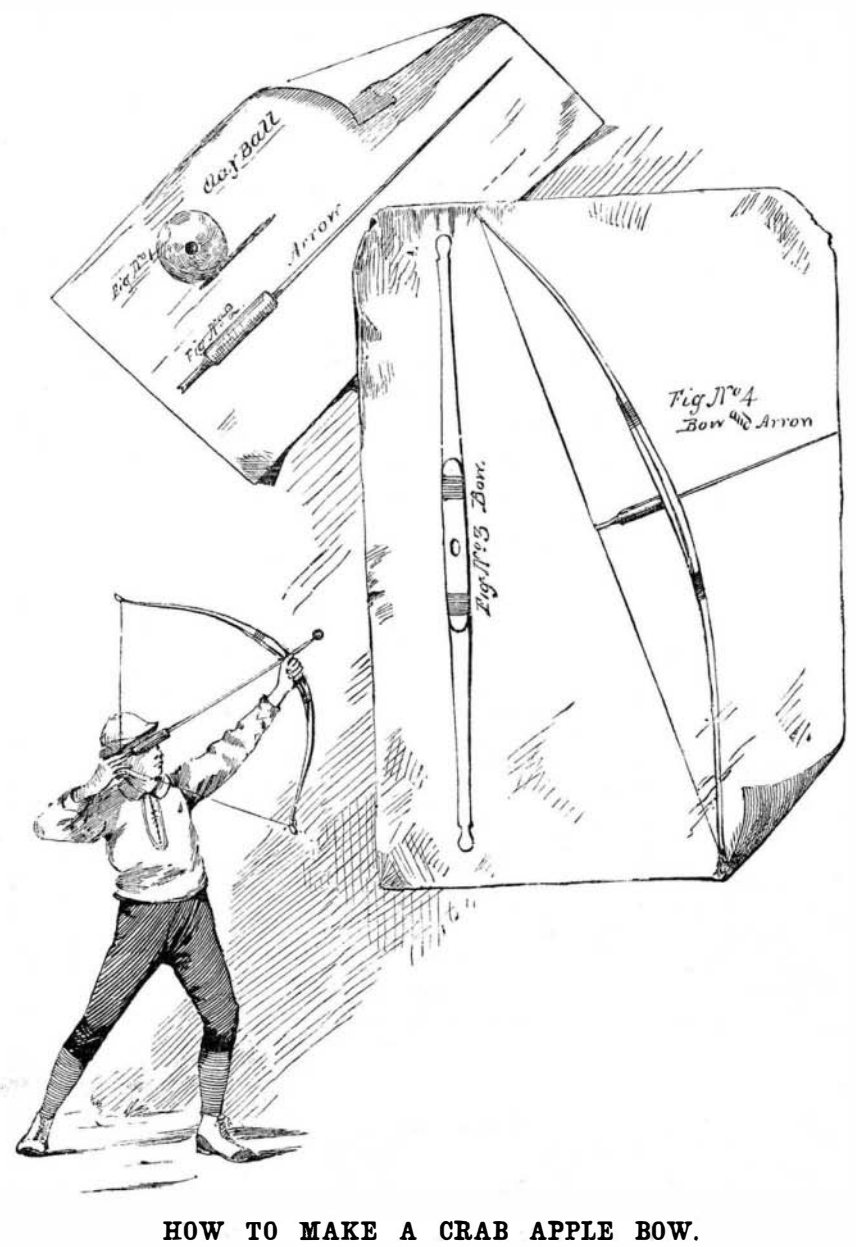
HOW TO MAKE A CRAB-APPLE BOW.

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 stave sawn 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.



HOW TO MAKE A CRAB APPLE BOW.

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 33 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 Oguenquit, 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 bitts, 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.

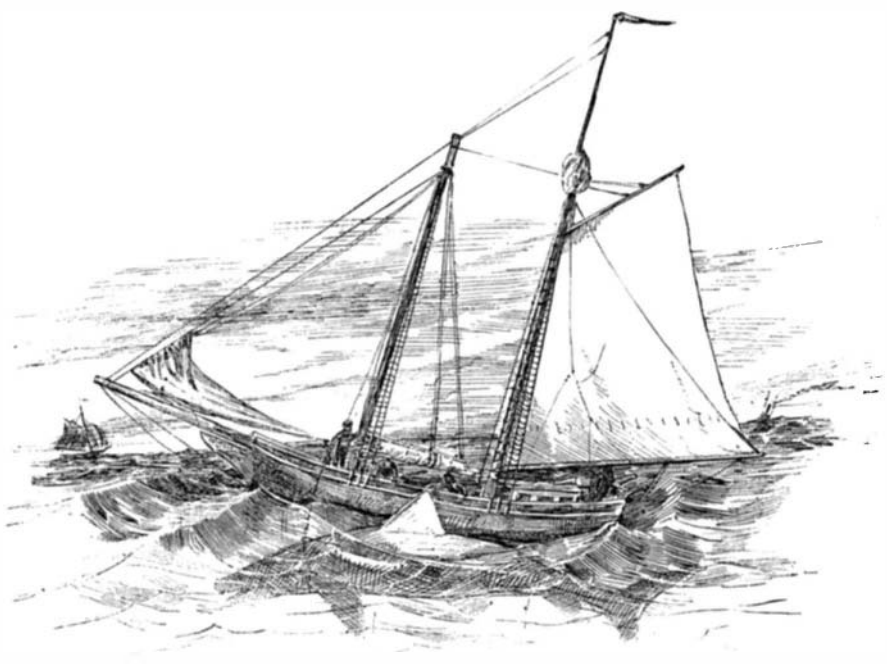
In 1848 numbers of these sharks were caught off Cape Elizabeth, Me., and a tradition exists among the men there, that, one hundred years ago, they were captured in a regular fishery as are whales to-day. In Greenland they are caught in great numbers, this most important fishery being at Naorkanek, where 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 Fiskenaes 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 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 (*alive*); 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 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



GIGANTIC SHARK CAUGHT NEAR BLOCK ISLAND, R. I.

fact that from the small village of Ogunquit about twelve boats (dories) went out daily, and were filled to the water's edge in a few hours, so that at this one spot over five thousand were brought in daily for several weeks.

The writer examined the contents of the stomachs of many, but food was scarce; a few deep water star fishes, scarlet shrimps, etc., being found, but the greater quantity contained nothing but mucus, or, as I judged, the half digested remains of some jelly fish, and I was informed by Mr. Perkins that the dog fish eat out the center of the larger aurelias, etc., he having observed it, and examined great numbers of jellies that had been thus disemboweled. On the coast of Cornwall the *M. vulgaris* is found in equal numbers, as many as 20,000 having been caught in a single haul of a net. The liver of the mackerel shark (*Isunopsis dekayi*) is much valued, the oil obtained from it being in great demand by curriers. The shagreen obtained from the shark ray (*Squateica dumerili*) has long been used in polishing wood; even Aristotle refers to it. A specimen of the fish was captured some years ago, measuring 20 feet. In India and China the shark has a somewhat different value. The fins are the choice parts, and are used in the concoction of certain Asiatic and mysterious soups, more tempting to the curiosity than the palate. In one year over $100,000 worth of these fins have been shipped from Calcutta to China. In the islands of the Pacific the teeth of the large sharks are bound to swords, gauntlets, and spears, forming formidable weapons. In Florida, the jaws are sold as curiosities, and the back bone pierced by a steel rod, and well polished serves as a cane. One of the most practical uses of the shark is seen in its habits as a scavenger. Refusing nothing in the way of food, they form an important factor in the sanitary department of the submarine world.

October, 1882.

Blomidon.

To the mineralogist probably no place on the continent of America presents so much attraction as the trap regions of Nova Scotia, of which Blomidon is the representative. Our correspondent, Mr. S. D. Macdonald, F.G.S., of Halifax, N. S., who has spent some time in its vicinity, sends us a detailed description of the place, which may be of interest to our readers, especially as summer travel is increasing so rapidly in that direction.

This magnificent promontory is situated on the picturesque shores of the Bay of Fundy, whose tides are among the wonders of the world, attaining a height of seventy feet in their flood of three hours' duration.

Those who have watched their surges as they break and foam at the foot of the fir-crowned head of Blomidon, often bearing in their vortex some unfortunate coaster belated in his attempt to double the cape, or again, wave capped, hurrying on with accelerated force before the gale until encountering the opposing cliffs, there scattering their masses in driving clouds of foam and spray, have enjoyed a scene that will linger while memory lasts.

From Blomidon to Cape Split is a series of headlands, composed of amygdaloidal trap resting conformably upon sandstone of Triassic age, and overlaid by basalt. These rise almost vertically from the water to a height of four hundred and fifty feet, and present a picture of striking beauty, as well worthy the attention of the artist as that of the observer of geological phenomena.

This amygdaloidal bed is much fissured and full of cavities, in which are found those trap minerals of rare beauty that have made the place so celebrated that to-day but one place, Mysore, in India, alone rivals it in the variety and brilliancy of its minerals.

In winter the ice laden currents grind with terrible abrading force at the base of the cliffs, until, the superincumbent weight becoming too great, immense masses are detached from above and come crashing to the beach, opening up rich treasures to the mineralogist.

Among the most abundant of them are amethysts, chalcedony, agate, onyx, jasper, opal, cacholong, apophillite, natrolite, analcite, modernite, chabazite, stilbite, sinter, heulandite, and upward of fourteen others of the zeolite group.

Among the first visitors to this locality was De Monts, who, in company with Pontrincourt and Champdor, as early as 1604 "discovered great stores of jasper and amethysts," which were carried to France, and presented to the king, who ordered the finest of them placed in the crown of state. Many are still to be seen in the museums of Paris.

Of late years the attention of mineralogists, far and near, has been attracted to this place, until few cabinets in the New or Old World are without specimens from those grand old cliffs

Railway Speeds in Europe and America.

A German journal, *Die Verkehrszeitung*, has recently made a comparison of the fast trains of leading countries in Europe, to show the speed attained. This is a matter in which many take interest, but the various statements made from time to time have lacked authority, and could hardly be trusted as accurate records. The figures which the *Verkehrszeitung* gives, however, seem to have been compiled from time-tables, either official or the very accurate and recent ones published in the German and Foreign *Railroad Guide* compiled in the German Post-Office Department. We have reduced the distances given in this article from kilometers to miles, and added to its statement of minutes per mile (kilometer) a statement of the speed in miles per hour, which will be more readily intelligible to our readers. The speed in all cases is calculated by dividing the length of the route by the time between the two terminal stations, including stoppages between:

Runs of 310 *Miles* (500 *Kilometers*) *or More.*

Route.	Length of run, miles.	Miles per hour.	Minutes per mile.
London-Sheffield-Edinburgh express	416	41	1·464
Berlin-Cologne express	354½	37	1·625
Paris-Bordeaux fast train	346¾	36½	1·650
Paris-Lyons fast train	326	36⅛	1·650
Paris-Marseilles fast	536	34⅜	1·730
Bodenbach-Vienna express	335½	31·4	1·910
Paris-Toulouse fast	466½	29·4	2·040

Runs of 248 *to* 310 *Miles* (400 *to* 500 *Kilom.*).

Cologne-Bremen-Hamburg courier	277½	33⅛	1·80
Cracow-Vienna express	257	27¼	2·20

Runs of 186 *to* 248 *Miles* (300 *to* 400 *Kil m.*).

London-Salisbury-Plymouth express	230	37	1·62
London-Bristol-Portsmouth express	247	36 6	1·64
Paris-Longuyon express	207½	31·6	1 90
Hamburg-Cassel courier	215¾	30·8	1·95
Holzminden-Aachen	203½	30·0	2·01
Mainz-Basel	218½	29·7	2·02
Berlin (Kohlport)-Breslau	123½	29·4	2·01
*Munich-Nuremberg-Hof	241	26·7	2·25

Runs of 124 *to* 186 *Miles* (200 *to* 300 *Kilom.*).

Paris-Boulogne-Calais express	184½	37.0	1·62
Berlin-Hamburg	177½	35.3	1·70
Paris-Rouen-Havre fast	141½	33·1	1·81
Paris-LeMans fast	131	33·1	1·81
Bremen-Magdeburg express	163	31.7	1·89
Brussels-Cassel express	133½	30.6	1·96

Runs of 62 *to* 124 *Miles* (100 *to* 200 *Kilom.*).

London-Sittingbourne-Dover express	78	44·8	1 34
London-Tunbridge-Dover express	65¼	43·5	1·38
Berlin-Jüterbog-Dresden courier	116½	38 1	1·57
London-Norwich express	114	37 0	1·62
Dresden-Zoffen-Berlin courier	108	34·3	1·75
Cassel-Frankfort courier	123½	33·9	1·77
Breslau-Oderburg courier	132½	32·4	1·85
Berlin-Leipsic	101¼	32·4	1·85
Stargard-Stettin-Berlin	115	31·7	1·89
Darmstadt-Heidelberg	37¾	34·9	1·72
Mainz-Aschaffenburg	40¼	30·3	1·98

The speed made on parts of the longer runs is of course greater than the average for the whole. Some of the sections on which the greatest speed is made are as follows:

Section.	Length, miles.	Miles per hour.	Minutes per mile.
Stendal-Lehrte	83¼	45·1	1·33
Spandau-Stendal	57¼	43·5	1·38
Hanover-Debisfelte	54½	43·5	1·38
Berlin-Falkenberg	69½	41·1	1·46
Jüterbog-Berlin	39	41·1	1·46
Frankfort-Guben	30	41·1	1·46
Neustadt-on-Dosse-Spandau	—	40·3	1·49
Berlin-Luckenwalde	31	39·5	1·52
Stettin-Angermünde	42¾	37·5	1·60
Hanover-Cologne	203½	35 9	1·67
Berlin-Kustrin	51⅛	35·6	1·69

Long runs at fast speed are few, it will be seen, there being no room in Great Britain for what we would call a long run here, and fast trains being fewer on the Continent, and confined chiefly to comparatively short and especially important routes in France and Germany. The London-Edinburgh line, 416 miles long, is somewhat shorter than the New York-Buffalo and New York-Pittsburg lines in this country. The London-Edinburgh speed of 41 miles per hour is very nearly matched by the New York Central's special Chicago express, running from New York to Buffalo, 440 miles, in 11 hours, or at the rate of 40 miles an hour. The Pennsylvania's New York & Chicago limited makes the 443 miles from Jersey City to Pittsburg in 11 hours and 50 minutes, or at the rate of 37·4 miles per hour—the latter faster time than is made by any Continental train that runs more than 300 miles. Indeed, the Fort Wayne's time for the Chicago & New York limited is 35 miles an hour for 468 miles, and the Chicago limited over the 525 miles of the Lake Shore from Buffalo to Chicago runs 34·4 miles an hour, and makes the trip in 15¼ hours. These are very nearly the same speed as that of the fast train over the 536 miles between Paris and Marseilles. The fast train on the Michigan Central makes the 284 miles from Detroit to Chicago in 8 hours and 5 minutes, which is 35·1 miles per hour, and the Great Western train connecting with it runs 229 miles, from Windsor to Clifton, in 6 hours and 25 minutes, which is 35·8 miles an hour.

On no European route of 200 miles or more named above is there a train making as much as 37 miles an hour, except between London and Edinburgh, Berlin and Cologne, and London and Plymouth. The list, however, strangely omits what is perhaps the most frequented of all—between London and Liverpool, on which there certainly are trains that make more than 40 miles an hour, and which is from 225 to 250 miles long by different routes—about the same distance as from New York to Boston, New York to Washington, or Buffalo to Detroit.

The best examples we have of trains to match these are on these very routes from New York to Washington and Boston. Trains now run from New York to Boston, by the Shore Line, 232 miles, in 5 hours and 53 minutes, or 39⅓ miles per hour, and this includes the ferry transfer at New London. On the Springfield line trains take six hours for the 234 miles—39 miles per hour. This is not equaled by any English speed given above for a line 200 miles long or more, except that between London and Edinburgh, but we are sure that it is surpassed by some of the trains between London and Liverpool.

* Numerous stoppages and an unfavorable alignment make this train slow.

During the session of Congress, the Pennsylvania last season ran a limited express, which passed over the 244 miles between Jersey City and Washington in 5 hours and 50 minutes, which is at the rate of 41⅝ miles per hour—not matched by any European line of equal length in the above list.

Of shorter routes, and parts of routes, there are many in Europe on which the speed is more than 40 miles an hour, and but few here. Our fastest train is one between Jersey City and Philadelphia, making the 89 miles by the Pennsylvania Railroad in 1 hour and 52 minutes, which is 47⅔ miles per hour, and by the Bound Brook route substantially the same time is made—faster than the speed of any European train reported by the *Verkehrszeitung*. On the Boston & Providence Railroad a train makes the 44 miles between Boston and Providence in 57 minutes—46⅓ miles an hour—also faster than any of the above European trains. The fastest train over the 142 miles of the New York Central between New York and Albany takes 3½ hours for the run, making a speed of 40·6 miles an hour.

Below we tabulate these fast American trains, which will render comparison easy with the European trains in the tables above:

Route.	Length, miles.	Miles per hour.	Minutes per mile
Jersey City-Philadelphia	89	47⅔	1·26
Boston-Providence	44	46⅓	1·29
Jersey City-Washington	244	41 5-6	1·43
New York-Albany	142	40 6	1·47
New York-Buffalo	440	40	1·50
New York-Boston (Shore Line)	232	39⅓	1·52
New York-Boston (*via* Springfield)	234	39	1·54
Jersey City-Pittsburg	443	37·4	1·60
Windsor-Clifton (Great Western)	229	35 8	1·68
Detroit-Chicago	284	35 1	1·71
Chicago-Pittsburg	468	35·0	1 71
Buffalo-Chicago (Lake Shore)	525	34 4	1·74
Chicago-Jersey City (Penna R. R)	911	35·6	1·69
New York-Chicago (N. Y. C. & L. S.)	965	36·3	1·65

This certainly is not a very bad showing for a new country. Possibly one or two English trains equal the fastest American speed given above for 50 or 100 miles, but we think that none exceeds it, and so far as speed on long routes is concerned we make the best showing, though as there is more room here for long routes, that perhaps was to be expected. Only a few years ago we could not have made such a showing. On the Continent of Europe also there is greater speed, and fast trains on more lines, than was attempted five or six years ago. In England, however, there has been very little change for many years. The maximum, or a rate very near it, was attained there long ago, and there have long been very fast trains on many routes, which apparently has so satisfied the requirements of the people and the ambition of the railroad men that little effort is made to increase it.—*Railroad Gazette.*

An Ancient Salt Mine.

A mine has been found in a mountain near Salzburg, Austria, which, it is considered, gives indications of having been occupied and abandoned at least two thousand years ago. It contains a large and confused mass of timbers, which were used for support, and a number of miners' implements. The timbers were notched and sharpened, but were subject to an inundation, and left in confused heaps. The implements were mainly wooden shovels, ax-handles, etc. Among the relics, also, was a basket made of untanned raw hide, a piece of cloth woven of coarse wool, the fiber of which is very even and still in good preservation, and a torch, bound together with flax fiber. The probabilities are that the ancient salt-miners were overtaken by the flooding of the mine, as mummified bodies have been discovered also. The find seems to have belonged to the pre-Roman times, as the ax-handles were evidently used for bronze axes, specimens of which have been found upon the surface of the mountain. The relics are of a high order, the basket being superior even to some that were used in the early historic times.

The Car Coupler Problem.

It has been proposed to organize a joint stock company, says *The Railroad Gazette*, for the purpose of employing the best available ability to investigate the whole question thoroughly, and thus indicate what is demanded. When this is known, it is proposed to buy up all the patents which are essential to control all couplers and cars which would fulfill the ascertained requirements, and then, by the power and influence of the company, to secure the general introduction of the appliances which the company had determined to be the best. If a company of this kind were skillfully organized, and could secure the services of a competent person to do the work of what may be called mechanical evolution, it could probably exercise such an influence as would compel the general adoption of the appliances which its investigations had shown to be the best. The work to be done would be that of extended mechanical research, made through the instrumentality of a corporation, and then the bringing of the results of these investigations in such an angle of vision to railroad companies, the public, and State legislatures that the correctness of the conclusions would be recognized and the appliances recommended adopted. Of course, a corrupt use might be made of the influence of such a corporation, but without this it would seem possible for it to accomplish a great deal. It would be a kind of missionary society, first to ascertain what is the true inwardness of car couplers, then to convince benighted railroad officers of the soundness of its mechanical gospel.