THE LAYMAN PNEUMATIC SPORTING AND OUTING BOAT.

The old time Celtic coracle, with wicker framework and covering of hide, has its modern successor in the Layman pneumatic boat, a wonderfully ingenious and successful craft which is acquiring wide popularity among sportsmen and those fond of aquatic sports, as well as with ladies and children for use on the seashore. The sportsman who desires to kill can find no better ally than this noiselessly propelled craft, while those who spend the summer on the seashore or by lake and river side can have endless pleasure in floating bubble-like on the breakers or in exploring the inmost recesses of lake and "unknown river."

The Layman boat resembles in contour a horse collar. It is made of India rubber cloth. The irregular ellipse determined by the sides has as bottom a strong sheet of the same cloth, from whose forward portion two boots or leg cases depend. The bottom of the boots are provided with collapsing paddles, which open on the back stroke and close on the forward stroke, as does a duck's foot. The small end of the oval is the bow. A stiff rudder strapped in one position is attached to the stern. The office of this is to keep the bow in front—it is not used for steering.

For its shape the boat depends upon inflation with air. The oval sides represent two tubes, the lower one of large cross section, the upper one of smaller. The lower one is divided by cross partitions into three compartments; the entire upper tube forms a fourth compartment. To prepare the boat for use, the sides are inflated with air. This is best forced in with a blower, five minutes sufficing to inflate it. It can be inflated in three minutes by the lungs alone. When inflated, it at once stiffens up, as the sides take their characteristic oval shape, forming virtually a frame. As they distend, they bring the floor to a level, and the boat is ready for use.

Putting the feet into the cases and holding the boat up by hand loops, the boatman walks down the shore, and as the body of the boat takes the water the launch is made. By sitting comfortably on the bottom of the boat and paddling with the feet, a progress of two or three miles an hour can be made in any direction.

THE LAYMAN BOAT USED IN DUCK SHOOTING.

Several people can crowd into the same boat, 400 pounds being the capacity of the large sized one. Loops are provided for awning stanchions, to give the last requirement for comfort. It will be seen that for the duck hunter it presents several advantages. It admits of a most effectual blind being used, one of which is shown in one of the cuts. The propulsion is done entirely with the feet, so that both hands are free for the gun. Its noiseless working gives every chance of approaching closely to the ducks. Places hitherto inaccessible can be reached by its means, and game can be secured which otherwise would escape.

One of the cuts illustrates a passage through Hell Gate, East River, New York, which was made without difficulty by a party including a lady. The experience is described as delightful, the waves of the steamers adding to the excitement. No water was shipped, the boats proving perfectly dry and seaworthy. An interesting modification is shown in one of the cuts in the wading pants, made on the general lines of the boat. These are heavy Mackintosh pants, attached to whose waist portion is the pneumatic boat. When deflated the wearer is prepared to wade about or walk on land. If deep water is to be entered, a few minutes of preparation inflates his boat and he is ready for work afloat. A strap which is secured beneath the knees gives the proper position for boat work.

The fishing scene on Narragansett Bay is reproduced from a photograph from life, showing the inventor and family enjoying themselves à la Isaac Walton, near Bristol, R. I.

The cuts show the capabilities of the novel craft. It makes the user thoroughly amphibious. When afloat, a considerable load can be transported, as many as three children with an adult finding room in it. In the cut showing the use of the blind by duck shooters is also clearly shown the standing and sitting positions of the occupants. The boat, when deflated, is stowed away in a small valise, as shown in the same illustration. As regards weight, the boats vary from fifteen to twenty pounds. Owing to their compactness when deflated, they form an admirable tender for small yachts, and afford an effectual life preserver for use in cases of accident. Experiments have shown its absolute safety. Three of the compartments may be punctured and the fourth one will keep it afloat. A complete repairing outfit accompanies it in case any accident should happen. Owing to the strength of the fabric it is rarely torn.

We are indebted to Mr. H. D. Layman, of the International Pneumatic Boat Company, 851 Broadway, New York, for courtesies extended to our editor and artist in the preparation of the article and engravings.

FAMILY PARTY IN LAYMAN BOATS IN NARRAGANSETT BAY.

PASSAGE OF HELL GATE, EAST RIVER, N. Y., IN THE LAYMAN BOAT.

How to Copy Engravings.

Many workers find a great difficulty in successfully copying engravings, so as to reduce the prominence of the lines and cross hatchings. These, when magnified by the lantern, spoil the picture. But it is possible to tone them down in such a way that they will not be objectionable. There are several methods of doing this. The best one is very easy to manage, so as to effectually break up those lines which appear so prominent in skies and foreground. Cover the engraving which is to be copied with a thin and finely ground piece of glass, the polished side downward. This glass must be exceptionally clean, and to insure this it should be brushed over with ammonia or nitric acid, afterward well water-washed. When the glass is in position it will be seen that the engraving, viewed through the glass, has the appearance of a pencil drawing. No lines are visible, but a general softness has taken their place. Of course it would be perfectly useless to photograph the print in this condition. To restore vigor to the important parts of the picture, go over the ground glass surface with a brush dipped in oil, painting, as it were, every portion except the sky and the immediate foreground, where the objectionable lines usually are to be seen. This operation will give the desired blackness, thus rendering the print capable of producing a first-class negative. If this method be adopted, the result will prove most satisfactory, for it will be impossible to distinguish the obnoxious lines.—Photography.

For Transparencies.

For lantern slides or transparencies, which yields tones of a peculiarly pretty warm black, varying with the particular plate used, but always of an agreeable kind:

Pyro	3 grains
Sodium sulphite	12 "
Bromide of ammonium	3 "
Carbonate "	6 "
Caustic potash	5 "
Water	1 ounce.

Electric Cars as Life Savers.

Strange as it may seem, a Brooklyn newspaper has printed a communication which proves that more lives have been saved by electric cars in that city than have been destroyed, and in comparison with the former the proportion of the latter is so small that it is insignificant. D. J. Lapley, a citizen of Brooklyn, says:

"For some reason the newspapers have had a good deal to say in condemnation of the trolley car and its record of 'one hundred fatal accidents' in Brooklyn. It seems to me that the case is not sized up judicially, and that most of the blame is misplaced. Nearly every fatality of this class has resulted from contributory negligence or gross carelessness, or even from suicidal purpose. The trolley has no monopoly as a source of danger. Children who are allowed to run the streets without being properly cautioned, and grown people who, from intoxication or any other cause, tempt fate recklessly, are always liable to disaster, fatal or otherwise. A larger number of people have been drowned by falling into the water from the piers, since the advent of the electric motor, than the trolley has to its credit, yet the papers have failed to harp on the deadly dock.

"The trolley, by lessening the defilement of the streets, has so ameliorated the sanitary condition of the city atmosphere that it has saved many times the number of lives it has destroyed. It has furnished a quick and comfortable transit to the outlying wards, which has reduced the prevalence of grip and pneumonia among the suburban passengers more than one-half. Many can recall the winter cars, with their slush-soaked straw and foul odors, and the tiresome and dangerous delays in the snow, when the passengers were forced to walk in the storm, or even to assist the wretched horses by pushing. Many a man has gone down to his grave from a cold contracted on such a trip. The trolley has saved thousands of lives by enabling the mechanic and clerk to move their little ones from the unwholesome tenements of the city to the pure air and sunshine of the country. It has added, in dozens of ways, to the sum of human welfare. Why, then, does the press persistently attack a system which accomplishes so much good that it has become a great public necessity?"

Coal Consumption on Torpedo Boats.

For the following interesting particulars respecting the coal consumption of the 27 knot torpedo boat destroyers, we are indebted to a correspondent of the Glasgow Herald. He states that the cruiser built by Messrs. Thornycroft, on a three hours' run just made, maintained a speed of 27·97 knots, practically 28 knots, or for the whole time 84 nautical miles; and while running this distance burned in her three water tube boilers 17¼ tons of coal. The rate of combustion is 68 pounds of coal per square foot of grate area per hour, although in some trials it has reached 79 pounds; but then the power per square foot of grate area is very high, 24 indicated horse power. The boats of this class carry 60 tons of fuel at a pinch, and this would enable them to go at full speed for a period of over nine hours, during which they would travel fully 250 nautical miles. The coal consumption is equal to 4 hundredweight per sea mile; that is to say, during the 2 minutes 9 seconds taken to a sea mile 4 hundredweight of coal are burned. A ton of coal, therefore, takes the boat five sea miles. But it would only be on a rush that such speed would be maintained. Now, other tests have been made at about half the speed—13 knots—and here, instead of five miles, the ton of coal carried the destroyer for a distance of about 38 nautical miles, so that the total distance at 13 knots with the 60 tons of coal would be nearly 2,000 miles. This shows the great cost of doubling the speed. The coal per horse power at 13 knots was 1·61 pounds.

The Invention of the Telephone.

In a recent address Prof. Hughes says it is 30 years since his first experiments with a working telephone. In 1865 while at St. Petersburg fulfilling a contract with the Russian government for the establishment of his printing telegraph instrument upon all their important lines, he was invited by Emperor Alexander II to give a lecture before the royal family, which he did. As he wished, however, to present not only his own telegraph instrument, but all the latest novelties, Prof. Philip Reis, of Friedericksdorf, Frankfort-on-Main, sent to Russia his new telephone, with which Prof. Hughes was enabled to transmit and receive perfectly all musical sounds, and also a few spoken words, though these latter were rather uncertain; at moments a word could be clearly heard, and then from some unexplained cause no words were possible. This instrument was based, Prof. Hughes states, upon the true theory of telephony, and contained all the necessary organs to make it a practical success. Its unfortunate inventor died in 1874, almost unknown, poor and neglected, but the German government has since tried to make reparation by acknowledging his claims as the first inventor, and erecting a monument to his memory in the cemetery at Friedericksdorf.

Bessemer, the Inventor, and his Treatment by the Britishers.

The Commercial Bulletin (Boston) gives the following interesting incidents in the life of Henry Bessemer, the distinguished inventor. His treatment by Great Britain, where he was born, conducted his experiments, and finally produced one of the greatest inventions of the age, is not creditable to the country of his nativity.

The inventor of the celebrated "Bessemer process" is the most modest of men, shunning rather than courting observation. A few years since he was sometimes to be seen taking a "constitutional" in the neighborhood of his unpretentious abode at Denmark Hill, in England, but the venerable gentleman with the benevolent face, in the old-fashioned frock coat and voluminous, many-folded choker neck cloth, is now rarely seen even by his immediate neighbors.

The British public, the British government, and British manufacturers did their very best at one time to crush one of the most useful men ever born in Britain, and failed ignominiously. Sheffield laughed at him, and Woolwich gave him the official cold shoulder; but Sheffield and Woolwich would be crippled indeed at the present time were it not for "Bessemer steel." Yet, even now, although foreign potentates have showered crosses and stars upon him, the English government has not conferred upon him any honor more important than an ordinary knighthood, and this in spite of the fact that he has created one of the largest and most important industries in the world.

Some fascinating calculations, made by Sir Henry himself, prove that one year's production of Bessemer steel might be represented by a solid column sixteen and a half times the height of St. Paul's Cathedral and as thick through as an ordinary gasometer—about 100 feet.

Henry Bessemer, son of the late Mr. Anthony Bessemer, was born in Hertfordshire in the year 1813. His earlier years were devoted to art, and we find that he was an exhibitor at the Royal Academy at the age of 20. At this early age he had discovered a means by which impressions of the designs on coins, medals, and other reliefs could be reproduced in any numbers on cardboard. Some of his work in this line is still extant, and when specimens come into the market they bring high prices.

This led him indirectly to a more important invention. He discovered that the government of the time was robbed to the tune of £100,000 per annum by unscrupulous persons, who were in the habit of removing the embossed duty stamps on legal and other documents and using the same again. Young Bessemer invented the useful little contrivance by which the stamp is embossed on the paper or parchment of the document itself, and submitted it to the then chief of the stamp department at Somerset House.

The potentate in question saw the advantage of this system at a glance, and soon afterward the authorities expressed their willingness to make use of it. A pretty little story is connected with this invention. When his model was completed, Bessemer showed it to the young lady to whom he was then engaged. Her first comment upon it showed that she was well fitted to become the wife of an inventor. She said:

"Yes, I understand this; but surely, if all stamps had a date put upon them, they could not at a future time be used again without detection."

This proved a very valuable suggestion, for Bessemer soon hit upon the idea of a steel die, with a space for a movable date, and in that form his invention was adopted by the authorities. Will it be credited that he never received a solitary farthing from the government for his services or the use of his invention?

Such is, nevertheless, the fact, and when he hinted mildly at legal remedies he was told by the Solicitor to the Stamp Department that he was entitled to no compensation, inasmuch as he had presented his invention to the government gratis! This was at a time, too, when he was by no means well off, when, indeed, he lacked the necessary money to set up housekeeping with the clever young lady whose brilliant suggestion had resulted in a perfect stamping machine! He received many generous promises from various ministers, of course; but one government went out of power after another, and to this day he has never been compensated in any shape or form.

A man of vast wealth now, Sir Henry Bessemer can afford to regard the troubles of that period of his life with comparative indifference—though he has since had more ample reason to cherish a dislike for all British governments and politicians. But his disappointment in this instance taught him a very salutary lesson. When he made the great discovery of his life—that by which it is possible to convert pig iron into steel by a simple and inexpensive process—he kept his discovery a secret. To some extent it is a secret to this day. The importance of the discovery can hardly be overestimated.

Before the Bessemer process came into use steel could not be bought under £50 a ton, and its price prohibited its use in numberless departments of industry where it is now considered essential. At that time, too, only 51,000 tons of cast steel were produced in Sheffield in a year. In 1892, 33,546 tons of steel were manufactured in the world every day according to the Bessemer process, the selling price per ton averaging £8 perhaps.

Everybody knows that steel is superseding iron in all departments where toughness and durability are considerations. In the building of ships and bridges and in the making of girders for buildings, of locomotives, rails, steam boilers of all kinds, steel is now universally used. It is chiefly due to Sir Henry Bessemer that one is almost as safe on a modern ocean steamship as on land, and that the modern structure of steel is nearly as imperishable as the ancient Pyramids.

Such a discovery, it might be supposed, would be hailed with enthusiasm by those interested in the iron trade of Great Britain. Not a bit of it. Bessemer met with every possible discouragement. The steel manufacturers of Sheffield were dead against him from the first, and the government ignored him. One does not expect to find unusual enterprise in a governmental department, so it is not surprising to learn that the British Admiralty could only be induced to adopt the Bessemer steel in the building of war ships when it had been in use in building merchant ships many years. Even the engineer of the London and Northwestern Railway declined to have anything to do with Bessemer steel. Encouragement, valuable encouragment, Bessemer did receive, however, from the late Mr. Platt, M.P., head of the famous Oldham firm, who gave him £50,000 for a fifth share in his patents.

On the Continent, too, his merits were immediately recognized. Krupp, the great gun manufacturer, was one of the first to pay him royalty on his patents. The Emperor Napoleon evinced the keenest interest in his invention, and would have decorated Bessemer with the Grand Cross of the Legion of Honor if it had not been explained to him that British subjects were not allowed to receive decorations from foreign governments except by special permission. The Emperor of Austria conferred upon him a knighthood of one of the most distinguished Austrian orders, and the King of the Belgians, when he was in London, drove out to Denmark Hill to call upon him.

The British government had to follow suit in some fashion, and a knighthood was conferred upon him in 1879. In 1880 he was presented with that highly prized distinction, the freedom of the City of London, "in recognition of his valuable discoveries, which have so largely benefited the iron industries of this country, and his scientific attainments, which are so well known throughout the world."

Americans have done their best to show their respect for this great man. In Indiana there is a flourishing young town called after him.

When the gold Albert medal of the Society of Arts was presented to him at Marlborough House by the Prince of Wales himself, Bessemer humorously confessed that, though he prized such distinctions, he was no less pleased with the £1,057,748 which he made by his patents.

Bessemer recently recovered from a severe illness, and is at present, in his 83d year, busily engaged in answering the great mass of correspondence which accumulated during his illness. Doubtless a large proportion of this correspondence consists of begging letters. He is one of the most charitable men of the day, though he does not like it to be known, and many a large benefaction from him finds its way anonymously into the coffers of the hospitals and orphanages of London.

It is a characteristic of the man that he should take a particular pleasure in his invention of a machine for the manufacture of nails, for the simple reason that this invention relieves hundreds of young girls in what is known in England as the "Black Country" and Wolverhampton of the degrading toil of forging nails by hand. In filthy, reeking dens these poor young things passed their lives in "unwomanly rags," engaged in unwomanly toil. But Bessemer has altered all that.

A Russian Student's Hair.

An Odessa correspondent of the London Times says: "An event has happened which has caused quite a consternation among the students attached to the university here. Prince Toumanoff, a member of an old and historical family in this country, has just received an order expelling him from the university here and directing him to leave the town within forty-eight hours. The extraordinary reason for this Draconian decree is that he declined to wear his hair short. He has been refused permission to go to St. Petersburg to present a petition, and now by his expulsion from this university he is not permitted to enter another in Russia; therefore his bright hopes and his aspirations to employ his talents for his country's benefit are wrecked and his career in Russia is ruined. The severity with which the university students in South Russia have lately been treated is viewed with dismay. Their grievances are left unredressed and petitions are useless. In these circumstances fresh disorders may be expected to break out at any time."