fasten tightly the round stick J. Whittle out another piece for a handle K, and bore a hole through the top for the stick J to fit in loosely; bore another hole through one side for the string to pass through. In the illustration, as in the original from which the drawing was made, there is a large hole bored through two sides; but this is unnecessary, and only put in the diagram to better show the position of the string inside. Upon the wooden plate I, describe a circle about one and three-quarter inches in diameter. In the centre of the two paper disks make holes large enough to fit with shoe-eyelets; then with tacks (L, Fig. 229) fasten the two paper disks on to the wooden plate at the points G and H, in such a manner that the tack passing through the eyelets

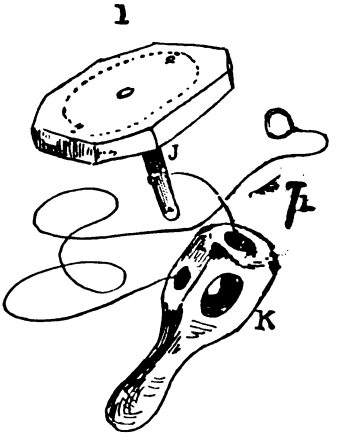


FIG. 229.—Parts of Rainbow Whirligig.

will allow the disks to revolve freely. Attach a string to the stick J at a point that will come opposite the string-hole in the side of the handle, when the stick J is slid into the hole at the top of the handle K. The wooden disk is made to spin exactly in the same manner that motion is imparted to the potato mill already described. When in motion the colors on the paper disks will blend and produce, with each change of position, a number of beautiful variations. The two paper disks blend together, making a large circle three and one-half inches in diameter, composed of concentric rings of the most lovely hues—red, pink, purple, green, and all the different shades and combinations imaginable are portrayed with ever-changing variety by the spinning rainbow whirligig.

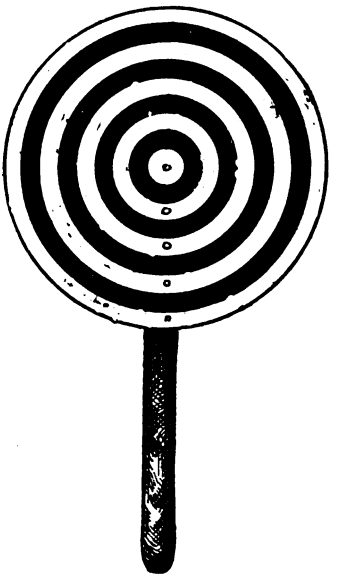


FIG. 230.—Paradoxical Whirligig.

A Paradoxical Whirligig

is a very ingenious toy, consisting of a circle of white card-board, upon the surface of which any number of black rings are painted, one within the other, until it resembles an archery butt or target.

The disk is tacked or glued securely to a stick or handle (Fig. 230) so that it is impossible for it to really revolve, yet if you grasp the toy by the handle and give your arm a motion similar to that of the shaft of an engine, the disk upon the stick will appear to revolve like a wheel, and so closely does the optical delusion resemble actual motion that it will deceive almost any one who is not familiar with the experiment.

A picture of a wagon, with wheels made like the disks of the paradoxical whirligig, may be made, and the wheels will have all the appearance of revolving when a wabbling motion is imparted to the picture. There are many curious experiments that can be tried in this line—spirals may be made to twist around; pictured machinery may be given the appearance of actual moving wheels, etc. The philosophy of all this is best explained in the description of the next whirligig.

The Phantasmoscope, or Magic Wheel.

The phantasmoscope, or magic wheel, is comparatively simple, consisting, as may be seen by the accompanying illustration, of a disk of any diameter revolving upon a pin in the centre. Figures in different poses of arrested action are painted or pasted upon the one side; under each figure is an oblong opening or slot. Much amusement can be derived from this old and simple toy. We herewith give one with the correct positions of a horse trotting a 2:40 gait, drawn in silhouette upon the outer margin of the wheel.

Make a careful tracing of the illustration (Fig. 231) with a lead-pencil upon tracing-paper; reverse the tracing-paper upon a piece of card-board so that the side with the pencil-markings on it will be next to the card-board; after which fasten both card-board and paper to a drawing-board or table-top with tacks, so that neither tracing nor card-board can slip. With the point of a hard pencil, a slate-pencil or any similar instrument, go carefully over each line of the tracing as seen through the tracing-paper; be careful not to omit a single mark; it is very provoking to discover, after removing the tracing-paper, that part of the drawing is wanting; but if you have been careful, when the tacks are removed you will find the picture neatly transferred on the card-board. Go carefully over each line on the

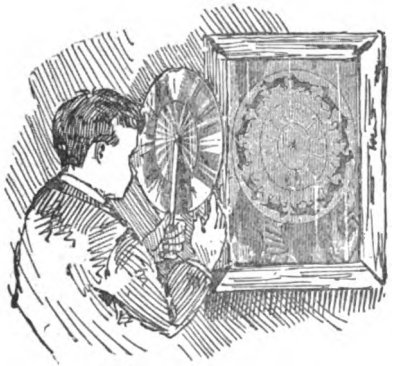
card-board with a pen and black ink, and fill in the outlines of each picture with ink, making a silhouette of the figures.

Cut the phantasmoscope, or magic disk, out, following the

FIG. 231.—The Magic Wheel.

outer circle with the scissors, and under each figure, where the oblong places are drawn, cut a corresponding opening through the pasteboard. Fasten the wheel to a stick or handle by means of a pin at its centre, on which it can freely turn.

If a larger machine be wanted, the illustration here given may be enlarged by the process described on page 250. To use the magic wheel, stand in front of a mirror, as shown in the small illustration; hold the disk before the eyes; look through the slots under the figures, and turn the wheel rapidly. The horses' legs will commence to move as in life, and as each successive position drawn upon the phantasmoscope is the exact one taken by a trotting horse, the horses in the mirror will all appear to be in actual motion, on a fast trot. If the eye is directed over the margin of the paste-board disk, an indistinct blur is all that is seen. The principle is generally well known and easily explained. It pertains to the phenomenon known as the persistence of vision. When the eye is directed through the slot, the figure of a horse is seen for an instant as the opening passes the eye, and the impression is retained after the object is shut off by the intervening portion of the board between the slots until another horse appears through the succeeding opening, when an additional impression is made, the same as the preceding impression, except a slight change in the position of the legs. These impressions follow each other so rapidly that they produce upon the retina of the eye the effect of a continuous image of the horses, in which the limbs, replaced by a succession of positions, present the appearance of a file of horses in actual motion.



Making the Horses Trot.

The instantaneous photographs taken nowadays of people, horses, and other animals in motion, opens a new field for inves-

tigation, and one which, with the aid of the simple toy described, will be found very entertaining as well as instructive.

Mr. Muybridge's celebrated photographs of animals in motion can all be adapted by smart boys to home-made phantasmoscopes, and it will probably not be long before the wonderful photographs of birds and bats on the wing, taken by E. J. Marcy with his revolving photographic gun, will be within reach of the public. Then with the magic disk the reader can make birds fly, horses trot, men ride bicycles, and reproduce every movement as correct as in nature.

For young scientists these beautiful experiments will be found very entertaining.

CHAPTER XL.

THE UNIVERSE IN A CARD-BOX.

Smoke-Rings.

A JOVIAL-LOOKING commercial traveller once won a wager from the landlord of a certain Detroit hotel by making over a hundred rings with one mouthful of smoke. The writer was sitting in the hotel office at the time, and becoming interested in the conversation, watched to see how the trick was done. Taking some cards from his card-case, the young man proceeded to bend up the edges in such a manner that the centre part of each formed a perfect square. Six cards he folded in this manner; then, after fishing in his pockets for some time, he produced a dime and a lead-pencil. Placing the ten-cent piece upon the centre of one card, he made a ring with the lead-pencil by following the edges of the coin. Opening a pocket-knife at the file blade, with the point he cut a round hole in the card, following the circle made by the pencil. He then put the cards together, in the form of a light but strong box (Figs. 232, 233, 234, and 235), and taking a long pull at a cigar which was

between his lips, he filled his cheeks, and blew the smoke into the paper box. By this time all the idlers in the office had collected around the smoker, who, with a triumphant smile upon his face, commenced to tap the sides of the box with his lead-pencil. At each tap a tiny but perfect and beautiful ring of smoke shot into the air—one hundred and ten were counted before the smoke was exhausted. Fig. 236 shows how similar rings can be made with a lamp-chimney in which a card disk with a hole in it has been placed; a piece of paper or membrane fastened over the other end serves for a vibrating surface, which, when struck with the thumb, forces out the little rings of smoke.

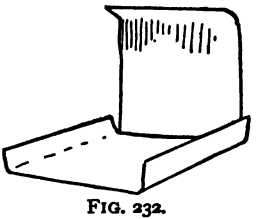


FIG. 232.

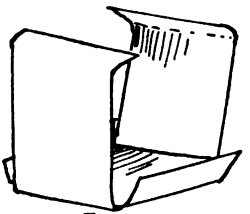


FIG. 233.

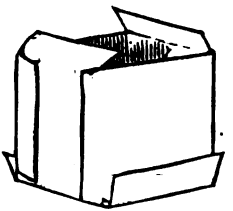


FIG. 234.

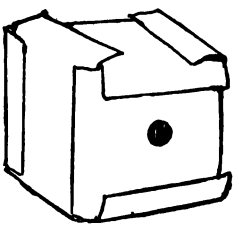


FIG. 235.
How to make a Card-box.

The reader must not for a moment suppose that it is necessary to use tobacco smoke to perform this beautiful experiment; any other smoke will answer just as well to make the "vortex rings," as they are scientifically called. If after dipping a paint-brush into india ink, or any water-color paint, you gently insert the tip of the brush into a glass of clear water, you will see the pigment fall from the end of the brush, and, gradually sinking to the bottom, form rings exactly similar to the circles of smoke described.

The rings made by skipping a flat stone over the water are but another example of the vortex, and the jolly commercial traveller, when he was exhibiting the little paper box and

smoke-rings to the laughing crowd of fellow-travellers in the hotel office, was standing upon the threshold of a mighty mystery, experimenting with laws, and showing the action of the same forces that are supposed to have produced the wonderful rings around Saturn! Indeed, it is asserted that the broad, misty band of light which we see at night stretched across the heavens, and known to every boy as the milky-way, is nothing more nor less than a gigantic vortex ring, composed of millions of heavenly atoms. Some very learned men think that the secret of the whole universe, the origin of gravitation and electricity, are all locked up in the mystery which controls the formation and motion of a simple smoke-ring.

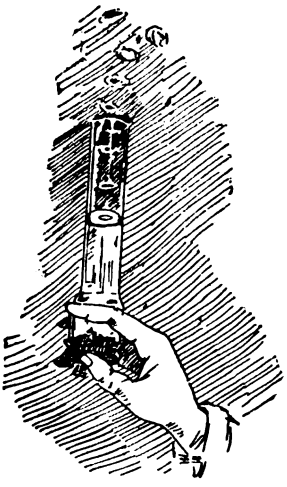


FIG. 236.—Lamp-Chimney Smoke-Box.

As Adrien Guebhard wisely remarks, in an interesting article upon this same subject, "Nothing is vulgar to one who knows how to see, and nothing indifferent to one who knows how to observe."

CHAPTER XLI.

LIFE INSTILLED INTO PAPER PUPPETS, AND MATCHES MADE OF HUMAN FINGERS.

MANY strange and unaccountable occurrences are attributed by ignorant people to "animal magnetism," some even going to such an extreme as to refuse to shake hands with other persons for fear of parting with some of their precious magnetic properties. Where there is much smoke there must be some fire, as the old adage goes, and although the marvellous stories current in a certain class of literature are wholly untrue, animal electricity undoubtedly exists. All boys who use a comb to smooth out their tangled locks upon a cold winter morning, no doubt hear and wonder at the crackling of the electricity as the comb passes through their hair. Many of my readers have probably tormented poor puss by holding her in a dark closet, and watching the sparks fly from her fur as, with a pitiless hand, it was briskly rubbed the wrong way until a severe scratch or bite from the cat warned them that she took no interest in such scientific experiments. A less cruel and more entertaining experiment is to cut out a lot of little paper figures, and the next cold day, when your hair begins to snap and stand on end in its effort to follow the electrified comb, hold the comb over the figures; the little puppets will immediately appear to be endowed with life and commence to jump and dance, or stick to each other and to the comb (Fig 237), as if fastened by glue.

Often one little figure will stand on his head, and another, fixing himself by one hand, hold his tiny form upright in a most comical manner; sometimes they will form themselves into long strings and go through all manner of queer and seemingly intelligent movements. The same result can be produced by rubbing a piece of gutta-percha smartly upon a piece of woollen cloth, and then holding it over the paper puppets. When one of those intensely cold waves from the North strikes the country and frightens the mercury in the thermometers, until it retreats down to the very bottom of its glass tube, electricity is often so easily generated that I have known persons to light a gas-jet by simply applying the ends of their fingers to the burners

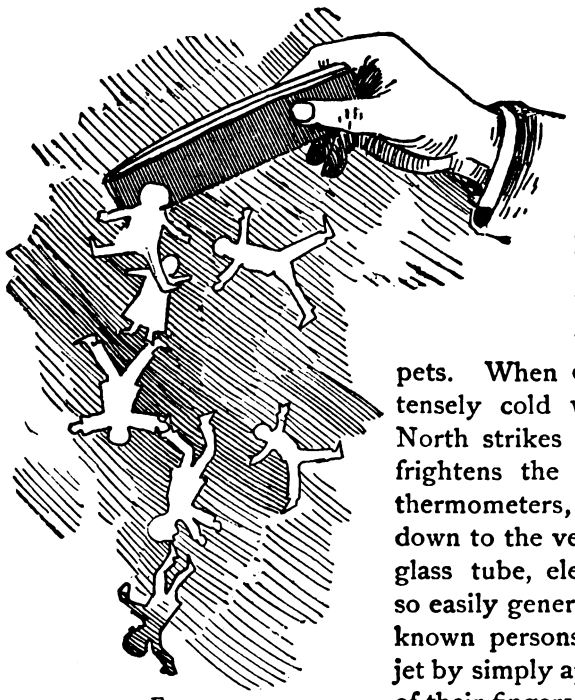


FIG. 237.

A certain professor, well known to the public, was so startled at seeing the gas blaze up upon touching the burner with his finger, that he dropped into a sitting posture upon the floor, and there, with his feet spread apart, and his eyes and mouth open, he presented a perfect picture of astonishment and wonder.

To Light the Gas with your Finger,

turn it on without applying a light, walk around the room, sliding your feet over the carpet, until you again reach the burner, touch the tip of the burner and instantly the light will blaze up as if by magic.

From what has been already said, the reader will understand that the gas-jet experiment is only successful under peculiar conditions of the atmosphere. Do not try to turn on the gas with one hand and light it with the other, for as soon as the first hand touches the metal key the electricity is expended, and there is none left in the other hand to ignite the gas. Turn the gas on first, walk around the room in the manner described, and touch nothing with your hand before it is applied to the burner.

There are many other experiments that may be tried by boys interested in this subject, but as they necessitate more or less complicated and expensive instruments they are omitted, it being the object of this book to describe only such things as can be manufactured by the boys themselves.

CHAPTER XLII.

HOME-MADE MASQUERADE AND THEATRICAL COSTUMES.

The White Man of the Desert.

IN 1876 quite a large party were returning from New Orleans to St. Louis on board the largest of Mississippi steamers. Every night was devoted to merriment, in which all joined, passengers and officers. One morning, large posters, made with colored chalk on brown paper, and hung at both ends of the cabin, announced a grand masquerade as the programme for the evening.

As a rule, masquerade costumes are not to be found aboard Mississippi River steamers, yet, that evening, when the band struck up a march, every stateroom door opened, and from each doorway issued some queer or fantastic figure. One costume in particular was so simple, and yet so complete, as to be noteworthy. A boy had taken two sheets from his

berth, and, by wrapping one around each leg, fastening them at the ankles with strings and at the waist with a shawl-strap, made quite a presentable pair of Turkish pants. The shawl-strap, worn with the handle in front, had the appearance of an odd-looking double belt; a pair of white stockings, drawn over a pair of slippers and the bottom of the pants, answered for white boots; his shirt served as a white waist. A sheet hanging from his shoulders, after the manner of a cape or shawl, combined, with a turban made of a towel, to give a decided Arab look. The boy's face and hair had been made snowy white by an application of flour.

The disguise was complete, and the costume pronounced by all to be the very best in the cabin. In a similar manner many characters may be personated, and the costume made up of such material as can be found about home.

Many proposed tableaux, masquerade, or parlor play is abandoned because the costumes necessary are either unattainable or altogether too expensive.

There is "lots of fun" to be had at entertainments of this kind and for fear that my reader might miss some such opportunity to have a "good time," this chapter is devoted to describing two or three costumes, and showing how first-class character dresses can be made without an expenditure of money.

"The Fourteenth Century Young Man"

can be clothed with modern garments altered to suit the occasion. Tights are necessary, and may be made of an ordinary suit of knit underclothes (Fig. 238) by the addition of a little trimming and a pair of trunks to cover the top part of the drawers. But let us commence at the top of the man and work down, describing each article of dress in the order in which it comes.

The Fourteenth Century Young Man.

The Mediæval Hat.

Soak an old felt hat thoroughly in hot water; put it over the top of some blunt-ended object, a bed-post, for instance, and,

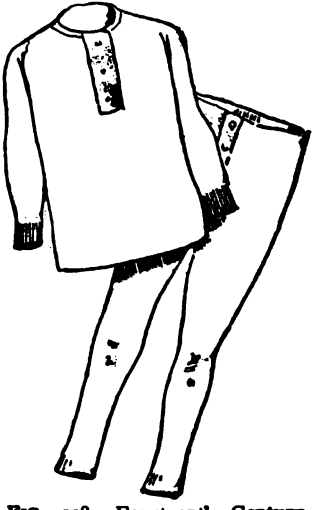


FIG. 238.—Fourteenth Century Costume, Untrimmed.

FIG. 239.—Stretching the Hat.

FIG. 240.—The Mediæval Hat.

grasping the brim with both hands, pull down steadily and firmly until the crown becomes elongated to the proportions of the

ones belonging to the hats worn by the clowns in the circuses (Fig. 239). In stretching the hat be very careful not to tear the felt. Turn the brim up in the back and pull it down in front.

Fasten a long feather of any kind, a chicken or turkey feather will answer, to the back of the hat, and let the plume droop over the front, as shown by Fig. 240.

The Wig.

To make this you will probably have to ask your mother's or sister's assistance. Induce one of them to make a cloth skull-cap of the shape shown by Fig. 241. Cover, and sew to

FIG. 241.—Skull-Cap.

FIG. 242.—Spanish Moss Wig.

FIG. 243.—Excelsior Wig.

FIG. 244.—White Cotton Wig.

this cap Spanish moss or "curled horse-hair," such as is used by upholsterers (Fig. 242). Cotton or excelsior will make very respectable wigs when nicely arranged and sewed on to neatly fitting skull-caps (Figs. 243 and 244).

Eyebrows, Moustache, and Beard

can be made of white or black cotton, fastened to the face with a little mucilage.

The Doublet,

to be in keeping with the mediæval hat, must fit quite closely, and an ordinary knit undershirt is just the thing, especially if

it be a bright-colored garment. At the neck fasten a broad white collar, a piece of lace or a ruff, borrowed for the occasion from some lady friend. From the same source procure a large bow of ribbons to fasten at the throat and conceal the band and button on the front of the shirt. If ruffs or lace cuffs be added to the sleeves, the doublet will be complete, and the shirt so disguised that no one will suspect its true character (see Fig. 245).

FIG. 245.—The Doublet.

Trunks.

Take any pair of old pants and cut them off at the knees; if they are a trifle too large for you, they will make all the better trunks.

Let the same lady friend that made the skull-cap, hem the bottom of the pants. The hem should be strong enough to hold strings within for drawing the bottoms tightly around the limbs (Fig. 246).

If you do not wish to impose too much upon the good nature of your lady friends, you may put the strings in the pants yourself after the manner shown by Fig. 247.

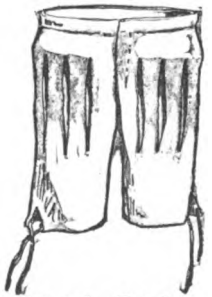


FIG. 246.—Trunks.

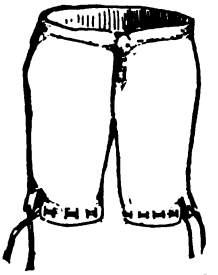


FIG. 247.—Slashed Trunks.

Half a dozen slashes cut in the trunks through which some bright-colored cloth is allowed to show, adds greatly to the general appearance.

Tights.

A pair of knit drawers arranged with straps that pull the bottoms of the drawers over the insteps and heels of the feet, make as good a pair of tights when worn with trunks as any that can be rented from the costumer, and they are much more pleasant to wear than the often uncleanly hired garments (Fig. 248).

FIG. 248.—Leg with Tights.

To Dress.

First put on your stockings; then pull on the tights, allowing the straps to fit under the foot. Next put on the trunks, and pull the bottom of the legs of the latter garment up as high as possible, draw the strings and tie them tightly, this will make the trunks puff out and spread open the slashes. Next put on the doublet, and allow it to fall outside the trunks. Slippers or low shoes should be worn.

A friend and myself once made a couple of suits like the one just described, using red knit underclothes for tights and white flannel pants slashed with red for trunks. Red-covered shoes and red feathers in our hats completed the costumes, which were exactly alike in every particular. So closely did we resemble each other when masked and dressed in these home-made garments, that our most intimate friends were unable to distinguish one from the other.

The Baby

is a mirth-provoking disguise when well personated. To transform yourself into a baby, remove your coat and vest,

and, after procuring two long white skirts, fasten one at your waist, and let the waist-band of the other come just under your arms, so that this skirt will fall over the first one adjusted. Let some one tuck up your shirt-sleeves to the shoulder, and run ribbons through them and out at the neck, tying the ends in bows at the shoulders. To do this, the shirt must be opened at the throat and the collar-band tucked under; this makes a low neck and short sleeves. A broad sash passed around under the arms and tied in a large bow-knot looks very baby-like (Fig. 249). The head should be covered with a hood. The latter can be made of a piece of white cloth, or a large handkerchief folded in the following manner:

FIG. 249.—The Baby.

How to Make a Handkerchief Hood.

Fig. 250 represents the handkerchief. Take the corners A and B and fold them under, as shown by Fig. 251. Allowing the handkerchief to rest flat upon a table, turn the corners made by the fold over as you would in making a paper hat; this will give you Fig. 252. Again proceed as you would in manufacturing a paper hat, and turn the bottom C D up over A B; roll this bottom piece up and over about three times (Fig. 253). Pick up the handkerchief by the ends C and D, and you will have Fig. 254, a pretty and complete baby-hood, which, when it is put on the head, and the ends C and D tied under the chin, will conceal the hair, and besides adding to the baby look, it will help to disguise the person wearing it.

Thus, I might go on until next year, telling how to make all manner of costumes; but I have sufficient confidence in boys to believe that, as a rule, they only need a hint or two to start them in any project, and that their own ingenuity will carry them through. So far I have carried my descriptions of boy-

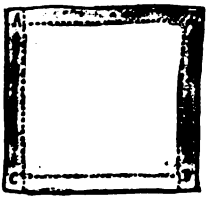


FIG. 250.

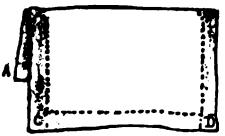


FIG. 251.

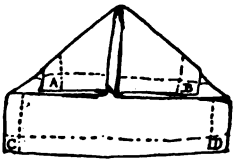


FIG. 252.

FIG. 253.

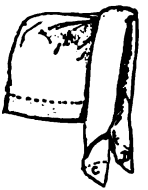


FIG. 254.

ish pastimes through the seasons, and I now halt at the recurrence of spring; not, believe me, for lack of matter, for suggestion breeds suggestion, until there seems to be no end, and my greatest difficulty has been to avoid devoting too great a space to any one topic.

No boy need hope to achieve success as a manufacturer of any of the objects described in this book unless he carefully reads the description and masters the details. Remember that even in sports and plays no slipshod, careless, and partial effort can avoid failure. As a rule, the best and most earnest worker is the liveliest and heartiest companion.

It is not without regret that the author bids farewell; and

if the reader of this book derive half the enjoyment from the perusal that the author has from the writing, then the book is not a failure; and if what little that has been said encourage and help any boys—be they few or many—to appreciate, love, and enter into all sensible sports, as every true American boy should, then has this book fulfilled its mission.

Additional Suggestions for the Four Seasons.

SPRING.

KITES.

On September 27, 1885, The United Kite-Raising Association, of Yorkville, attempted to send up the biggest kite on record. The cloth that covered it weighed fourteen pounds, and the kite was sixteen feet high and fourteen feet wide, with a tail four hundred feet long.

The wind was too light to keep the monster up, but the crowd had "lots of fun" in the attempt.

In New York City there is a law, passed in the interest of the telegraph companies, which imposes a fine of five dollars on any one raising a kite south of Fourteenth Street; but since the law was passed, the boys have had ample revenge in seeing the telegraph poles condemned as a public nuisance, and cut down.

It does not appear that "Section 240 of the Corporation Ordinance," as the kite law is termed, is known to the boys, or enforced by the police, as the following item, clipped from one of the New York newspapers, will plainly demonstrate:

THOUSANDS OF KITES.

THE CURIOUS FLEET OF AIR CRAFT WHICH HOVERS OVER THE EAST SIDE.

Anybody riding up the Second Avenue railway on a fine breezy afternoon will become impressed with the belief that kite-flying must be one of

the leading East Side industries. The air fairly swarms with kites. They hover like a great flock of birds over all that section of the city east of the Bowery between Chatham Square and the Cooper Institute. There are kites of all descriptions, from the big, majestic, "six-cornered" kind that hang motionless save now and then a grave nod and a languid swing of the long tail to the fierce little rattle-headed Chinese variety that take the form of great butterflies and beetles, and dart hither and thither without a moment's rest. When the sunlight falls right, a faint, shadowy maze of strings can be seen running from the kites to countless house roofs. It is not always small boys who are attached to the kites by these strings. Idle, hulking fellows, old enough to be at something better, loll away afternoons lazily watching their kites drift away as they feed them out string. As for the telegraph, telephone, and electric light wires along these streets, they are so hung with kite wrecks and festooned with bedraggled kite tails that they look like lines hung with the washing of a rag fair.

Last Saturday was a great day for kites. Thousands of them flecked the sky over the East Side, and only one was above Fourteenth Street. But that was purely accidental. It was flown from a roof within the forbidden territory.

New York City boys, as a rule, have very little practical knowledge of the manner of making kites, but depend upon the shops for their supply. There is a portly German on Prince Street who for twenty years has supplied the small boys of New York City with their kites, and he says that kite time does not begin here before the Fourth of July.

Since the first edition of the "American Boy's Handy-Book" appeared, but one suggestion on a new form of kite has been received; and, as the author subsequently saw one of the kites fly successfully, he takes pleasure in quoting the letter, and in adding to the list in the book:

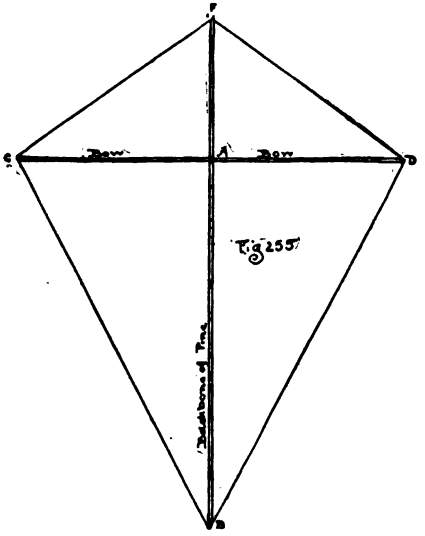
The Tailless Kite—Holland Kite.

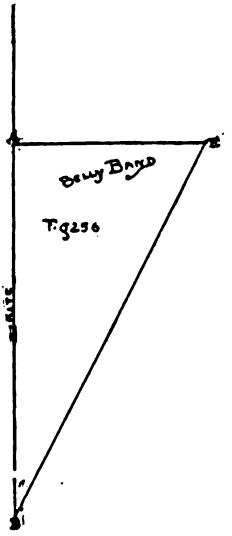
ROCHESTER, NEW YORK, January 6, 1882.

FRIEND ELWOOD: In "The American Boy's Handy-Book," a copy of which you presented my son Christmas last, I do not see that easily-made

and always-successful, tailless Holland kite, a great number of which I have made for my own and other boys.

The draft represents a kite four feet long. The proportions must be mathematically correct. Stick (B, F, Fig. 255) four feet long; the cross-stick (C, D, Fig. 255) is a bow, made of ash, hickory, oak, or split reed, just three feet long, with strings attached to each end and tied at the back, to give it the proper curve. This curve must be varied with the strength of the wind. If the wind is strong, tighten the bow-cord, and give it more





curve. The bow and stick are fastened to each other one foot from upper end of stick and at A, Fig. 256, the centre of the bow.

Attach belly-band at contact of stick and bow (A), and at lower end of stick (B); and to determine length of belly-band, let its angle just reach end of bow, C or D, at which angle the kite-string is to be attached.

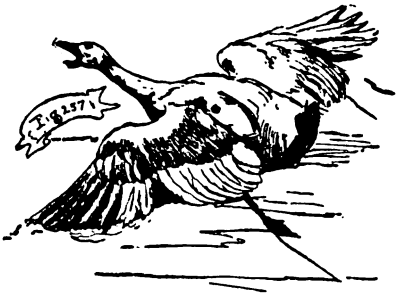
These kites may be made of any size, but these proportions must be strictly observed. Each side must be equal in weight. Lift the kite by belly-string, balancing lower end on a finger pivot, and if it tips to one side, paste pieces of paper to the light side, till they are equal. The stick and bow must be as light as their duties will warrant.

These kites require no tails. Just the right weight and length for an old style kite tail has never been determined, and this uncertainty caused much unhappiness with the boys of my time.

The first of these tailless kites that I made for my boy at its first ascension remained up all day.

FISHING.

THE author, when a lad, was unable to learn to swim by following the directions in the books he had; nor did the articles on skating assist him in the least in learning to skate; but where a new game was described, or diagrams given for some boyish contrivance, such notes were of great assistance.



Now, I do not wish my readers to suppose that, either in the main part of the book or the appendix, he will find an exhaustive discourse on fishing; what he will find is all the novelties in that line, with diagrams and explanations, that have come within the experience of the writer.

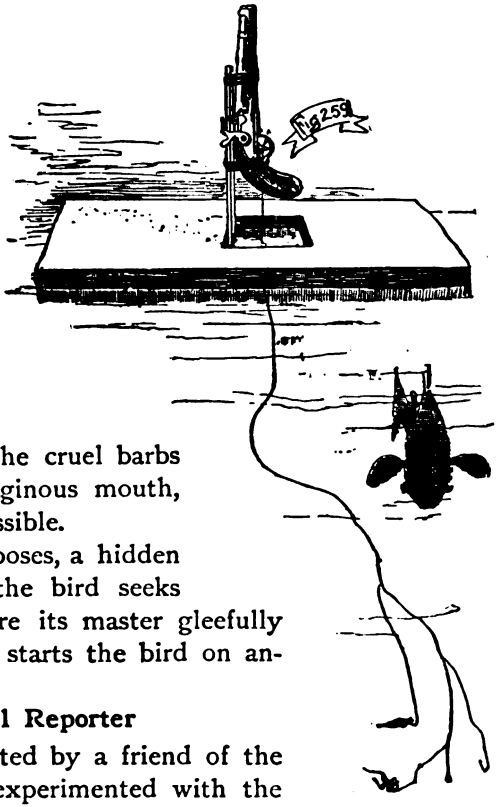
Mr. Fred Holder, the celebrated naturalist and writer of boys' books on natural history, is responsible for

The Goose Fisherman,

which is nothing more nor less than a live goose (Fig. 257), with a line and spoon-hook attached to one leg. Mr. or Mrs. Goose is driven into the water and forced to swim, which, owing to the nature of the bird, is not a difficult or disagreeable task.

As the bird swims, using its feet as paddles to propel itself, the spoon at the end of the line is jerked along in a most interest-

ing manner to the fish, and if there are any pickerel, with their voracious appetites to spur them on, they cannot often restrain themselves, but needs must seize what, to them, appears to be a fat, shiny, young fish, but which they learn to their sorrow to be a hard metal snare (Fig. 258).



Then the fun begins. The goose feels something tugging at its leg, and becomes excited. The unfortunate fish plunges about, only to drive the cruel barbs deeper into its cartilaginous mouth, and make escape impossible.

Finding, as it supposes, a hidden enemy in the water, the bird seeks refuge on shore, where its master gleefully unhooks the fish, and starts the bird on another trip.

The Pistol Reporter

is a contrivance invented by a friend of the author, after he had experimented with the "Dancing Fisherman" described on page 31.

The "Reporter's" float is made exactly in the same manner as the Dancing Fisherman's, but in the place of the jumping toy, an old-fashioned, single-barrelled pistol is securely lashed to the upright stick, and the fish-line tightly fastened to the trigger.

To prevent accidents my friend never loaded the pistol, but

relied upon the noise of the exploding cap to notify him that there was something on the line. Fig. 259 shows the Pistol Reporter. The common toy-pistol makes the best "Reporter," being smaller and more easily procured.

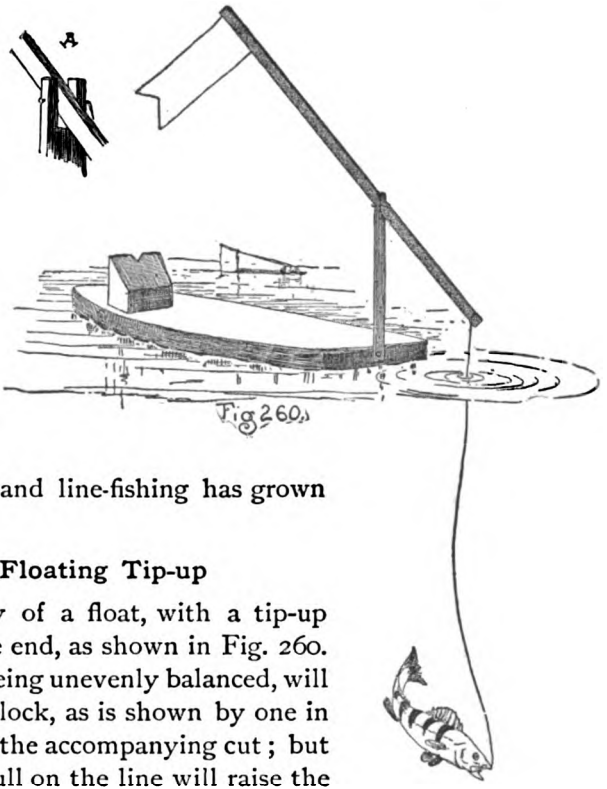


Fig 260.

One more invention, and the reader will have more than enough to occupy his time after the ordinary pole and line-fishing has grown tiresome.

The Floating Tip-up

consists simply of a float, with a tip-up fastened at one end, as shown in Fig. 260. The flag-rod, being unevenly balanced, will fall upon the block, as is shown by one in the distance in the accompanying cut; but the slightest pull on the line will raise the flag, and warn the fisherman that there is something at the bait. Fig. 260, A, shows the simple manner in which the joint or hinge is made, by driving a long pin through the jaws of the upright and through the flag-pole, allowing about one-third of the pole to extend over the water for the attachment of the fish-line.

SUMMER.

HOME-MADE BOATS.

THE "Crusoe-raft" is an immense success, and the "Man Friday" has been used, not only by the boy readers of this book, but by the parents and big brothers of the boys in their hunting trips, and these rustic crafts may now be seen on many of the unfrequented lakes deep in the North Woods; in fact, these two simple and primitive boats have become so popular that the writer will add another to the list, if anything, still more primitive in design.

The advance-guard of modern civilization is the lumberman, and following close on his heels comes the all-devouring saw-mill. This fierce creature has an abnormal appetite for logs, and it keeps an army of men, boys, and horses busy in supplying it with food. And, while it supplies us with lumber for the carpenter, builder, and cabinet-maker, it at the same time, in the most shameful way, fills the trout-streams and rivers with great masses of sawdust, which kills and drives away the fish. But near the saw-mill there is always to be found material for a

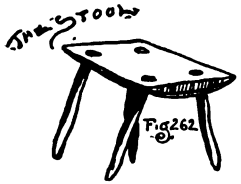
Slab Canoe,

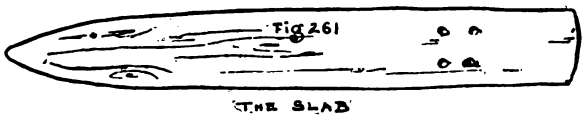
which consists simply of one of those long slabs, the first cut from some giant log. (Fig. 261.)

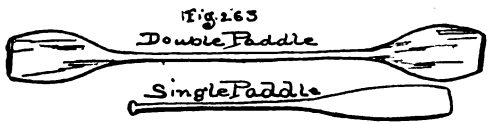
These slabs are burned or thrown away by the mill-owners, and hence cost nothing; and as the saw-mill is in advance of

population, you are most likely to run across one on a hunting or fishing trip.

Near one end, and on the flat side of the slab (Fig. 261),





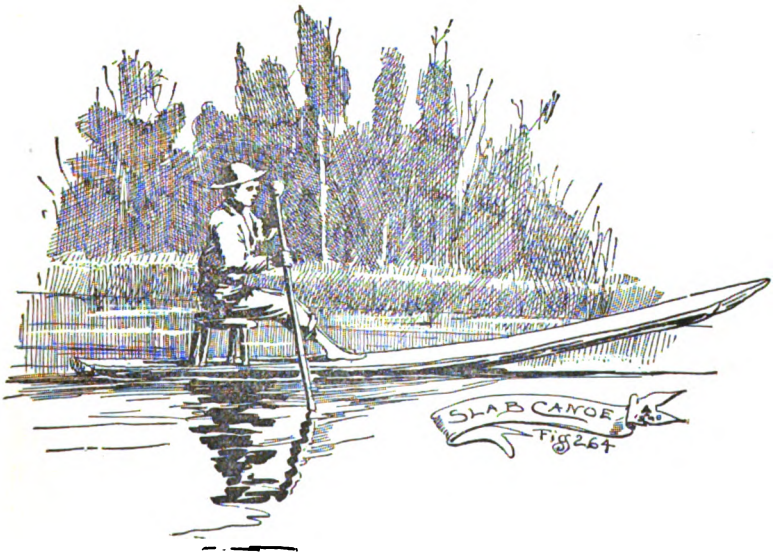


bore four holes, into which drive the four legs of a stool made of a section of a smaller slab (Fig. 262), and your boat is ready to launch. From a piece of board, make a double or single paddle (Fig. 263), and you are equipped for a voyage. An old gentleman, who in his boyhood days on the frontier frequently used this simple style of canoe, says that the speed it makes will compare favorably with that of many a more pretentious vessel. See Fig. 264 for furnished boat.

How to Build a Birch Bark Canoe.

According to the Baltimore *Sun*, birch canoes are greatly increasing in popularity. At most of the summer resorts they will soon supersede all other craft that have to be propelled by

hand. There are several reasons for this renewal of favor. They are not hard to propel, they are pretty, and in experienced hands perfectly safe. They are also indispensable to sportsmen. So general is the favor in which these light and graceful boats are held that the building of them has become quite an industry in Maine, especially along the Penobscot River.



Although the Indian was the first to build these simple little boats, some of his white brothers are quite as expert in the work. But the red man can outdo his white brother in navigating the craft. The only tools required in building a canoe are a knife and awl, a draw-shave and a hammer. An Indian can do all of his work with a knife.

Several years ago canvas began to be used extensively in canoe-building, instead of birch bark, but it will never entirely

supersede birch, for nothing can be found that bends so gracefully. There are several canvas canoe factories in Maine, but the canoes made of canvas have neither the symmetry nor the durability of the birches. They are a trifle cheaper, however, but if pleasure and profit are wanted, one should never have anything but a bark craft.

If properly handled, a good canoe will safely hold four men. Canoes intended for deep water should have considerable depth. Those intended for shoal water, such as trout fishers use, are made as flat as possible. Up to the time when canoeing was introduced the materials for building craft of this kind could be found all along the rivers. Big birch-trees grew in countless numbers, and clear, straight cedar was quite as plentiful within a few feet of the water's edge. Now one must go miles back into the dense forests for such materials, and even then seldom does it happen that two suitable trees are found within sight one of the other. Cedar is the harder of the two to find.

When the writer's young friend Mr. E. T. Adney, the artist, naturalist, and backwoodsman, returned from the North Woods, he told the author that among other accomplishments he had learned how to build a real Indian birch bark canoe. His description of the manner in which this graceful boat is made was so interesting that the main points are here inserted for the benefit of those who are ambitious of becoming skilled in wood craft.

Indian Birch Bark Canoe.

THE TREE.

The tree is selected, first, for straightness, second, smoothness, third, freedom from knots or limbs, fourth, toughness of bark, fifth small size of eyes, sixth, length—which last is not so important, as two trees can be put together—and seventh, size, which is also not so important, as the sides can be pieced out.

DIMENSIONS.

The average length of canoe is about 19 feet over all, running, generally, from 18 to 22 feet for a boat to be used on inland waters, the sea-going canoes being larger, with relatively higher bows. The average width is about 30 inches inside, measured along the middle cross-bar; the greatest width inside is several inches below the middle cross-bar, and is several inches greater than the width measured along said cross-bar.

The measurements given below are those of a canoe 19 feet over all; 16 feet long inside, measured along the curve of the gunwale; 30 inches wide inside. The actual length inside is less than 16 feet, but the measurement along the gunwales is the most important.

BARK.

Bark can be peeled when the sap is flowing or when the tree is not frozen—at any time in late spring, summer, and early fall (called summer bark); in winter during a thaw, when the tree is not frozen, and when the sap may have begun to flow.

DIFFERENCE IN THE BARK.

Summer bark peels readily, is smooth inside, of a yellow color, which turns reddish upon exposure to the sun, and is chalky-gray in very old canoes. Winter bark adheres closely, and forcibly brings up part of the inner bark, which on exposure turns dark red. This rough surface may be moistened and scraped away. All winter-bark canoes must be thus scraped and made smooth. Sometimes the dark red is left in the form of a decorative pattern extending around the upper edge of the canoe, the rest of the surface being scraped smooth.

PROCESS OF PEELING.

The tree must be cut down so that the bark can be removed more easily.

A log called a skid (Fig. 265) is laid on the ground, a few feet from the base of the tree, which will keep the butt of the tree off the ground when the tree is felled. The limbs at the top will keep the other end off the ground. A space is cleared of bushes and obstructions where the tree is to fall.

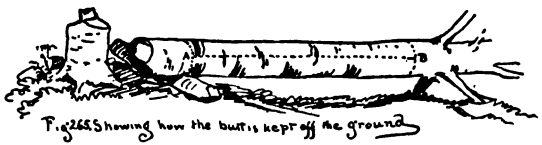
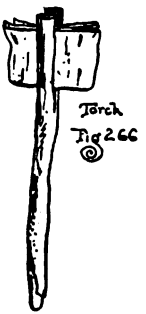


Fig 265 Showing how the butt is kept off the ground

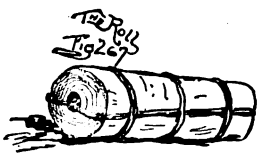
After the tree has been cut down, a cut is made in a straight line (A, B, Fig. 265), splitting the bark from top to bottom, and a ring cut at A and B (Fig. 265). When sap is flowing, the bark is readily removed; but in winter, the edges of the cut are raised with a knife, and a thin, pliant hardwood knife or "spud" is pushed around under the bark.



Torch
Fig 266

TOASTING.

After the bark has dropped upon the ground, the inside surface is warmed with a torch, which softens and straightens it out flat. The torch is made of a bundle of birch bark held in a splitstick (Fig. 266).



The Roll
Fig 267

It is then rolled up like a carpet, with inside surface out, and tightly bound, generally with cedar bark when the latter can be procured (Fig. 267).

If the tree is long enough, a piece is taken off at least nineteen feet in length. so that the ends of the canoe may not be

pieced out. A few shorter pieces are wrapped up with the bundle for piecing out the sides.

THE ROLL

is taken on the back in an upright position, and is carried by a broad band of cedar bark, passing under the lower end of the roll and around in front of the breast and shoulders (Fig. 268).

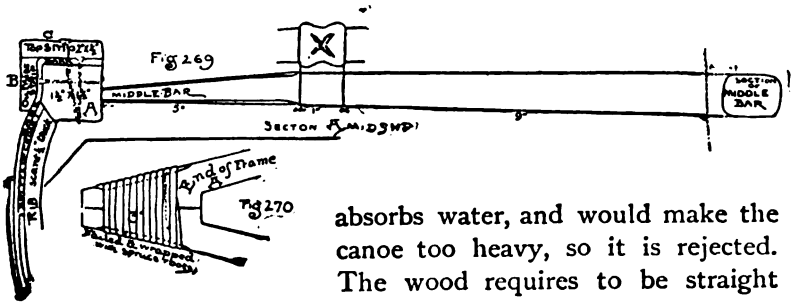
EFFECTS OF HEAT.

It is laid where the sun will not shine on it and harden it. The first effect of heat is to make it pliant. Long exposure to heat or to dry atmosphere makes it hard and brittle.

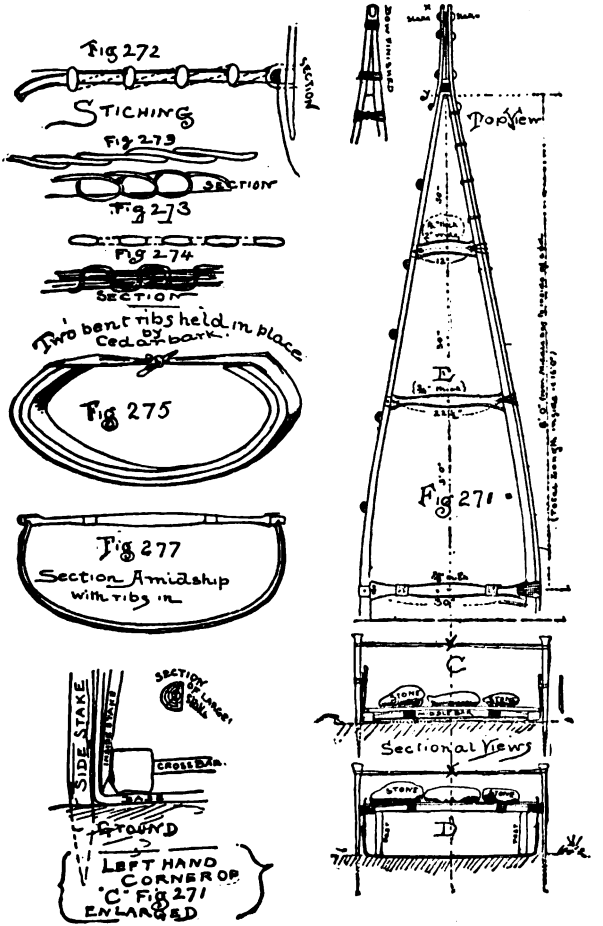
THE WOODWORK

is as follows:

Five cross-bars of rock-maple (Figs. 269, 271, and 277). All the rest is of white cedar, taken from the heart. The sap-wood



absorbs water, and would make the canoe too heavy, so it is rejected. The wood requires to be straight

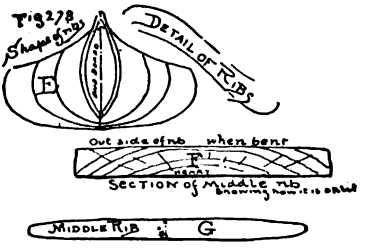


and clear, and it is best to use perfectly green wood for the ribs.

Two strips 16½ feet long, 1½ inch square, tapering toward either end, the ends being notched (see Fig. 269, A). Each

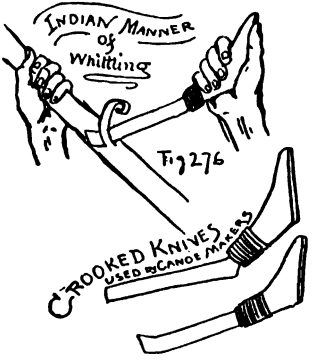
strip is mortised for the cross-bars as follows (see Fig. 271). The lower outside edge is bevelled off to receive the ends of the ribs.

For dimensions of cross-bars see Fig. 271. The cross-bars are placed in position, and the ends of the gunwales are tied with spruce roots after being nailed together to prevent splitting. Each bar is held in place by a peg of hard wood.



For stitching and wrapping, long, slender roots of spruce, or sometimes of elm, are peeled and split in two. Black ash splits are rarely used except for repairing (Figs. 272, 273, 274).

Next (B, Fig. 269) two strips 1 or 1¼ inch by ⅛ inch, a little over 19 feet long, to go outside, and (C, Fig. 269) two top strips, same length, two inches wide in middle, tapering to one inch at either end, 1⅛ inch thick.



RIBS.

About fifty in number (Figs. 277–78) are split with the grain (F, Fig. 278), so that the heart side of the wood will be on the inner side when the rib is bent. The wood bends better this way. They must be perfectly straight-grained and free from knots. Ribs for the middle are four inches wide, ribs for the ends about three inches wide (Fig. 277 and G, Fig. 278), and are whittled down to a scant half an inch (Fig. 276). Green wood is generally used, and before it has had any time to sea-

son. The ribs may be softened by pouring hot water on them, and should be bent in pairs to prevent breaking (Fig. 275). They are held in shape by a band of cedar bark passed around outside.

The ribs are of importance in the shaping of the canoe. The sides bulge out (Fig. 277–78). The shape of the ribs determines the depth and stability of the canoe.

LINING STRIPS.

Other strips, an eighth of an inch thick, are carefully whittled out, with straight edges. They are a little over eight feet long, and are designed to be laid inside on the bark, edge to edge, between the bark and the ribs. These strips lap an inch or two where they meet, in the middle of the canoe, and are wider here than at the ends, owing to the greater circumference of the canoe in the middle.

SEASONING.

Before building all the timber is carefully tied up and laid away. The ribs are allowed to season perfectly, so that they will keep their shape, and not spring back.

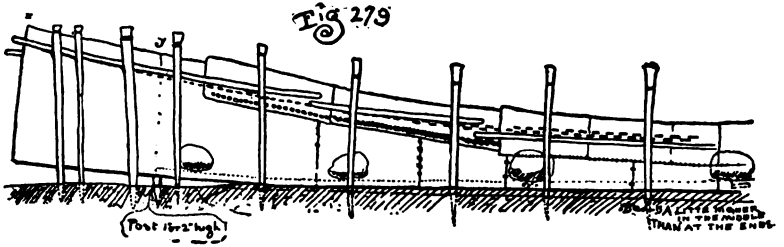
THE BED.

Next the bed is prepared on a level spot, if possible shaded from the sun. A space is levelled about three and a half feet wide and a little longer than the canoe. The surface is made perfectly smooth. The middle is one or two inches higher than either end.

BUILDING.

The frame is laid exactly in the middle of the bed. A small post is driven in the ground (Fig. 279), on which each end of the frame will rest. Stakes, two or three feet long and about two inches in diameter, are whittled flat on one side, and are driven with the flat side toward the frame at the following

points, leaving a space of about a quarter of an inch between the stake and the frame (Fig. 279), one stake an inch or two on either side of each cross-bar, and another stake half way between each cross-bar. This makes eleven stakes on each side of the frame. Twelve additional stakes are driven as follows: One pair facing each other, at the end of the frame; another pair, an



inch apart, about six inches from the last pair, measuring toward the ends of the canoe; and another pair, an inch apart, a foot from these. These last stakes will be nine and a half feet from the middle of the frame, and nineteen feet from the corresponding stakes at the other end. Next, these stakes are all taken up, and the frame laid aside.

TO SOFTEN THE BARK.

Next, the bark is unrolled. If it has laid until it has become a little hardened, it is placed in the river or stream for a day or two. It is spread out flat, and laid upon the bed with the gray or outside surface up. The inside surface it placed downward, and becomes the outside of the canoe.

The frame is replaced upon the bark, so that it will be at the same distance from each side and end of the bed that it was before. At each cross-bar boards are laid across the frame, and heavy stones are laid upon them to keep the frame solid and immovable upon the bark (Fig. 271, C). The edges of the bark

are next bent up in a perpendicular position, and in order that it may bend smoothly slits are made in the bark in an outward direction, at right angles to the frame. A cut is made close to the end of each cross-bar, and one half way between each bark, which are generally sufficient to allow the bark to be bent up smoothly. As the bark is bent up, the large stakes are slipped back in the holes which they occupied before, and the tops of each opposite pair are connected with a strip of cedar bark which keeps the stakes perfectly perpendicular. At each end it is necessary to take out a small triangular piece or gore, so that the edges may come together without lapping.

Next twenty-two pieces of cedar, one to two feet long, and about $\frac{1}{8}$ or $\frac{3}{4}$ inch thick, are split out, and whittled thin and flat at one end. This sharpened edge is inserted between the outside edge of the frame and the bent-up bark, opposite each large stake. The other end of the chisel-shaped piece is tightly tied to the large stake outside. By means of the *large outside stake* and the inside "*stake*," so-called, the bark is held in a perfectly upright position; and in order to keep the bent-up part more perfectly flat and smooth, the strips of cedar are pushed in lengthwise between the stakes and the bark, on each side of the bark (Fig. 271, C, D).

Sometimes, in place of having temporary strips to go on outside of the bark, the long outside strip described before is slipped in place instead.

It may now be seen if the bark is not wide enough. If it is not, the sides must be pieced out with a narrow piece, cut in such a way that the eyes in the bark will run in the same direction as those of the large piece.

As a general rule, from the middle to the next bar the strip for piecing is placed on the inside of the large piece, whose upper edge has previously been trimmed straight, and the two are sewed together by the stitch shown in Fig. 272, the spruce

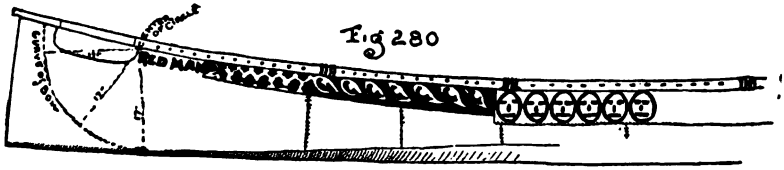
root being passed over another root laid along the trimmed-off edge of the large piece of bark to prevent the stitches from tearing out. From the second bar to the end of the canoe, or as far as may be necessary, the strip is placed outside the large piece, and from the second to the end bar is sewed as in Fig. 273, and from the end bar to the end of the canoe is stitched as in Fig. 274.

Next, the weights are taken off the frame, which is raised up as follows, the bark remaining flat on the bed as before:

A post eight inches long is set up (Fig. 271, D), one end resting on the bark and the other end supporting either end of the middle cross-bar. Another post, nine inches long, is similarly placed under each end of the next cross-bar. Another, twelve inches long, is placed under each end of the end cross-bar; and another, sixteen and a half or seventeen inches, supports each end of the frame.

As the posts are placed under each cross-bar, the weights are replaced; and as these posts are higher at the ends than in the middle, the proper curve is obtained for the gunwales. The temporary strips, that have been placed outside the bent-up portion of the bark, are removed, and the long outside strip before mentioned (B, Fig. 269) is slipped in place between the outside stakes and the bark. This strip is next nailed to the frame with wrought-iron nails that pass through the bark and are clinched on the inside. This outside strip has taken exactly the curve of the frame, but its upper edge, before nailing, was raised so as to be out an eighth of an inch (or the thickness of the bark) higher than the top surface of the frame, so that when the edges of the bark have been bent down, and tacked flat to the frame, a level surface will be presented, upon which the wide top strip will eventually be nailed. Formerly the outer strip was bound to the frame with roots every few inches, but now it is nailed.

The cross-bars are now lashed to the frame, having previously been held only by a peg. The roots are passed through holes in the end of the bars, around the outside strip (see right hand side of Fig. 271). A two-inch piece of the bark, which



has been tacked down upon the frame, is removed at the ends by the cross-bars, where the spruce-roots are to pass around, and the outside strip is cut away to a corresponding extent, so that the roots, when wrapped around, will be flush with the surface above.

All the stakes are now removed, and laid away to be ready for the next canoe that may be built, and the canoe taken upside down upon two horses or benches, that will keep the craft clear of the ground.

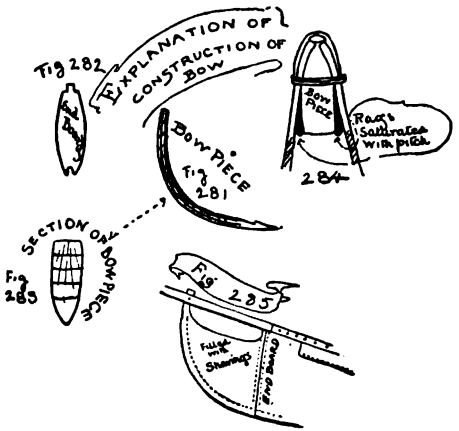
The shape of the bow is now marked out, either by the eye or with mechanical aid, according to the following rule: A circle, with a radius of seventeen inches, is described (Fig. 280), having as a centre a point shown in diagram. The bark is then cut away to this line.

BOWPIECE.

To stiffen the bow, a bowpiece of cedar, nearly three feet long (Fig. 281), an inch and a half wide, and half an inch thick on one edge, bevelled and rounded off toward the other edge, is needed. To facilitate bending edgeways it is split into four or five sections (as in Fig. 283) for about thirty inches. The end that remains unsplit is notched on its thicker edge (Fig. 281) to

receive the lower end of an oval cedar board (Fig. 282) that is placed upright in the bow underneath the tip of the frame. It is bent to correspond with the curve of the boat, with the thin edge toward the outside of the circle, and wrapped with twine, so that it will keep its shape. The bowpiece is placed between the edges of the bark, which are then sewed together by an over-and-over stitch, which passes through the bowpiece.

A pitch is prepared of rosin and grease, in such proportions that it will neither readily crack in cold water nor melt in the sun. One or the other ingredient is added until by test it is found just right.



PATCHING AND PITCHING.

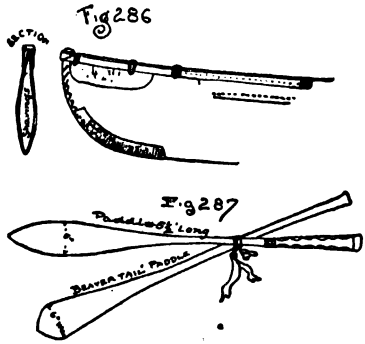
The canoe is now placed on the ground, right side up, and all holes are covered on the inside with thin birch bark, that is pasted down with hot pitch. A strip of cloth is saturated with hot pitch, and pressed into the cracks on either side of the bow-piece inside, between the bark and the bowpiece (Fig. 284).

The thin longitudinal strips are next laid in position, edge to edge, lapping several inches by the middle; they are whittled thin here so as to lap evenly.

The ribs are next tightly driven in place, commencing at the small end ones, and working toward the middle. The end ribs may be two or three inches apart, being closer toward the middle, where, in many cases, they touch. Usually, they are

about half an inch apart in the middle. Each rib is driven into place with a square-ended stick and a mallet.

The ends are stuffed with shavings (Fig. 285 and "Section" Fig. 286), and an oval cedar board is put in the place formerly occupied by the post that supported the end of the frame. The lower end rests in the notch of the bowpiece, while the upper is cut with two shoulders that fit underneath each side of the frame; Fig. 282 shows the cedar board.



The top strip is next nailed on to the frame. Almost always a piece of bark, a foot or more long, and nine or ten inches wide, is bent and slipped under, between both top and side strips and the bark. The ends of this piece hang down about three inches below the side strips. The loose ends of the strips are bound together, as in diagram, and the projecting tips of both strips and bowpiece are trimmed off close.

Next, the canoe is turned upside down. If winter bark has been used, the surface is moistened, and the roughness scraped off with a knife. Generally the red rough surface is left in the form of a decorative pattern several inches wide around the upper edge (Fig. 280). Sometimes the maker's name and date are left in this way.

Finally, a strip of stout canvas, three or four inches wide, is dipped in the melted pitch, and laid on the stitching at the ends, extending up sufficiently far above water line. All cracks and seams are covered with pitch, laid on with a small wooden paddle. While still soft, a wet finger or the palm of the hand is rubbed over the pitch to smooth it down before it hardens.

LEAKS.

Water is placed inside, and the leaky places marked, to be stopped when dry. A can of rosin is usually carried in the canoe, and when a leak occurs, the canoe is taken out of the water, the leak discovered by sucking, the place dried with a torch of wood or birch bark, and the pitch applied.

Paddles are made of rock maple, and sometimes of birch and even cedar. Bow paddles are usually longer and narrower in the blade than stern paddles (Fig. 287).

BOTTOM PROTECTION.

Sometimes the canoe is shod with "shoes," or strips of cedar, laid lengthwise, and tied to the outside of the bark with ash splits that pass through holes in the cedar shoes, and are brought up around the sides of the canoe and tied to each cross-bar. This protects the bottom of the boat from the sharp rocks that abound in some rapid streams.

All canoes are of the general shape of the one described, though this is considerably varied in different localities, some being built with high rolling bows, some slender, some wider, some nearly straight on the bottom, others decidedly curved.

Besides the two paddles the canoe should carry a pole ten feet long, made of a slender spruce, whittled so as to be about one and three-fourths inch in diameter in the middle, and smaller at either end, and having at one end either a ring and a spike or else a pointed cap of iron. The pole is used for propelling the canoe up swift streams. This, says my informant, "is absolutely indispensable." The person using the pole stands in one end, or nearer the middle if alone, and pushes the canoe along close to the bank, so as to take advantage of the eddies, guiding the canoe with one motion, only to be learned by practice, and keeping the pole usually on the side next the bank. Where

the streams have rocky and pebbly bottoms poling is easy, but in muddy or soft bottoms it is tiresome work.

There is not one man in ten around a boat-house that knows how to handle a shell boat. Frail as these little racing machines are they will last a long time with careful handling.

Now, the same general remarks apply to a birch bark canoe, and careless handling will soon spoil a beautiful craft. Figs. 288, 289, 290, 291, will show the reader how to pick up and carry his boat without injuring it.

A CANVAS CANOE

can be made by substituting canvas in the place of birch bark; and if it is kept well painted it makes not only a durable but a very beautiful boat. The writer owns a canvas canoe that is at least fifteen years old and is still in good condition.

About six yards of ten-ounce cotton canvas, fifty inches wide, will be sufficient to cover a canoe, and it will require two papers of four-ounce tinned tacks to secure the canvas on the frame.

The boat should be placed, deck down, upon two "horses" or wooden supports, such as you see carpenters and builders use.

Fold the canvas lengthwise, so as to find the centre, then tack the centre of one end of the cloth to top of bow-piece or stem, using two or three tacks to hold it securely. Stretch the cloth the length of the boat, pull it taut, with the centre line of the canvas over the keel line of the canoe, and tack the centre of the other end of the cloth to the top of the stern piece.

If care has been taken thus far, an equal portion of the covering will lap the gunwale on each side of the boat.

Begin amidships and drive the tacks, about two inches apart, along the gunwale and an inch below the deck (on the outside). Tack about two feet on one side, pull the cloth tightly across,

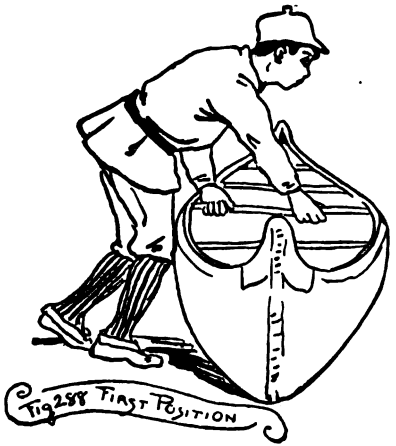
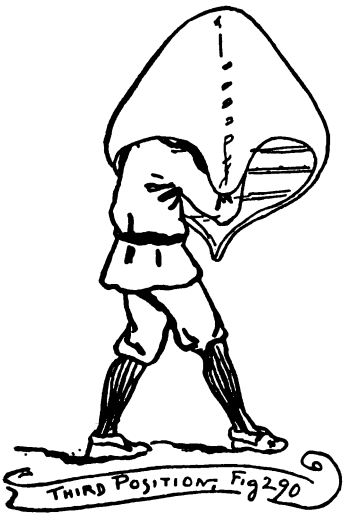


Fig 288 First Position

Second Position Fig 289



Third Position. Fig 290

Fig 291
Fourth Position
The Carry

and tack it about three feet on the other side. Continue to alternate, tacking on one side and then the other, until finished.

With the hands and fingers knead the cloth so as to thicken or "full" it where it would otherwise wrinkle, and it will be possible to stretch the canvas without cutting it over the frame.

The cloth that projects beyond the gunwale may be used for the deck, or it may be cut off after bringing it over and tacking upon the inside of the gunwale, leaving the canoe open like a birch bark.

The Dug-out.

Although not quite as delicate in model or construction as the graceful birch-bark canoe, the "dug-out" of the Indians is a most wonderful piece of work, when we consider that it is carved from the solid trunk of a giant tree with the crudest of tools, and is the product of savage labor.

Few people now living have enjoyed the opportunity of seeing one built, and, as the author is not numbered among that select few, he considers it a privilege to be able to quote the following interesting account given by Mr. J. H. Mallett, of Helena.

How to Build a Siwash Canoe.

"While visiting one of the small towns along Puget Sound, I was greatly interested in the way the Indians built their canoes. It is really wonderful how these aborigines can, with the crudest means and with a few days' work, convert an unwieldy log into a trim and pretty canoe.

"One Monday morning I saw a buck building a fire at the base of a large cedar-tree, and he told me that this was the first step in the construction of a canoe that he intended to use upon the following Saturday. He kept the fire burning merrily all that day and far into the night, when a wind came up and com-

pleted the downfall of the monarch of the forest. The next day the man arose betimes, and, borrowing a cross-cut saw from a logger, cut the trunk of the tree in twain at a point some fifteen feet from where it had broken off, and then with a dull hatchet he hacked away until the log had assumed the shape of the desired canoe. In this work he was helped by his squaw. The old fellow then built a fire on the upper part of the log, guiding the course of the fire with daubs of clay, and in due course of time the interior of the canoe had been burned out. Half a day's work with the hatchet rendered the inside smooth and shapely.

"The canoe was now, I thought, complete, though it appeared to be dangerously narrow of beam. This the Indian soon remedied. He filled the shell two-thirds full of water, and into the fluid he dropped half a dozen stones that had been heating in the fire for nearly a day. The water at once attained a boiling point, and so softened the wood that the buck and squaw were enabled to draw out the sides and thus supply the necessary breadth of beam. Thwarts and slats were then placed in the canoe, and the water and stones thrown out. When the steamed wood began to cool and contract the thwarts held it back, and the sides held the thwarts, and there the canoe was complete, without a nail, joint, or crevice, for it was made of one piece of wood. The Siwash did not complete it as soon as he had promised, but it only took him eight days."

SOAP-BUBBLES.

Since writing Chapter XIV., my little nephew has shown me an improvement on the cumbersome manner of blowing gas bubbles here described.

Blow a bubble just large enough to retain its form; put your finger over the mouthpiece of your pipe to prevent the escape of air; then quickly but gently place the bubble over the gas-burner, that has previously been dampened with soap-water.

The gas-burner will enter the bubble without bursting it, and when the gas is turned on, will fill the bubble, which can then be removed and sent skyward without difficulty, thus obviating the necessity of the rubber tube. Here is another suggestion from a young friend:

"I was very much interested in the directions for making bubbles. I make them sometimes with an empty spool, by rubbing it on the soap; then dipping it in the water only a very little, and blowing through the other end, I make as nice a bubble as though I used a pipe."

ONE OF YOUR READERS.

PAPER FIRE-WORKS.

Simultaneously with the announcement in the New York City papers that by an explosion of red fire the author of this book had met with a terrible accident, and the probable loss of his eyesight, there appeared in the *Youths' Companion*, an article by the injured party on "Harmless Paper Fire-works."

If the author had confined himself to his own suggestions he would have had just as much or more enjoyment, saved himself a terrible ordeal, and six months' loss of time, besides saving his friends from the anxiety they felt over the doubtful recovery of his sight. And here he wants to thank the number of boys, strangers to him by name, but whose friendship he values and evidently possesses, for their very kind letters during his tem-

porary blindness, which letters he was unable to answer on account of the red fire having, for the time being, closed and sealed those wonderful little curtains we call the eyelids.

Paper Thunderbolts

do not, as might be inferred from their name, make a noise, but silently dart about in the sky in a most novel and amusing manner.

When Mr. W. Hamilton Gibson occupied the studio at 191 Broadway, and the author was a travelling surveyor, Mr. Gibson used to amuse himself and friends by making these thunderbolts and dropping them from the window of his studio.

FIG. 292.

FIG. 293.

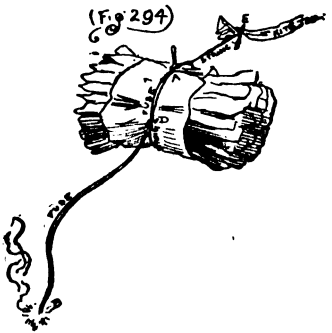
Cut some colored paper into pieces about four inches wide and eight inches long. Then at one end of each piece cut it into strips about one-third of the length of the paper (Fig. 292). Pinch the uncut end of the paper together, and twist it tightly, so that it will not come undone (Fig. 293).

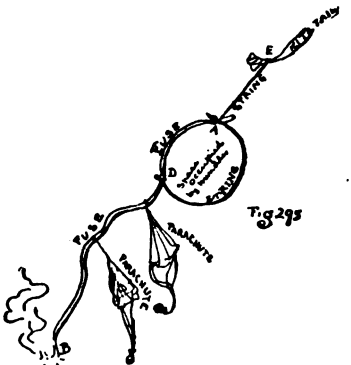
The Fuse.

If one can be procured, buy a miner's fuse; if not, soak a piece of loosely twisted twine or cord in wet gunpowder and allow it to dry, or use the fuses from the centre of a pack of fire-crackers.

Make a bundle of a hundred or more various-colored thunderbolts, wrap them loosely in a piece of tissue-paper, and bind them with a piece of twine which has first been tied to the fuse, about an inch or two from the end of the latter, in such a manner that the inch or two of fuse forms part of the band around the thunderbolts (Fig. 294), while the rest of the fuse is left free (D to B, Figs. 294–5).

Then make fast the loose end of the twine to your big Fourth of July kite's tail (E, Figs. 294–5). Send up the kite, and, just as she rises, light the free end of the fuse, and as the





kite ascends the fuse will burn slowly up to the bundle until it reaches the part where it forms part of the band around the thunderbolts. As sood as it burns here the weight of the bundle severs the charred band, and down come all the odd-shaped pieces of paper, darting this way and that, and all of them acting as if possessed with life, presenting not only an amusing but a really beautiful sight in the sky.

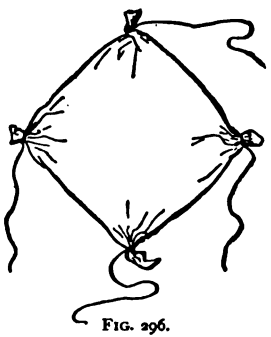


Fig. 296.

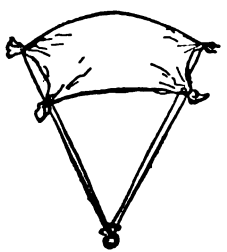


Fig. 297.

Parachutes.

If a number of simply made parachutes be attached to the powder-soaked string, at intervals, as the fuse burns to the point of attachment, they will drop off, and float away in a most graceful and beauti-

ful manner. Make the parachutes of tissue-paper cut into pieces about five inches square. Twist each corner, and fasten to it a thread about eight inches long (Fig. 296). Wrap a small pebble in pieces of scrap-paper, and make it take the form of a torpedo: make the four free ends of thread fast to the pebble (Fig. 297). A twist in the centre of the paper will give a point to attach the thread to (Fig. 297), the other end is fastened to the fuse (Fig. 295). Besides parachutes and thunderbolts,

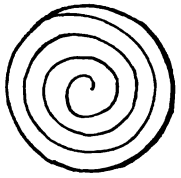


FIG. 298.

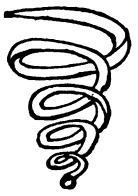
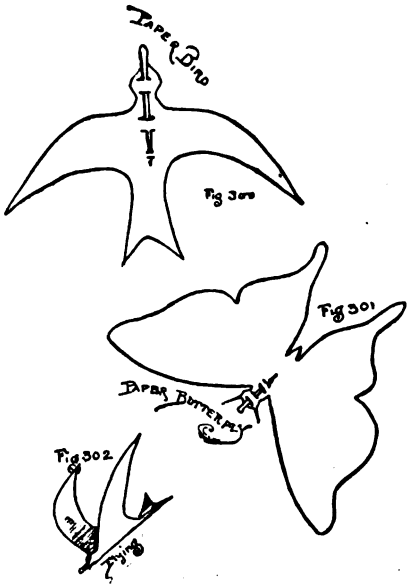


FIG. 299.

Paper Whirligigs

can be made (Fig. 298) of common wrapping-paper cut in the form of spirals. Some sort of weight, not too heavy, must be gummed to the centre of the whirligig, so that when freed in mid air the weight will draw the spiral out, and they will present a curious sight, as they go wriggling and twisting toward the earth (Fig. 299).



Birds and butterflies may be made in the forms shown by Figs. 300, 301, 302. A stick run through the head and neck gives them the proper balance to make them pitch and dive as they go through the air.

With paper fireworks an enjoyable day may be spent and the glorious Fourth of July passed with no danger of such a painful accident as happened to the writer July 4, 1884, but from which he fully recovered.

Home-made Hunting Apparatus.

WHITTLING.

Some one has been trying to claim for the practice of whittling an English origin, and in a little work, published in London in 1774, entitled "The Sentimental Exhibition; or, Portraits and Sketches of the Times," may be found the following statement: "M. Grosse, or some other Frenchman, remarks, that when we English have no other employment, we are sure to do mischief, and, therefore, when a parcel of sailors go into an inn at Wapping, the landlord delivers to each of them a stick and a knife with which to amuse himself, that they may not destroy the host's furniture."

In Kentucky and all through the Southwest, fifty years ago, it was the custom to have piled up on the hotel counter a lot of neat cedar sticks. Each guest, as he left the dining-room, selected a stick, and, taking out his jack-knife, commenced to whittle as he talked. So universal was this habit that he probably would have been unable to talk without whittling. The author has seen the most complicated wooden chains and cubes, with movable balls inside, that were whittled out of solid sticks by some of these old-time experts, and are now kept as curiosities by their children.

Now, however, whittling is confined mostly to boys, and, as the Americans are noted for their practical ideas, there is no reason why American boys should not make something of use, at least to themselves, with their jack-knives. Suppose my reader commences with a piece of straight-grained pine, about one or one-and-a-half inch thick, and free from knots.

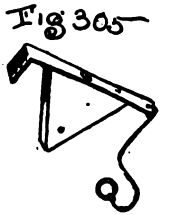
THE ELASTIC GUN.

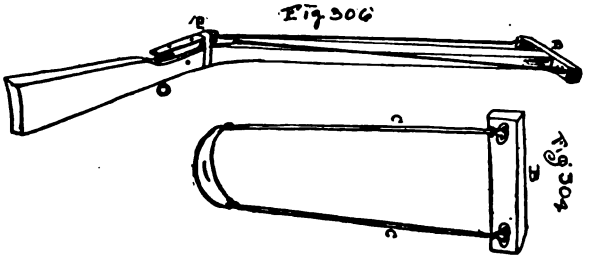
Carve a gun-stock in the form of Fig. 303, smoothe it nicely, and cut a slot (A) for the trigger.

THE SLING.

Cut a piece of wood long enough to project about one inch or more on each side of the barrel (B, Fig. 304), and screw it firmly to the muzzle. Near the ends of the cross-piece, put screw-eyes, and attach a strong elastic to each screw-eye (C, C, Fig. 304). To the elastics fasten a soft leather sling with strong cords. A still more simple way is to screw the screw-eyes one on each side of the muzzle of the gun, and fasten the elastics on to them.

ELASTIC GUN—THE STOCK.





THE TRIGGER.

Make the trigger of a piece of perfectly straight hoop-iron, three or four inches long; with a nail, punch two holes in it; bend about half an inch of one end of the iron at right angles; then make a triangular block of wood, and bore a hole in one corner,

and with a screw fasten the hoop-iron on securely; fasten one end of a short string to the hole in the straight end of the hoop-iron, and to the other end of the string attach a ring.

Put the trigger in the slot (A, Fig. 303), and let it fit closely but move freely. Put a screw into the stock so that it will run through the corner of the triangle of the trigger and through the stock to hold the trigger in place.

Slip a strong rubber band around the trigger (E, Fig. 306), and the gun is finished and ready to use.

The boy who invented this gun as an improvement on the one described on page 198, states that it will shoot with great accuracy and force. After a little practice he claims that he could snuff a candle at fifty feet.

Archery.

There are innumerable books written on this sport, and consequently it does not fall under the list of subjects appropriate to the American Boys' Handy Book, except in the form of an introduction to some home-made weapons.

Archery as a fashionable recreation is now upon the ebb, but archery for boys is, and has been always, a popular and inexpensive pastime.

The bold Robin Hood is still the boy's hero. He was an outlaw, but outlaws in his days were often more respectable than the polished courtiers who followed the king. Robin Hood's fame, as a bowman, has done not a little to add to the popularity of the sport, although the best authorities of to-day claim that the tales of the wonderful feats in archery by this bold outlaw and his men cannot be regarded as strictly true. A writer for the New York *Sun* says that: "The longest distance that an arrow has been sent from a bow, the record of which may be regarded as authentic, is 972 yards. This tremendous feat was accomplished by Selim, Grand Seignor of Turkey, in

1798. The record was carefully taken by Sir Robert Ainslie, at that time British representative at the Turkish court. The bows of to-day could not throw an arrow under the best conditions half that distance. The Turks made their bows to use as weapons, and they were accordingly long and heavy, and the arrow that Selim shot was a light one. One of the best long records made in England was the work of a Turkish bow and a Turkish archer. It was in 1792, when Mahmoud Effendi, Secretary to the Turkish Embassy, shot an arrow a distance of 482 yards. The best bows of the present time find their limit at about 400 yards. These records are simply indicative of the strength of the bows and the archers."

Occasionally we hear of some good work with the bow in our own country. Not long since, when a flock of wild geese passed over Virginia City and wheeled in one of their circles, Otey, the long-bowman and "Lone Archer of the Sierra," sent a shaft among them. It was a long shaft, but it was well aimed. It went whizzing through the air and penetrated one of the wings of a flyer, causing it to flutter and lose place in the flock, which proves that we have some experts in this country who do not belong to the red-skinned fellows, who are being so rapidly and shamefully exterminated in the West.

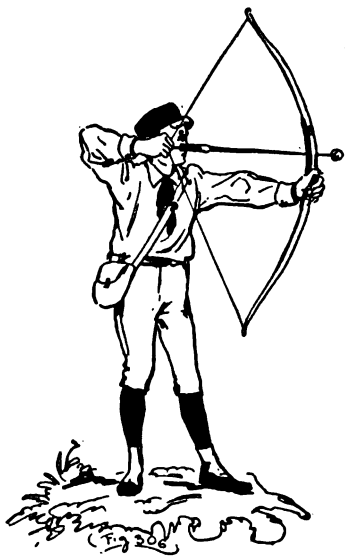
My readers, I hope, are perfectly able to make their own weapons, and need not call upon their parents for money to buy shop-made outfits, for they are expensive. The best yew bows for ladies cost from $18 to $50 each; the same for gentlemen, $20 to $100 each. Arrows for ladies are $3.50 to $11 per dozen; for gentlemen, $5 to $12 per dozen. Practising arrows can be bought as low as $1.50 and $2.00 per dozen. Bowstrings cost 25 to 50 cents each. For ladies, quivers cost $1.50 to $2.75 each; for gentlemen, $2.50 to $3.50 each. The rest of the outfit consists of arm-guards, $1 to $2 each; shooting-gloves, 75 cents to $2 each; tips for bows, 50 to 75 cents per

pair, and tassels, 50 to 75 cents each. Targets can be bought all the way from $1 to $7 apiece; target-stands, $2.50 to $5 each; green baize bow-covers, 75 cents each, and scoring-cards and tablets, ivory and ebony prickers, 25 cents to $2 apiece.

American boys love novelties and improvements on all things; and if we cannot improve on Robin Hood's long bow, we can at least introduce

THE BUCKEYE BOW,

which to most boys will be a novelty, and does away with the constant liability to lose your arrows (Fig. 306).



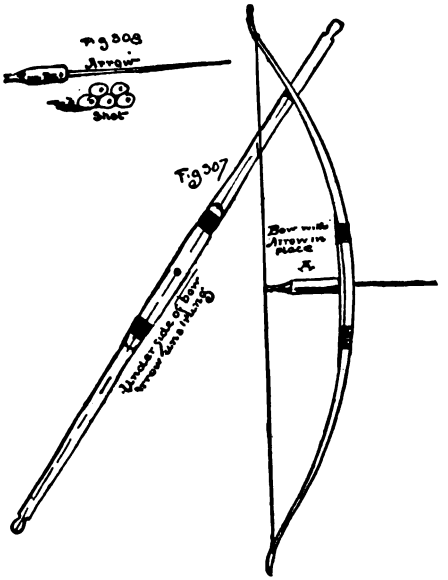
THE BUCKEYE BOW.

The illustrations here given show a new sort of bow, and a manner of using it that avoids the above difficulty.

Split a good strong barrel-stave, and whittle it into the form of a bow, two inches wide at the centre, and tapering to about three-quarters of an inch at each end. It is necessary to strengthen with another piece of stave, spliced on to the centre. Let the splice be one-third the length of the bow. Through the centre of the bow and splice, bore a hole large enough for the arrow to fit it loosely (Fig. 307).

Make the arrow of any tough, straight-grained wood, in the form shown by Fig. 308. Let it be at least three-quarters of an inch thick at the thick end. Use great care to make the thick end terminate at right angles, or, to use a boy's term, "square-

ly," at a distance from the notch exactly equal to the distance from the middle of the string to the centre of the bow when it is strung (see Figs. 307 A, and 308).



Fill your ammunition-bag with buckeyes, horse-chestnuts, or small potatoes. Clay and putty may be manufactured into balls and used as missiles.

This will make an outfit which will serve to amuse any boy, and, as with all other weapons, by practice great skill may be acquired in its use.

Stone-throwing.

I can remember boys with whom I used to play who were wonderful marksmen with stones, using only their arm and hand to propel them.

In Virginia there is said to live a young man, named Cross, who goes hunting without a gun, his sole and only weapons being smooth round stones, which he carries in his pockets. Throwing stones, he kills not only hares but partridges. Three respectable and truth-telling men assured the correspondent of the Richmond *Telegram* that they went out one day with him, they taking their guns; that he killed that day, using nothing but stones thrown from his hand, six hares running, and three partridges flying. He attended the State Fair, where a show-

man exhibited rag-babies arranged on steps and charged five cents for two throws with a ball, at say ten paces. If you struck a baby, he gave you a prize and charged nothing. You have doubtless seen the game. Cross went in, threw and struck, and struck and threw, knocking over a baby at every pop until he broke up the show.

If such skill can be acquired with the unassisted hand and arm the reader may readily see that there are still greater possibilities with many of the home-made weapons described in this book.

AUTUMN.

DECOYS.

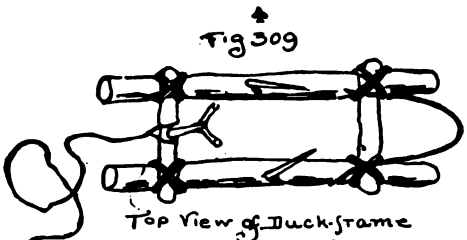
BEFORE writing anything further in this line, the author must confess that as a boy or man he never killed an animal without a feeling of remorse for what he had done, and it was only after long thought and study upon the subject that he decided to put anything about hunting and trapping in this book. But after mature deliberation, the conclusion reached was that other boys must have the same sensations as himself, when a bloody little trophy of their skill is stowed away in their game-bag, and that these feelings will prevent the average lad from killing for the sake of killing; for there is no fun in wanton destruction of life for a properly educated boy; and the writer trusts that none of his readers will ever aim their guns at a harmless song-bird, or any other creature not considered necessary for the table. And now that we understand one another, let us see if we cannot also understand the game.

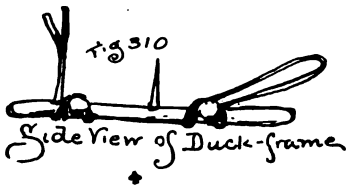
Dead Duck Decoys.

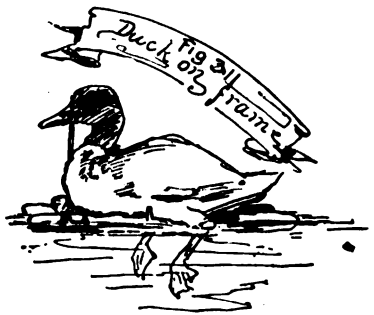
As the triangle of wild ducks in the sky approach their feeding-ground, and catch sight of their fellows, already at their repast, they argue, and rightly so, that there can be no enemy near.

Hunters and sportsmen, being well acquainted with this fact, go to the resort of the ducks, and scatter over the water a lot of frauds in the shape of ducks made of wood to deceive the wild birds overhead; but these have the usual objection that most boys find to all hunting apparatus—expense. Now, if my

reader is an expert, and can slip up within range and secure a duck or two, he can, with little trouble, convert the dead ducks into decoys to lure on their live comrades to death, and the place of honor on the dinner-table.





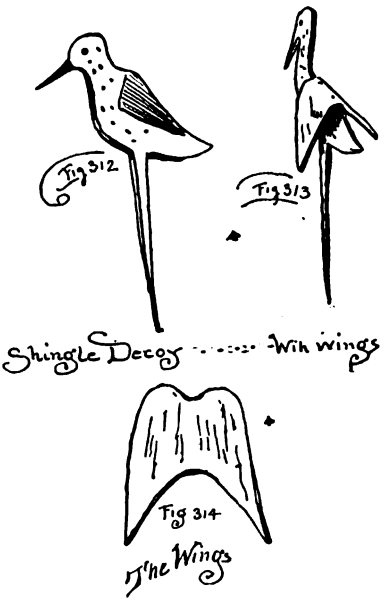


With your pocket-knife cut four pieces of wood in the proportions shown in Fig. 309; bind them together with string, take a small switch, and bend it in a loop as a support for the tail, and fasten it in place, as shown in the diagram. At what might be termed the bow, fasten an upright Y-shaped stick, or a sharp pointed one to hold the dead duck's head in place. Two pointed sticks fastened in the sides will keep the bird in place.

Fig. 310 shows a side view of the duck-frame. A string is attached to one end with a stone for an anchor; it keeps the head of the decoy to the wind, after the manner of a live duck, and the live bird will not discover the cheat until it is too late to retreat, provided the reader is a good shot. Fig. 311 shows the dead duck set up as a decoy.

Shingle Snipe and Plover Decoys.

The diagrams, Figs. 312, 313, 314, explain the construction of these decoys so well that it is only necessary to say that they can be made of shingles by the aid of your pocket-knife, and, with some paint added, will look enough like the real birds to deceive even the much-persecuted and wary snipe and plover.



The second (Fig. 313) shows one with wings of birch-bark added. Fig. 314 gives the pattern of the birch-bark wings.

To be a good hunter it is absolutely necessary to be well posted upon the habits of the creature hunted; and such a person will secure game where another person would not even suspect its presence.

Place your decoys for snipe in the muddy or marshy spot that the birds are wont to frequent; then hide in some convenient blind or cover. Of course, a top view of the shingle decoy presents only a straight line to the eye, as does a direct end view; but this matters little, as these particular views are not the ones likely to be seen by the birds, especially if there is a number of decoys set at different angles.

Notes on Taxidermy.

The writer has received so many enquiries for a good recipe for tanning skins without injury to the fur, that he takes pleas-

ure in quoting so excellent authority in such matters as Mr. Isaac H. Bailey. This gentleman published the following formulas for accomplishing this in the *Shoe and Leather Reporter:*

"Take two parts each of alum and salt, and one of saltpetre, all well pulverized. Clear the flesh of fatty matter. Sprinkle it white with the mixture. Fold in edges and roll up; remain four days, then wash with clean water, and then with soap and water. Pull the skin when drying, to make it soft.

"Another recipe is: Lay the wet skin on a smooth slab or a hard board; scrape with a dull knife until all loose flesh and film is removed; then wash off in soft water. Take a glass or stone jar, put in an ounce of oil of vitriol and a gallon of rain or river water. Let the skin steep in this for about half an hour. Take it out, work it with the hands until dry, when it will be pliable and soft. The more worked the softer. Use no grease."

How to Make an "Uncle Enos" Banjo.

Fig. No. 315, page 426, shows a cigar-box, with holes bored through the ends for the stick that supports the neck to pass through. The bottom of the box is used for the top to the banjo. The lid of the box may be left on, so that it can be closed or opened, as the taste or ear of the banjoist may direct.

Fig. No. 316 represents a pine board with a plan of the neck drawn upon it, ready to be sawed out. *D*, *d'*, *d''*, *d'''* mark the spots where holes are to be bored through for the key to turn in. The place for the low bridge that separates the strings before they enter the keys is marked by the dotted lines at *a*; a rectangular slot should be cut here to fit the bridge (Fig. 5, Diagram 318) into, as shown by the side-view of the neck (Fig. 321); *b* (Fig. 316) is a keyhole in the side of the neck for the short string. See side-view (Fig. 321).

The slot for a small bridge for the short string of the banjo is

marked by the dotted lines at *c* (Fig. 316). This little bridge is fitted in the slot, as shown in the side-view (Fig. 321).

Fig. 317 shows the broomstick, whittled down at one end, so as to fit the holes bored in the cigar-box, through which it must pass and protrude about one-half inch at the butt. The top to the upper part of the broomstick is smoothed off flat, so that the neck (Fig. 316) may be securely screwed on to it, as is more clearly shown by the side-view (Fig. 321).

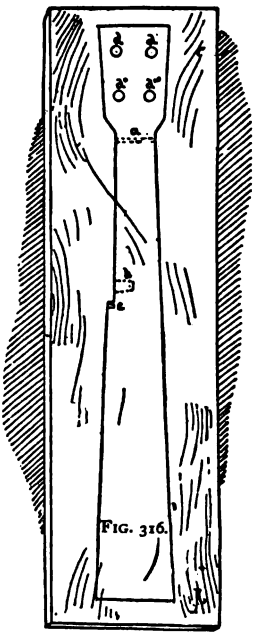


FIG. 316.

Fig. 4 (Diagram 318) shows what shape to make the keys. The latter must have holes (just large enough for the banjo strings to pass through) bored near the ends, as shown by the diagram. The keys may be made of any kind of wood—hard wood is the best.

Fig. 5 (Diagram 318) shows the bridge that fits into the slot *a* (Fig. 316), already described.

Fig. 6 (Diagram 318) is simply a piece of tin bent into the shape shown in the diagram, and made to fit over the butt-end of the banjo for the wires of Fig. 7 (Diagram 318) to pass over when the latter is put in place (see Fig. 319).

Fig. 7 (Diagram 318) is a piece of hard wood or leather with five small holes bored through it for the attachment of the banjo-strings, and a wire loop at the end that passes over the piece of tin (Fig. 6, Diagram 318), and is held in place by the tension of the strings and the protruding end of the broomstick at the butt of the banjo (Fig. 319).

The bridge proper is shown by Fig. 8 (Diagram 318). It may be cut from a piece of soft pine in a few moments, with a

pocket-knife. Its place is in front of Fig 7 (Diagram 318), where it spreads the five strings before they pass over the head and neck of the instrument.

Fig. 321 shows the neck finished and all ready to be fitted to the box. The neck is fastened to its broomstick support by two screws, as may be seen in the diagram.

Fig. 319 shows the finished instrument, all strung and ready for use.

Fig. 320 shows the arrangement of the banjo strings. The shortest string on a banjo is the fifth. And now we have reached the part where the boy who wants to make an Uncle Enos banjo will have to expend a few cents. Go to a dealer, and for the first and fifth ask for E strings. Let the first be a little

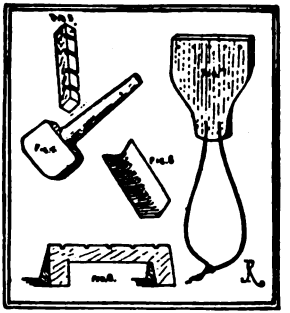


DIAGRAM 318.

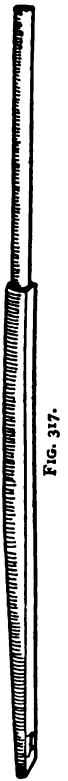


FIG. 317.

FIG. 320.

FIG. 319.

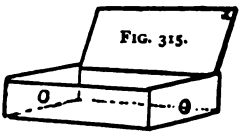


FIG. 315.

FIG. 321.

heavier than the fifth. The second should also be an E string, but much heavier than the first. For the third, ask for a guitar B string. The fourth, or bass string, is manufactured especially for the now popular banjo, and care must be taken *not* to purchase the guitar D for the banjo A, or bass; both strings are silver, wound on silk, but the latter is much finer wound than the guitar D.

The author has seen a banjo made under the direction of his old friend Uncle Enos, and the whole thing cost but half a day's labor and forty cents for strings.

WINTER.

NOTES ON SNOW-SHOES.

AWAY out in Wyoming some of our cowboy friends had great fun with the barrel-stave sleds described on page 260. They did not use them for ammunition sleds to carry snow-balls, but as toboggans. I am informed by one of the "boys," Mr. Dan Smith, that near his ranch, which is located at the foothills of the Big Horn Mountains, there is a very tall and steep-sided hill or mountain, the apex of which is scarcely large enough for a man to stand on, and is reached by a zigzag walk.

Early in the spring, after the first thaw had frozen, making a thick crust on the snow, Mr. Smith built him a barrel-stave sled, climbed to the top of the mountain with his wooden steed, and shot down the precipitous side. Down, down he went, like the wind! clearing slight hollows with a bound through the air, which excited the wildest enthusiasm among the cowboys, Indians, and half-breeds, and it was not long before there was not a barrel left in all the region around; and all day long, as long as the crust lasted, these grown-up boys flew down the mountain side amid shouts and laughter on the barrel-stave sleds described in Chapter XXVII.

Not only sleds,* hammocks, and the Norwegian† ski or "Skilobning" can be made from barrel-staves, but a very good substitute for the ordinary snow-shoe may be manufactured from the same material.

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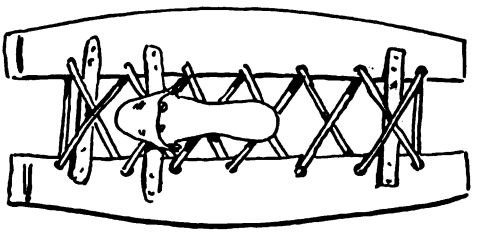
* See American Girls' Handy Book, Charles Scribner's Sons, Publishers.

† Chapter XXIX., p. 279.

Barrel-stave Snow-shoe.

Each barrel-stave snow-shoe consists of two staves, set just far enough apart to allow the sole of an old shoe to rest between. (Fig. 322). The staves are joined together by cross-pieces near each end, arranged as shown in the diagram.

Fig 322



From a pair of old boots or shoes, much too large for the expectant snow-shoer, a pair of rude slippers are made by the aid of a sharp knife (Fig. 323). This shoe or slipper is screwed firmly to the second cross-stick, as is shown in Fig. 322. The back part of the slipper is allowed to rest upon and is fastened to the net-work, made of clothes-line, or any other small rope or heavy twine. The rope is strung through holes in the sides of the staves, which have been bored with a red-hot iron.

Fig 323

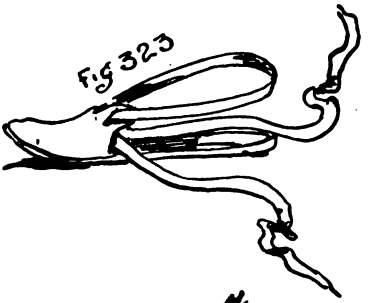


Fig 324

The part where the line comes upon the under part of the shoe can be grooved with the same hot iron, so that the rope will not project beyond the stave and impede the movements of the snow-shoer in sliding or coasting down inclines.

Lace the shoes on the feet, after the manner shown in the diagram (Fig. 324), and you have a pair of very serviceable crusting shoes, that is, shoes to use when a crust has formed over the surface of a deep snow which is not of sufficient strength

to prevent the unprotected shoe from crushing through at each step, but which will bear a snow-shoer safely, on account of his weight being distributed over a larger space (see illustration).

These shoes can also be used in travelling over boggy ground in the summer.

Again the author finds that the most difficult part of such a book as this is the end, for after he has gone over the seasons in detail as he did when a boy, it is hard to lay down the pen and again plunge into the busy world along with other old boys the tops of whose heads begin to resemble what the lads in Kentucky called "alleys," a sort of flesh-colored marble or "Meg" with faint blue veins on it, very hard and very shiny.

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