

HOW TO MAKE A CRAB-APPLE BOW.
BY VICTOR SMEDLEY.

Perhaps the greatest practical difficulty boys find in archery is the constant liability to lose their arrows. Good arrows are costly to buy and difficult to make, and the bow is useless without them. The accompanying drawings illustrate a sort of ammunition and manner of using it that entirely obviate this difficulty. A strong and serviceable bow can be made of a barrel stavesawn lengthwise to about one and a half inches wide at the center, tapering to three-quarters of an inch at the ends, as shown in Fig. 3. The hole for the arrow should be in the center of the bow and about one-half inch in diameter. Before boring the hole it will be necessary to strengthen the bow by splicing a piece of stave, about one-third the length of the bow, to the center (Fig. 3). Cut the notches for the string about one inch from the ends. Fig. 4 shows the bow, arrow, and ball in complete order for shooting. The arrow should be cut from a piece of tough, straight grained wood, and should be about three-quarters of an inch thick at the shoulder (Fig. 2), which should end abruptly at the same distance from the notch as the string is from the bow when strung. The end of the arrow should be pointed to hold the ball (Fig. 1). Clay is as good material as any to use for the ammunition (Fig. 1). Take a piece the size of a large marble, roll in the palm of the hand till somewhat round, then punch a hole for the arrow to fit in, and set it away to dry.

Clay is not the only material that can be used for ammunition; anything capable of being stuck on the end of the arrow will answer the purpose. In the proper season the crab-apple trees furnish a bountiful supply of ammunition for the boys who live in the country. The little hard apples are just the proper size and weight.

THE ECONOMIC VALUE OF SHARKS.
C. F. HOLDER.

One of the earliest industries recorded in the United States is that of shark fishing, the oil being the desideratum, and in some species the skin. Among the early colonists the bone shark was the one most sought after. Scientifically it is *Cetorhinus maximus*, known to fishermen and sailors as the sun-fish, basking shark, and sail fish. It is by no means voracious, living upon small animals, straining them through a series of rays or fringes, of an elastic, hard substance, that are arranged along the large gill openings that occupy nearly the whole space about the "shoulders."

Mitchell mentions the fish "as a shark of huge size, taken in considerable numbers about Provincetown, Cape Cod, for the liver; remarkable for having something in its mouth resembling the horny substance called whalebone"

They grow to an enormous size. One captured off Long Island, several years ago, measured 28 feet in length and 16 feet in circumference. According to De Kay, they attain a length of 23 feet, while Storer says: "The elephant or bone shark attains a length of 36 feet." Sir Charles Lyell records one nearly 55 feet long, that came ashore at Rathesholm Head, at Stronsa, parts of which are now in the British Museum; but probably the largest specimen ever seen is the one portrayed in the accompanying cut. In a conversation this summer with Daniel W. Perkins, Esq., one of the selectmen and school commissioners of Wells and Ogunquit, Me., he informed me that a bone shark had been caught off Block Island that was about 70 feet in length, and when hauled alongside was longer than the vessel. To refresh my memory on the subject, I addressed Mr. Perkins and the following is a quotation from his letter in reply:

"Your remembrance of the shark story was mainly correct; the facts are these: The schooner Virgin, of Gloucester, Capt. Chas. Merchant, of which vessel one of my neighbors, now deceased, was one of the crew, caught a shark off Block Island, from which they took eight barrels of liver. They lashed its head to the windlass bits, and his tail extended past the stern, so that he was longer than the vessel, which was of 68 tons burden. They also struck another shark the same day, which they reported larger, but he took their harpoon and line. . . . Several well authenticated stories of sharks of nearly equal size are reported. My great-grandfather emptied a pan of coals on the back of a shark which was lying alongside of his vessel on the Grand Banks, which he said was longer than the vessel."

From these and other accounts it would seem that there are sharks yet extant that would rival the extinct *carcharodon*. Capt. Atwood refers to three specimens seen

by him, one of which drifted ashore in a state of decomposition, and a fisherman visited it for the purpose of obtaining slices for his hens, according to the custom, thinking it a whale from a distance. The liver from this specimen produced five or six barrels of oil, which brought \$103 in Boston.

In 1848 numbers of these sharks were caught off Cape Elizabeth, Me., and a tradition exists among the men there, that, one hundred years ago, they were captured in a regu-

it was examined by Dr. Holder, curator of zoology at the Museum of Natural History, Central Park. It has a wide geographical range, and is extremely common on the west of Norway, and especially along certain banks of the Polar Sea, where the fisheries have been observed by M. Baars.

These banks lie at a distance of fifteen or twenty miles from the land, at a depth of 250 to 300 fathoms. Decked boats are used in their capture, although they seldom exceed

fifteen tons burden, with a crew of five or six men. The mode of capture is by means of a line, about four-tenths of an inch in diameter, to which a lead of six to nine pounds is attached as a sinker. This line ends in a tinned or galvanized iron chain, of about three fathoms in length, so that it cannot be injured by the familiar habit of the fish, hereafter to be described. The hooks are made of strong iron or steel, nearly four-tenths of an inch in diameter. As soon as the boats reach the bank they are brought to anchor, and the cord let down; before this, however, a perforated box, filled with rancid or putrid seal blubber, is fastened about two fathoms above the hook. This substance escapes through the holes of the box, and is carried along by the water, thus attracting the fish to the hook, which is also baited with seal blubber. The fisherman holds the line in his hand, as in cod fishing, and as soon as it is observed that the animal has taken the hook, by a sudden jerk this is forced into the mouth. As soon as captured the shark rolls himself round and round in the chain, which is not injured by the rough, file-like skin, as would be the case with a line. The animal is then hauled up, sometimes by the use of a windlass. As soon as it appears above the surface it is killed and held fast until the belly is opened and the liver removed. The swimming bladder is then filled with air by means of a pipe, so that the carcass will not sink. It is then fastened to the stern of the vessel. Sometimes other sharks follow the carcass of the dead one, and are occasionally caught by means of gaffs. When the boats leave the banks a buoy is generally fastened to each carcass, so that it may remain at the surface without sinking, otherwise it would be eaten by its fellows, who would neglect the baited hooks.

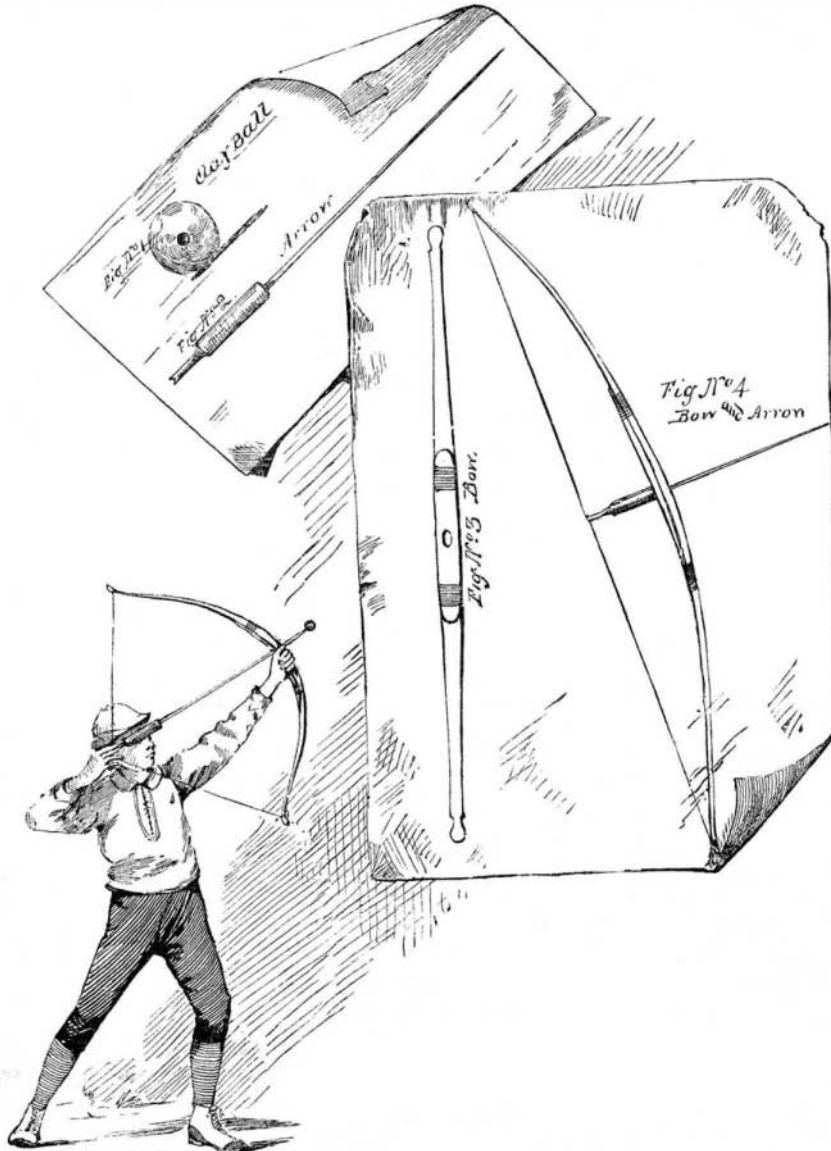
The yield of this fishery is not only dependent upon the wind and weather, which are so inconstant in the Arctic seas, but also upon the variation in the size of the fish and their abundance. Some of the fish furnish a liver weighing only twenty-five to thirty pounds, while from others livers of two

hundred and twenty to four hundred and fifty are obtained. Of late years the carcasses of these sharks have been brought ashore for the purpose of being manufactured into manure or guano; especially when they are taken inshore near the land, as is the case sometimes in the winter on the coast of Finmark, where they are sometimes taken with trawl lines. These trawls usually carry thirty hooks, six or seven fathoms apart, and are kept immediately above the bottom by means of glass floats.

The annual yield of this fishery amounts to eight to ten thousand barrels of livers, worth one hundred and fifty thousand gulden. The oil of this animal, obtained by steam heating, is extremely fine, and is used for purposes of illumination. The undissolved portions of the liver are then boiled, and furnish the brown tanner's oil.

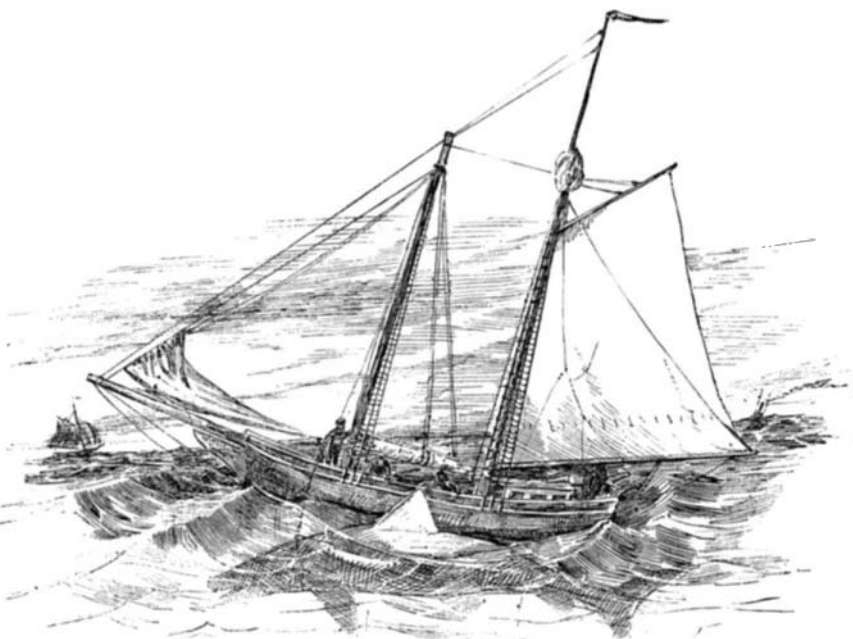
The picked dog fish (*squalus americanus*), caught in such vast numbers on the Maine coast, are valued for their oil—each liver being valued at about a cent apiece—and sold to tanners; the skins are also used for many purposes. The writer was fortunate in observing some of the habits of these fish during the past summer at Ogunquit, and the damage they produce upon the fisheries of this State can hardly be computed. They seemed to appear all at once—in such vast numbers that the great bay at Wells was fairly alive with them. One Wednesday, four hundred pounds of cod, hake, etc., were caught in a few hours, and three days later the men gave up fishing, and went dog fishing for the livers. Not an edible fish could be had for love or money. The water seemed alive with them—ninety-nine per cent being females—all with young (August 20) nearly ready to be produced (*alvée*); they breed, however,

at any time. So savage were they that they bit at oars, the keel of the boat, or at the sail when hanging over. When the trawls came in it was often found that they had eaten each other, and a man's life would be in the greatest danger by accidentally falling over, and several cases were current of loss of life under such circumstances. Some idea can be gathered of the vast numbers of these fish by the



HOW TO MAKE A CRAB APPLE BOW.

lar fishery as are whales to-day. In Greenland they are caught in great numbers, this most important fishery being at Naorkanek, where from three hundred to four hundred are taken every season, their livers yielding about 2,500 barrels of oil, that is preferred to seal oil, bringing even a higher price in the European markets. It is extremely pure, resists the cold, and is perfectly adapted for lubrication. Chemically, it can be compared to seal oil. Other important fisheries in Greenland are at Fiske-



GIGANTIC SHARK CAUGHT NEAR BLOCK ISLAND, R. I.

naes and Proven, and at these places and in Iceland, where the great shark is called the hoowcalder, the spec or blubber is a regular medium of exchange for coffee, pipes, tobacco, and other luxuries from the outside world. The shark next in value, in an economic point of view, is the nurse (*Somniosus microcephalus*). It is rarely seen on our coast, one of the first being washed ashore on Lynn Beach, in 1843, where