Correspondence.

The Life Line Mortar for Ships.

To the Editor of the Scientific American:

In your Feb. 2, 1884, number, "Life Saving Appliances at Sea," I was very much impressed with the idea you brought out of how impotent the saving appliances are in a heavy sea.

It appears to me, that the first piece of apparatus a vessel should possess would be a mortar for throwing life lines; it could always be loaded, fuse, hammer, cap, and line attached, and ready to be fired in a few seconds.

All the life saving stations are equipped with a mortar, and are found to be of great use. It would be so much easier and sure to throw a line to the shore than from the shore to vessel.

If a wreck occurred at some distance from a station, a line could be thrown from the vessel and passengers landed before the apparatus could be brought from the station.

Equally important, at sea, to make connection between two vessels when the sea is very rough, in which a boat could not live. A. S. P.

Paterson, N. J., Feb. 4, 1884.

"Pneumatic Propulsion" Revised.

To the Editor of the Scientific American:

In your paper of February 2 Mr. Henderson takes me to task for my "erroneous ideas as to the action of the air on the water." Now, I am very ready to acknowledge my errors, but I am also very ready to stand up for the right, and, inasmuch as your correspondent did not succeed in striking one of my manifold delinquencies, but took that which was just the reverse, he was not successful in his criticism.

He says "the air on escaping from the nozzle would pass along between the keels in a solid body," and in this way the friction caused by the air, "instead of assisting to propel the boat forward, would be retarding its progress." At that rate all I have to do is to turn the nozzle forward and try to drive the boat astern, and away she goes ahead, which was the very thing we were trying to do. I had not thought of that.

But, in simple fact, the whole operation is very different. When the jet from the pipe strikes the water its force is expended upon the mass of the water, which is practically a fixed body, and as action and reaction are equal, and the boat movable, the latter is driven forward on her course. She passes over the expelled air, but it is air at rest, for all its force has been expended upon the water and it simply *stops*. The difference in the friction of the boat against this air and the adjacent water will be in favor of the air, though it will be very slight.—Try again. There is abundant room for criticism, but it needs to come in a different line.

A.

Exhibition of American Machinery in Corea.

To the Editor of the Scientific American:

Your numerous readers will no doubt remember the late visit to Washington, New York, and Boston, of H. E. Min-Yong-Ik, the Corean Minister. He has just sailed from Marseilles, in the United States steamer Trenton, *via* Suez Canal, for his home in the far East, after a short visit to Paris and London, upon special invitation of our Government, through the courtesy of the President.

As the special envoy and representative of the Tah Chosun Government, and president of the agricultural department, his excellency takes a deep interest in the exhibition or museum being formed in Seoul, the capital of Corea.

In connection with this exhibition will be established an agricultural park for the practical display of the various descriptions of farming, mining, and geological implements, machinery, etc.

Before his departure from this country, the minister desired that I should take steps to make known to our manufacturers and business firms generally the desire of his government to have exhibits sent out, of such goods as may be adapted to the wants of an Oriental people, largely dependent upon agricultural and mechanical pursuits for their daily living. Up to the present time there has been no favorable opportunity of shipping to Shanghai and Corea by steam. The new American steamer San Pablo, to leave New York about the 25th of Feb. for Shanghai direct, *via* Suez Canal, offers a very favorable chance to intending shippers, both as regards time and reasonable rates of freight. The San Pablo should arrive at Shanghai about the 10th of May, and the goods should reach Corea about the 1st of June.

At Shanghai the steamers of the China Merchants' Steamship Company, leaving every few weeks direct for In-chun, the seaport of Seoul, will take these exhibits; and, as I am informed by the State Department, the freight charges from Shanghai to Seoul will be borne by the Corean Government.

All exhibits will be catalogued in English and Chinese, having the names of contributors or manufacturers attached. The Tah-Chosun Government should have the privilege of purchasing these exhibits, at the invoice prices, for purposes of early introduction among its own people.

My firm at Shanghai—Frazar & Company—will take charge of any goods, for transshipment to Corea, under instructions from shippers here.

On behalf of H. E. the Corean Minister, I shall be pleased to give any further information in my power that may be required, to assist in the opening up of the future trade between Corea and the United States.

Yours faithfully,

EVERETT FRAZAR.

73 South Street,
New York, Feb. 7, 1884.

Boiling of Oxygen.

In a paper presented to the French Academy, M. S. Wroblewski refers to his experiments in the liquefaction of oxygen, and attempts to make use thereof as a refrigerating agent. This he found to be exceedingly difficult, owing to the necessity of using the liquefied oxygen in closed vessels of great strength, and the very short duration of the ebullition. By means of a thermo-electric method the author was able to get an approximate measurement of the temperature at which liquefied oxygen boils when the pressure is suddenly released, which is stated to be —186° C., or 302·8° F. below zero. This is probably the lowest temperature ever recorded.

The author subjected nitrogen, after being compressed, to the action of this extraordinary cold. When the nitrogen was then allowed to expand a little, it solidified, and fell like snow in large crystals.

Chaperon and Lalande's New Battery.

In this form of single fluid battery, oxide of copper and metallic zinc are subjected to the action of a solution of caustic potash. Its construction is thus described in the *Polytechnisches Notizblatt:*

The oxide of copper is put in an open box of sheet iron which sits on the bottom of the glass jar, and to it is riveted a copper wire insulated with India rubber. This constitutes the positive pole of the battery. The negative pole consists of a half inch cylindrical bar of amalgamated zinc coiled into a spiral, and fastened to the lid so as to remain supended some distance above the box of oxide of copper. The upper portion of the zinc, where it rises to the lid, is covered with India rubber tubing, so that it may not be in contact with the liquid. The exciting fluid consists of a solution of 30 or 40 parts of caustic potash in 100 parts of water. Potash is preferred to soda, although the latter is cheaper, owing to the tendency of soda to effloresce. To prevent absorption of carbonic acid from the air, the jar must be provided with a close fitting lid or cover.

Among the advantages claimed are these, that the contact of the iron with the oxide of copper depolarizes the positive electrode. The reduced copper can be easily oxidized again by exposing it to damp air. If a current from a dynamo be passed through this battery in the opposite direction, the reduced copper will absorb oxygen, the dissolved zinc will be again reduced, and then regenerated. The new element is said to be very constant. One of these was used to ring a bell at the Vienna exhibition from beginning to end, with no other attention than the replacing of the evaporated water from time to time. A picture of the battery may be seen in the journal above referred to, in which the peculiar arrangement of the zinc pole is shown, but other forms will probably be found to answer as well.

Production of Iron and Steel.

The total production of pig iron in the United States in 1883 was 5,146,972 net tons against 5,178,122 net tons for the previous year. The past year was one of low prices, but not of greatly reduced production. The American Iron and Steel Association has received complete statistical reports from the companies owning the fifteen Bessemer steel works in operation in the United States in 1883, from which it is learned that the quantity of Bessemer steel ingots produced last year was 1,654,627 net tons against 1,696,450 tons in 1882. This is a much smaller decrease than has been generally supposed. It was, however, the first decrease that has occurred in the history of the Bessemer steel industry in this country. The quantity of Bessemer steel rails produced in 1883 by fourteen of the works referred to (the other company not producing rails) was 1,253,925 net tons against 1,334,349 tons produced in 1882, showing a decrease of 80,424 tons.

Great Britain's exports of iron and steel to the United States, in December last, show a falling off of 12,908 tons, as compared with similar exports in November. For the year 1883 there was a decrease of 506,929 tons as compared with similar exports to the United States in 1882, the exports being 688,187 tons for 1883 against 1,195,116 tons for 1882. Our imports of iron and steel in December were less than in any month since July, 1879.

Novel Thermometer.

The ordinary mercurial thermometer is, as is well known, based on the dilatation of bodies by the action of heat, and on the difference of dilatation between mercury and glass. A new thermometer, in which the mercury column sinks with a rise of temperature, has, moreover, been introduced by M. D. Latschinoff, who has based his instrument on the discovery of Kohlrausch that the coefficient of dilatation of ebonite is greater than that of mercury. Latschinoff has made the reservoir of his thermometer of ebonite, and the result is that the level of the mercury falls in it when the temperature rises, and, on the contrary, rises when the temperature falls. A rise of 20 degrees Cent. lowers the mercury 25 millimeters.

Micro-Organisms and Disease.

The public generally was not a little surprised when, something over two years ago, a German professor announced that he had made such progress in the microscopical examination and cultivation of different forms of bacilli and bacteria as to lead to the hope that thereby a means might be found of checking consumption, typhoid fever, and many other diseases, when established, or for their prevention, as small-pox is so largely preventable by vaccination. Since that time European savants have been yet more diligently following up this line of investigation; many different forms of micro-organisms have been successfully cultivated and made to assume widely different variations, so that one which was a virulent poison in one form, for a particular organization, might be innocuous to another, and *vice versa*. The end sought in these investigations is to so trace the immediate causes and propagators of all diseases as to materially aid in their prevention and cure, the theory being that inoculation with a mild type of micro-organism of a certain disease will overcome the more virulent, and thus prevent danger from that disease.

The knowledge thus obtained has thus far, also, been of almost incalculable benefit in the treatment of all diseases, especially those of a contagious nature. It was to enlarge our information in this field that distinguished French and German scientists visited Egypt during the cholera of last summer; freely endangering their lives in the prosecution of investigations in the hospitals and lazarettos of Cairo and Alexandria. It is greatly to be regretted, however, that American experts are contributing so little to this branch of the world's knowledge in this eminently humanitarian field, concerning which we quote as follows from the *Sanitary Engineer:*

"It is a shame that while these investigations are being pushed in Germany, France, and Great Britain nothing of the sort is going on in this country, the good commencement which was made in this direction by the National Board of Health having been totally abandoned for want of funds, while at the same time our legislative tinkers are at their wits' end to know what to do with the surplus in the treasury.

"Little by little the patient workers in European laboratories are tracing the life histories of the minute organisms which are found in the blood and tissues of men and animals affected with various diseases, and are learning to distinguish those which may be said to cause disease from those which only accompany or follow it.

"They have shown that a certain form of pneumonia is caused by an organism so minute that it appears only as a hardly perceptible dot or speck under the most powerful microscope, and yet which, nevertheless, they have cultivated in a series of tubes, and with the sixth or seventh culture have produced in animals pneumonia precisely like the case with which they started, showing that it breeds as true as wheat would do. Professor Quist, of Helsingfors, announces that the extremely minute particles of vaccine matter can be cultivated in the same way outside the living body and with the retention of their specific powers; and if this discovery be confirmed it solves the problem proposed by the Grocers' Company of London, who offered a large prize for the discovery of such a process.

"The last discovery of this kind is announced by Dr. Struck, of Berlin, who has been studying the micro-organism which appears to be the cause of a very fatal disease which sometimes affects the bones and marrow of man, and is known to surgeons as acute osteo-myelitis.

"The peculiarity of this organism is that it produces no apparent ill-effects when inoculated in animals, so long as the bones are sound. But if a bone in the animal is crushed or injured a few days before the inoculation is practiced, the injured limb is rapidly affected by the germ, and death follows in from ten to fifteen days.

"The fact that in order to produce this specific osteo-myelitis we must not only have the specific germ present, but must also have a certain damaged condition of the tissues, is a very suggestive one as indicating a possible explanation of the fact that in other specific diseases, such as diphtheria or typhoid, only a few out of many persons exposed to the specific cause may suffer any ill effects. The soil in which the seed is planted must be of the right kind and in proper condition, or the seed will not multiply. For some of the specific germs an inflamed tissue affords the most favorable conditions; as, for instance, in diphtheria, where a slight sore throat from ordinary causes appears to strongly predispose to an attack. Others, again, flourish in feeble and poorly nourished persons, whose blood is thinner and paler than in health, while still others appear to select as their favorite victims the ruddy and the strong, those who are apparently in blooming health, although such cases are exceptional. Those who have been breathing impure air laden with the emanations of cesspools, or of sewers of deposit, which are only another form of cesspools, or the air of overcrowded tenements, which contains almost as much foul organic matter as that of the cesspool, have been preparing in their own throats and lungs and blood a suitable medium for the growth, and reproduction in countless number, of these deadly little parasites.

"Much remains to be done in the study of the conditions under which these germs preserve their vitality and multiply outside the living body; in fact, we are only on the threshold of this part of the inquiry, and yet it is precisely this which is of the greatest interest to the health officer and sanitary engineer."

The Inventor of the Steam Plow.

The death is announced of the Rev. William Fisken, Presbyterian minister at Stamfordham, Northumberland, who was a septuagenarian, and had labored for thirty-seven years a few miles from Wylam, on the banks of the Tyne, where George Stephenson was born. Mr. Fisken, who was a native of Perthshire, while engaged in his religious labors, diligently pursued mechanics, in which his brothers, Thomas and David—of whom Thomas is a survivor—were equally proficient. Mr. Fisken was one of the two inventors of the steam plow, the other being his brother Thomas. Several years ago an important trial came off at Westminster upon the merits of the invention. The parties were the Messrs. Fisken and the Messrs. Fowler, the eminent implement makers at Leeds, and the finding of the jury was that the Presbyterian minister at Stamfordham and the schoolmaster at Stockton-upon-Tees were the original discoverers.

It is somewhat singular that the appliance which perfected the plan of the brothers, who had been working together at the steam plow, suggested itself to each of them independently and almost simultaneously. The late Mr. William Chartres, of Newcastle-upon-Tyne, the solicitor employed by the Fiskens, used to tell how the two brothers wrote to him on the same day about the final discovery, but that he received William's letter first.

Mr. Fisken also invented a potato-sowing machine, an apparatus for heating churches, and the "steam tackle," which has helped to render the steam plow of so much practical use. Mr. Fisken was much respected in Northumberland, in every part of which he was well known, both as an inventor and as an earnest minister of religion. His funeral was largely attended.

The First Steam Fire Engine.

A correspondent calls our attention to an article quoted in the SCIENTIFIC AMERICAN of January 26, page 49, from the Chicago *Herald*, under the above caption, in which the writer describes a visit to Mr. Greenwood's shop in Chicago in 1864, to see the new steam fire engine. Our correspondent thinks the article conveys the impression that this was the first steam fire engine made in the United States, which is incorrect, as he remembers to have seen steam fire engines on exhibition in the Crystal Palace, New York, in 1858.

Our correspondent is right; steam fire engines were shown at the Crystal Palace exhibition, and prior to that time trials of them had been made in this city. One of the early plans for a steam fire engine was illustrated in the SCIENTIFIC AMERICAN, Oct. 25, 1851.

We believe the first steam fire engine ever tried in this country was in New York. This was in 1842. It was a steamer built by the Matteawan Company for and on behalf of the insurance companies of this city, and was maintained by them for some time, doing good service at several fires whenever it was permitted to be used. But the firemen of New York were jealous of the new comer; they wrought themselves up to a bitter opposition; for if allowed to work it would distance all competitors, render hand engines of no account, and the occupation of "Mose" and the b'hoys would be gone. The insurance companies became satisfied that with hostility on the part of the firemen their losses would be increased rather than diminished, and the steamer was withdrawn.

"Floating" Oysters.

This is a term known among oyster packers as describing a way of making these bivalves look large and fat, although a close inspection will show that oysters so treated lack solidity and firmness, and are rather fluffy and bloated. The oysters are transferred from their native beds to tanks with different and a larger proportion of fresh water, and the operation became known as "floating" because, at first, the oysters were transferred from the vessels bringing them in to floats, which were towed to localities having the desired change of water, and there submerged. Oysters treated in this way are not only likely to lose their delicate flavor, but sometimes acquire a taste that is anything but desirable, which must have been the case in at least one instance in Chicago, where a dealer advertised that *he* did not sell "kerosene oil oysters."

Special Treatment for Different Woods.

The *Northwestern Lumberman* predicts that a portion of the furniture manufacturers will discover that their reputation is on the wane unless they treat more carefully the cheap woods used by them. Different woods require different treatment. . . . No one acquainted with the warping and shrinking qualities of wood, provided he had any desire to build up a lasting business, would place a wide piece of bastard sawed elm, with no material support back of it, in a piece of furniture, and this is being done every day. Maple and beech are used as injudiciously. The men who do it seem to think that such lumber will stand heat and change of temperature as well as walnut, which is a mistake unless it is properly sawed and seasoned, and then used in pieces of proper size. By and by the seasoning of wood by artificial means will become a science. It is constantly being proved that it will come to this. There are plenty of wood workers who talk long and loud about the "natural" process, and throw cold water on all others. In these days of discovery they might as well say that people should go naked because they were born so. The natural process has failed miserably, so far as it prepares certain kinds of lumber for certain purposes. The *Lumberman* is confident that in the near future elm, maple, beech, gum, and the other cheap woods will be used in high grade furniture, with no fear that they will perceptibly warp or shrink.

Professor Klinkerfues.

Professor Ernest Frederick William Klinkerfues, the German astronomer, shot himself in the observatory at Gottingen on the 28th ult. He was in his fifty-seventh year, having been born in Hofgeismar, March 29, 1827. He studied at the Polytechnic School at Cassel, and was employed as an engineer in the construction of the Main-Weser Railroad. He afterward devoted himself to the study of astronomy, and in 1851 was appointed assistant astronomer to Gauss at Gottingen, and succeeded him as Director of the Observatory, a position which he held to the time of his death. Professor Klinkerfues was the inventor of several astronomical instruments, principal among them being a new hygrometer for practical observations in meteorology. He was also the discoverer of several comets. He published a number of valuable articles in the review of the Scientific Society of Gottingen, and was the author of a work entitled "Theoretical Astronomy," published in 1872, and "The Theory of the Bifilar Hygrometer," 1875.

TERRY'S AQUATIC TRICYCLE.

The accompanying engraving shows a novel tricycle invented by a Mr. Terry, of England, and capable of being converted into a boat.

When used on terra firma the apparatus is like an ordinary two wheeled velocipede with steering wheel behind (Fig. 1). The operation of converting it into a boat is very simple, and takes but half an hour.

The two large wheels are made in two parts, which are fastened together by bolts. Two sections, placed parallel with each other at a distance of a meter, are used to form a space for the rower to occupy. The other two sections, fixed vertically, and external to the first, serve to give length and to make a boat with rounded ends. Two steel tubes, which connect the small wheel with the body of the tricycle, serve to fix the two parallel sections at their upper parts and to hold them at a distance. A wooden rod which is of no use in locomotion on land, being passed beneath and in the center of the sections, keeps them in place and answers as a keel. The frame of the boat is completed by a cord, which, starting from the extremity of the upper part of one of the vertical sections, connects the extremities of all the rest with each other, and serves as a support for a tarred canvas that covers the whole boat with the exception of the central space reserved for the oarsman.

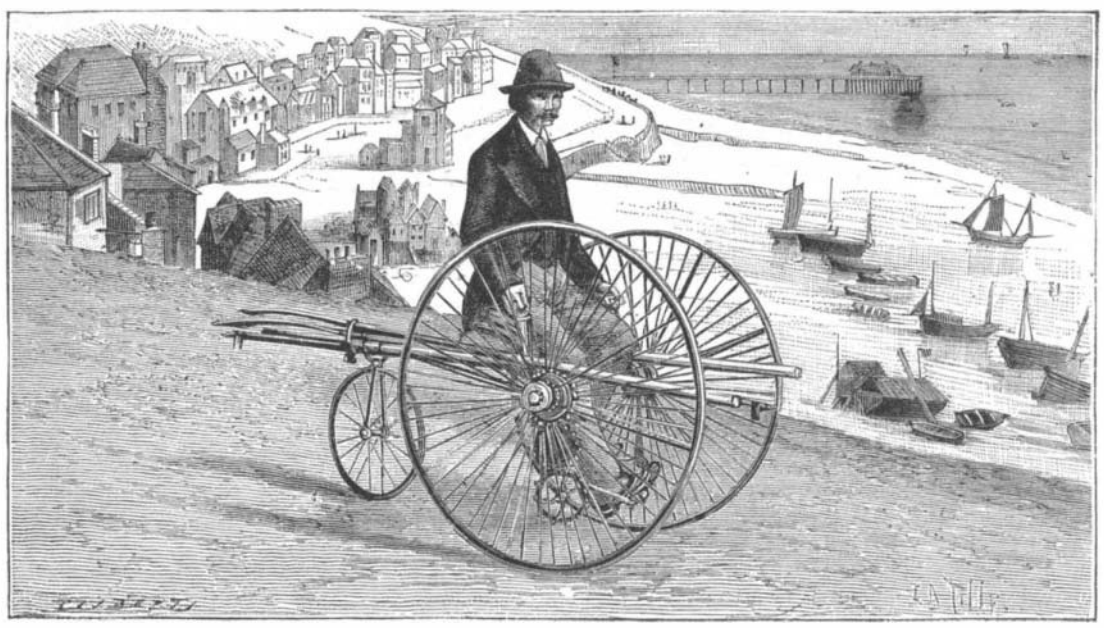

Fig. 1.—TERRY'S BOAT TRICYCLE.

All mounted, the apparatus forms a decked canoe 3·6 meters in length, 1·2 in breadth, and 0·6 in depth, that is to say, combining all the conditions necessary for proper buoyancy, even at sea (Fig. 2). The buoyancy is, moreover, increased by two air bags of 20 liters capacity each, which are attached to the two sides at the upper part of the open space. Mr. Terry started from London on his velocipede, Wednesday, July 25, at seven o'clock in the morning, and at 8 o'clock at night entered Canterbury after a journey of 58 miles. On the afternoon of the next day he was at Dover, a distance of fifteen miles only from the last named town. Friday he rested, and the next day, at nine o'clock in the morning, he left Dover in his tricycle converted into a boat. But three hours after his start the sea became rough, and it was not till five o'clock on Sunday morning that he touched land at Andreselles, a small village situated near Cape Gris-Nez. Having reckoned upon crossing the Channel in six or seven hours, he started without provisions; but, fortunately, Saturday evening he spoke a fishing boat from Boulogne, whose captain gave him cheer and pointed out the direction that he should take in order to land without danger.

The custom house officers, thinking they had a new sort of a smuggler to deal with, took him to Boulogne, where everything might be explained. Converting his boat into a tricycle he went from thence to Saint-Pierre-les-Calais, to the house of Mr. Maxton, a manufacturer of that town, to whom he had been recommended, and where he arrived Tuesday morning. Thursday, August 2, he started for Paris, and reached it after a journey of five days by the following route: Ardres, Saint-Omer Bethune, Saint-Pol, Doullens, Amiens, Montdidier, Clermont, Chantilly, and Saint-Denis. Distance, 290 kilometers. Mr. Terry, the inventor of this vehicle, is 29 years of age and has served for several years in the English navy.—*La Nature.*

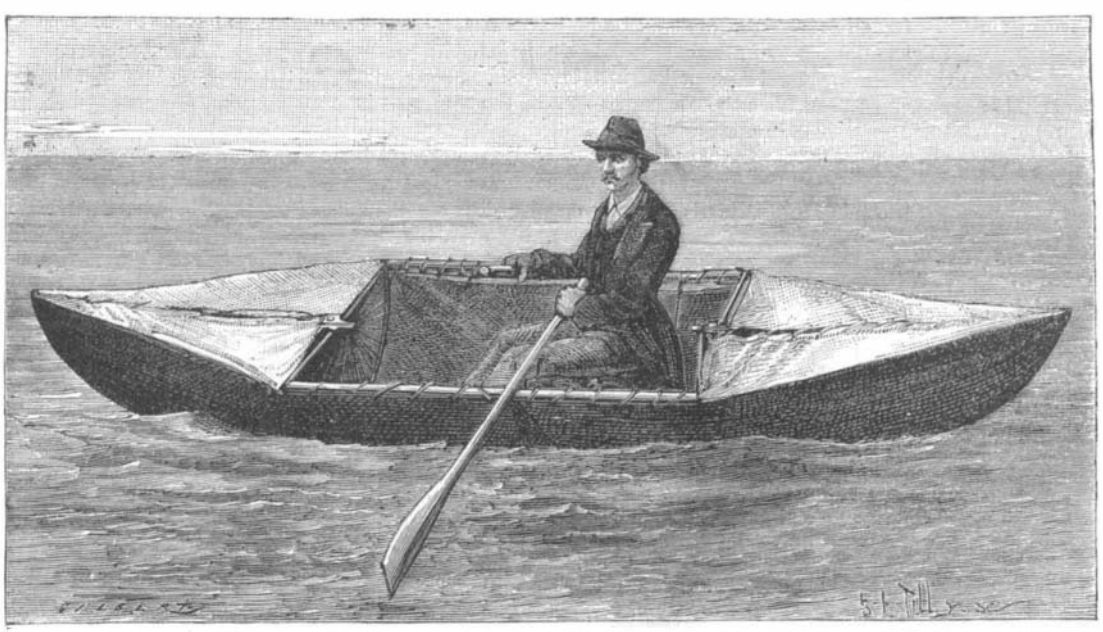

Fig. 2.—THE SAME CONVERTED INTO A BOAT.

Gas in Philadelphia.

Notwithstanding some abuses in the past in the public management of its own gas works by the city of Philadelphia, the report of the Trustees of the Gas Trust of that city for 1883, makes a very favorable exhibit. The price of gas was reduced, the city lighting was done free, except the cost of $7.35 per lamp for maintenance, the whole plant was greatly enlarged and improved—the mileage of gas mains now reaching 748 miles—and the wages of employes were increased, but the works made a net profit to the city during the year of $332,127. The accumulated profits from this source now amount to $4,871,085. The price of gas in Philadelphia is $2.15 per thousand feet against $2.25 per thousand in New York city. The Philadelphia people are supposed to get twice as much light from the same quantity of gas as the New Yorkers receive.

No wonder the stocks of our city gas companies command a high premium.