Correspondence.

The Paddlefast Boat Series.

To the Editor of the Scientific American:

I have all the numbers of the SCIENTIFIC AMERICAN SUPPLEMENT containing the articles on boat building by "Paddlefast." I take the liberty of suggesting that, to make them complete, you should supplement them by a series of chapters on displacement, stability, lateral resistance, position and size of spars, center of effort, and areas of sails; illustrating them by models taken from American practice. I mention this, as I find that anything in book form is English and does not apply to American models, and is too costly for ordinary buyers. J. H., JR.

[The various subjects above suggested by our correspondent were in contemplation by Paddlefast at the time of his decease. Since then we have been hoping to find some person to take up and complete the work. We should be glad to hear from any one who is able and willing to undertake it.—ED.]

How the Exhaust became Choked.

To the Editor of the Scientific American:

The following may be of interest to some of your many readers. We have had a small locomotive in constant use for the last twelve years, bringing the logs into our saw mills; it has a pair of 5 inch cylinders with 11 inch stroke attached to an upright boiler. For the last twelve months it has been gradually losing power, or rather speed, until it got so slow that it was taking 15 hours to do the work it used to do easily in 6 or 7 hours; what seemed strange, it ran about as fast loaded as empty, and crept along with about as heavy a load as ever it did.

We observed that the exhaust was not so distinct as it used to be, and latterly got to be continuous. At various times, as opportunity offered, we faced the valves, renewed the piston rings, and did everything we could think of to improve it, but all to no purpose. We had examined the cylinders and steam chest to see that there were no blown holes between them, and to see that there were no blown holes between the steam chest and exhaust. We plugged up the exhaust ports and filled the exhaust pipe with water, but found no leak; and in driving out the plugs the water came away with a rush, showing that there was no stoppage in the pipe. We were now almost at our wits' end, but to make sure the fault was in the engine, we disconnected the driving wheels, and found, as we had supposed, that the fault all lay in the engines, as they would only go at a creep; in desperation we removed the grease cocks, tried them again, and away they went at full speed, proving that after all the fault lay in the exhaust.

On disconnecting the pipe we found the stoppage near the top, just where it entered the funnel; we found we could not remove the obstruction until we cut the pipe, when at last the grand secret was laid bare. The uptake of the boiler where the exhaust pipe goes through gets very hot, sometimes red; this bad arrested a portion of the grease in passing from the cylinders, burning and soldering it hard to the pipe; this going on for twelve years had reduced the opening from two inches to little more than a quarter of an inch. We need scarcely state that after a few hours' work we had our locomotive running as well as ever it did.

BROWNLEE & CO.

Havelock, Marlborough, N. Z., 1884.

Inventors should Work like Politicians.

To the Editor of the Scientific American:

The strong arguments you have published concerning the matter of the bills before Congress affecting our patent system, should be republished in the form of a supplement, to be carefully distributed among our people. As it is, I am certain that the matter will be overlooked by many persons who would be of service at this time in opposing measures which without opposition will soon assume gigantic proportions, to the detriment of inventors and the general public. I, for one, will make good use of a large number of such supplements, and many people interested in the subject will undoubtedly do the same thing, so that the burden will not rest too heavily on a few persons.

Let Congressmen disguise themselves as patent purchasers and approach the records of the Patent Office, where the ownership of a patent exists, and they will come away satisfied that a purchaser is swindled only through his own carelessness, just as might be the case in a purchase of real estate without a search of title.

Let inventors for once come down to the level of politicians and "go to work," as they call it, and their rights will not long be tampered with by Congress.

R. M. FRYER.

New York, March 10, 1884.

[The world moves too fast, and there are too many new things each week engaging the attention, to justify the republishing of what has before appeared in our columns touching the proposed destruction of our patent system. But we can supply the back numbers containing these articles to those wishing them.—ED.]

A CORRESPONDENT of the *Pharm. Zeitung* tells another correspondent that benzoic acid and camphor can be made into a pill mass by means of powdered soap, 6 parts; water 1 part; and calcined magnesia, q. s.

The Pons-Brooks Comet.

An interesting account of the appearance of this comet, which is believed to be that of 1812, has been communicated by M. Jameson to the French Academy of Sciences. The writer is M. Trouvelot, who observed the comet on December 17 last, at 6:30 A.M., Marseilles mean time, with a telescope of 156 millimeters aperture, and an ocular magnifying eighty-five times. Seen by the naked eye, the comet appeared as bright as the stellar mass of Hercules, which it closely resembled; only at times a vague twinkle indicated that it possessed a core or nucleus. Viewed through the glass the comet plainly showed a head, coma or hair, and a tail. The general appearance was that of a long necked pear or grape stone, the round core being several degrees brighter than the nebulous hair around it, which gradually tapered off behind into the tail. The brightness of the core was estimated by M. Trouvelot as that of a star of sixth magnitude. In shape the core was not quite spherical, but slightly elongated in the direction of the tail. The hair was very bright, but as it blended into the sky its exact limits could not be very well distinguished. At first sight the head resembled a nebula with a central nucleus; but on closer inspection it appeared to be formed of two halves turned toward the sun and prolonged to form the tail. The sides of the tail, which extended opposite to the sun, also seemed to melt in the sky. The general direction of the comet was S. S. W. and N. N. E., the tail pointing in the latter line. M. Thollon has examined the spectrum of the comet at Nice, and found it to show with remarkable distinctness the three bands also given by the compounds of carbon. He concludes from his observations that the gaseous element enters largely into the constitution of the body. M. Trepied succeeded in observing the spectrum of the core on the evening of December 27, and found it as usual a longitudinal straight continuous band, with a notable increase of light at its intersections with the three carbon bands. He considers it probably due to reflected solar light, but has not yet seen the Fraunhofer lines observed by Mr. Huggins in a photographic spectrum of the great comet of 1881. The brightness of the core greatly increased from December 15 to 25, but appears to be fixed now. The tail, too, which developed rapidly during the latter days of December, is now of constant length.

Bright's Disease.

Referring to what was printed on this subject in the SCIENTIFIC AMERICAN of February 16, Dr. Alex. De Borra, of Crystal Springs, N. Y., writes that, after years of practical test of the milk diet for Bright's disease, he has a long list of cases in which he has made perfect cures. Great care is taken to get absolutely pure skimmed milk, from healthy and well fed cows, and no other food of any kind is given after the patient can bear five pints of milk a day. Up to this point, and until the stomach is able to take care of so much, is found to be the most trying period in this treatment, but no other medicine is given, and hand and hair-glove rubbing is daily administered.

Another correspondent takes exception to the claim made, that no drug of any therapeutic value in that disease has yet been discovered. In support of his assertion he sends us a recipe which he claims has effected a cure in Bright's disease, as well as in dropsy, in every case in which it has been tried during the last fifteen years. He recommends the drinking of an infusion of the dry pods of the common white soup bean or corn bean. When the latter cannot be readily obtained the pods of the "snap short" bean will answer, and even the Lima beam, though the latter is of inferior strength. The recipe is as follows: "Take a double handful of the pods to three quarts of water; boil slowly for three hours until it is reduced to three pints. Use no drink of any kind but this, the patient drinking as much as he conveniently can; it may be taken either hot or cold."

Acetate of Soda Car Heaters.

A new method of warming street cars has been on trial for several weeks on the De Kalb Avenue line in Brooklyn. About seventy cars have been fitted up with the appliance, which is a very simple one and does not encroach on the seating room for passengers. Two pipes run under the seats on each side, charged with a composition of acetate of soda, which at each trip is heated by a jet of steam sent through from a stationary boiler at the stable. The compound being heated is dissolved into liquid, and upon cooling throws out into the car the heat stored in it. This heat is pleasant and moist, and, without being intense enough to be disagreeable, is sufficiently strong for passengers to enjoy with ordinary out of door wraps, the temperature by actual record being maintained at 40 degrees higher than that outside the car. Thus, if the thermometer is down to 20 degrees above zero, the average temperature of the cars is kept at 60 degrees above.

A WRITER in the London *Garden* says he has discovered that grape vines in houses do better under rough rolled glass than under clear glass. The two most striking things he observed were the good quality of the fruit, and especially its color, and the health of the foliage of the vines, which was less affected by red spiders than any he had ever known before. The green state of the foliage before and after the fruit was ripe he attributed solely to the subdued rays of the sun upon the leaves through the rough plate glass, which obviated the necessity of giving air, thus trying the leaves less than they would be otherwise.

The Gum Arabic Supply Cut Off.

Gum arabic comes almost exclusively from the Soudan, and, owing to the operations of El Mahdi, there have been no receipts of any consequence for a year past. In confectionery it makes about 30 per cent of the best quality of gum drops, marshmallow, and jujube paste, and the Government envelope manufactory at Hartford, Conn., is said to use a ton of gum arabic weekly. The annual supply from the Soudan has heretofore been from 20,000 to 25,000 bags, of 400 to 600 pounds each, and there is usually a stock held in London about equal to one year's receipts. This reserve is now about exhausted, and the gum has been steadily advancing in price from the ordinary figures of 8 to 10 cents a pound until it now commands from 30 to 50 cents, according to quality.

The Vatican.

A writer in one of our contemporaries concludes that this word is often used by many who do not understand its import, and he proceeds to explain. The term refers to a collection of buildings on one of the seven hills of Rome, which covers a space of 1,200 feet in length and 1,000 feet in breadth. It is built on the spot once occupied by the garden of the cruel Nero. It owes its origin to the Bishop of Rome, who, in the early part of the sixth century, erected a humble residence on its site. About the year 1160 Pope Eugenius rebuilt it on a magnificent scale. Innocent II., a few years afterward, gave it up as a lodging to Peter II., King of Arragon. In 1305 Clement V., at the instigation of the King of France, removed the Papal See from Rome to Avignon, when the Vatican remained in a condition of obscurity and neglect for more than seventy years. But soon after the return of the Pontifical Court to Rome, an event which had been so earnestly prayed for by poor Petrarch, and which finally took place in 1376, the Vatican was put into a state of repair, again enlarged, and it was thenceforward considered as the regular palace and residence of the Popes, who one after the other added fresh buildings to it and gradually encircled it with antiquities, statues, pictures, and books, until it became the richest depository in the world.

The library of the Vatican was commenced 1,400 years ago. It contains 40,000 MSS., among which are some of Pliny, St. Thomas, St. Charles of Borromeo, and many Hebrew, Syrian, Arabian, and Armenian Bibles. The whole of the immense buildings composing the Vatican are filled with statues found beneath the ruins of ancient Rome, with paintings by the masters, and with curious medals and antiquities of almost every description. When it is known that there have been exhumed more than 70,000 statues from the ruined temples and palaces of Rome, the reader can form some idea of the richness of the Vatican. It will ever be held in veneration by the student, the artist, and the scholar. Raphael and Michael Angelo are enthroned there, and their throne will be as enduring as the love of beauty and genius in the hearts of their worshippers.

Gas Leakages.

An indicator of gas leakages has been constructed by Mons. C. V. Jhan, and is described in the *Revue Industrielle*. The apparatus consists of a vessel of porous earthenware, such as the porons cell of a galvanic battery, set upside down, and closed by a perforated India rubber stopper. Through the hole in the stopper, the inside of the vessel is connected with a pressure gauge containing a little colored water. The vessel can be exposed to the air of an apartment where a leak of gas is suspected; or a sample of the air may be contained in a bell glass inverted over the porous cell. The diffusion of gas through the earthenware raises the level of the water in the pressure gauge; and when the latter is properly graduated and proportioned to the capacity of the cell, exact and delicate indications may be obtained in a simple manner. This species of diffusiometer is so sensitive that when an Argand burner is gradually turned down until it is extinguished, the instrument, if held above the burner, will show a considerable rise of the water in four or five seconds. If held over an ordinary burner, turned on just sufficiently to be ignited, the liquid rises very rapidly. When the instrument is graduated in millimeters, a volume of one-half per cent of gas in a room may be distinguished by it. An example is afforded by a case of sickness, which, in the opinion of the medical attendant, was due to gas poisoning. Some doubt arose on the point, because gas was not laid on to the house. The diffusiometer was brought into requisition, and showed the presence of gas, the source of which was afterward found in a broken main 3 meters distant from the house. A modification of the same instrument is made, whereby the sensitive portion is adapted for permanent exposure in any place difficult of access—such as the ceiling of a theater or public building, where gas might be expected to collect; the indicating portion being fixed anywhere within view.

Blindness of Congressmen.

"Thieves can be dealt with without robbing the inventor or punishing the public," says a Philadelphia correspondent, in concluding a letter protesting against the blindness of Congressmen in refusing to see the true position of patentees before the law. Attention is also called to the fact that foreign governments have of late been hastening to encourage inventors by enacting patent laws mainly modeled after the United States system, even Spain granting patents for twenty years.

A Triangular Rule.

It is not an easy matter to lay out a straight line—or rather two parallel lines—on a shaft in the exact line of its center by an ordinary straight-edge or rule. There is no means of knowing that the rule is held exactly in line, and the marks for a keyway, for instance, may be parallel with each other but diagonal relative to the longitudinal center of the shaft. A simple straight-edge may be made by any machinist having access to a planer, that will insure exactness without extraordinary care. Take a piece of inch square bar steel ten inches long, anneal it, put it on the planer and plane two adjacent sides, and then plane away the two other adjacent sides, thus leaving it of triangular or L section, the sides perhaps three-sixteenths of an inch thick, or a quarter of an inch thick, beveled on the inside so that the edges will be thinned down to one-sixteenth of an inch.

If this method of producing an angular shell by the wasting of most of the block of steel appears unnecessary, a piece of plate steel three-eighths of an inch thick, two inches wide, and ten inches long may be bent to the angle, the corner being upset so as to get a perfectly square corner in finishing. It is evident that such a tool would be very convenient in laying out lines on shafts and other cylindrical bodies, and also on the inside of bored holes. Of course, two or three varying sizes of the tool would be desirable.

A modification of this tool may be made for leveling purposes, as the leveling of shafting, the testing of the parallelism of shaft and crank pin on steam engines, and for similar purposes. In this adaptation the tool is simply a block, say two and a half inches or three inches square, and six, seven, or ten inches long, with perfect planed sides and a V planed out of one side so deep as to have a bearing only on its edges or inside when placed on a shaft of any size from one and a half to six or more inches. With this tool, having an ordinary spirit level laid on its top, there is no difficulty in leveling, and no danger of having the spirit level mislead by not bearing exactly on the center of the shaft. This recessed V block need not be of steel; ordinary cast iron is good enough, only it must be planed and finished true on the V-recessed face and the opposite face—the top.

Water in Boilers.

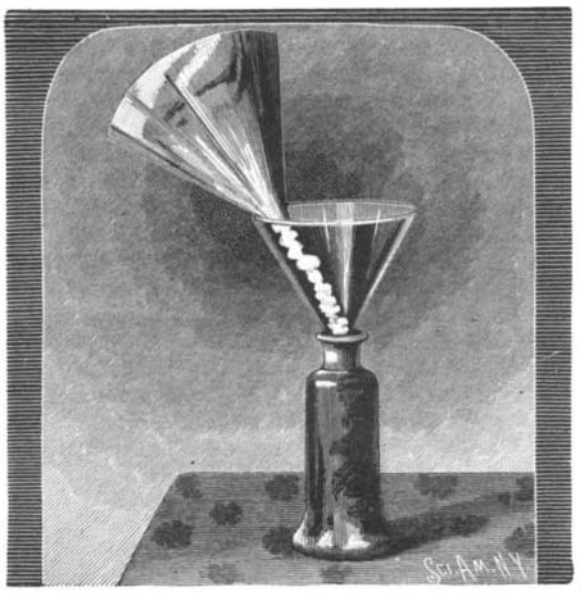
The danger of allowing water to assume the spheroidal condition in steam boilers is generally recognized; and M. Melsens has investigated the causes which conduce to this state. He has found that when the shell of a boiler is roughened with many points, water boils at the same temperature as that which in a perfectly smooth boiler will produce the spheroidal condition. The demonstration of this fact has been shown by the following arrangement: A dish representing the bottom of a boiler is divided into two equal parts, one of which is made perfectly smooth, while the other is covered with little pointed metallic cones, soldered to the plate. The dish is raised to a uniformly high temperature by a gas furnace, and then a quantity of water is poured simultaneously into both compartments, rising high enough to just cover the points of the cones. In the smooth compartment the water will pass into the spheroidal condition and not enter into ebullition; in the other, the ebullition will be lively so soon as the water covers the points of the cones. The same phenomenon occurs when the water has, by long boiling, been previously purged of its contained air. It remains to be proved whether this experimental fact can be utilized in the construction of boilers, in order to suppress or diminish the disasters arising from overheating.

What will Burst a Gun.

Some strangely twisted pieces of gun barrels exhibit, in a most interesting fashion, says the Philadelphia *Times*, the vagaries of overtasked gun barrels. The specimens are parts of some guns burst by Capt. Heath, of that city, during some protracted experiments with various weapons. Five of the barrels were burst because a ball was "stuck" near the muzzle in each case, two gave way because about four inches of snow was put in the muzzle, two were burst by reason of having some wet sand at the muzzle, and three were ruptured by mud at the muzzle. Sportsmen often scoop up a little mud or sand unconsciously, bang away at game, and are then astonished to find the gun with a ragged and shortened barrel.

ANOTHER CURIOUS CASE OF FREEZING.

The curious and beautiful case of freezing which was illustrated in the SCIENTIFIC AMERICAN a few weeks ago has called forth a number of letters from our correspondents, and one gentleman, Mr. Koerner, of Wisconsin, has forwarded to us a photograph which we present in the accompanying engraving. In the letter which came with the photo he said: "The bottle contained a solution of photosulphate of iron. I filtered the liquid until the bottle was quite full, and the



STEM OF ICE AT FILTRATION.

next morning, to my suprise, I found it in the condition shown. The white line connecting the filter with the bottom of the funnel is a solid piece of ice and has the coarse shape of rock candy. Everything is solidly connected, though the ice does not rest on the side of the funnel, but in one solid stick running up and holding the filter in place." The filter of course is one of the ordinary paper filters commonly used in laboratories; this unexpected termination of Mr. Koerner's filtering operation affords a very pretty illustration of the wonderfully expansive power of ice.

OIL ON TROUBLED WATERS.

Thomas Stapleton's translation of Bede's "Historia Ecclesiastica" was published in 1565. Bede was born 672 A.D., and died 735 A.D. In one portion of his work he states that when a certain priest was sent into Kent to fetch King Edwine's daughter to be married to King Oswin, he so appointed his journey as to return with the lady by water. Upon beseeching the prayers of the bishops he was given a pot of oil, told that he would meet a tempest and contrary wind, and that he was then to cast the oil into the sea. All happened as the bishop had foretold, and "in this distresse the priest at the length remembering the bishop's wordes, toke the oyle pot, and did caste of the oyle into the sea, which being done . . . the sea calmed, the bright sonne appeared, the ship passed on with a most prosperous viage." Here it will be noted the oil not only calmed the sea, but changed the weather and brought out the sun.

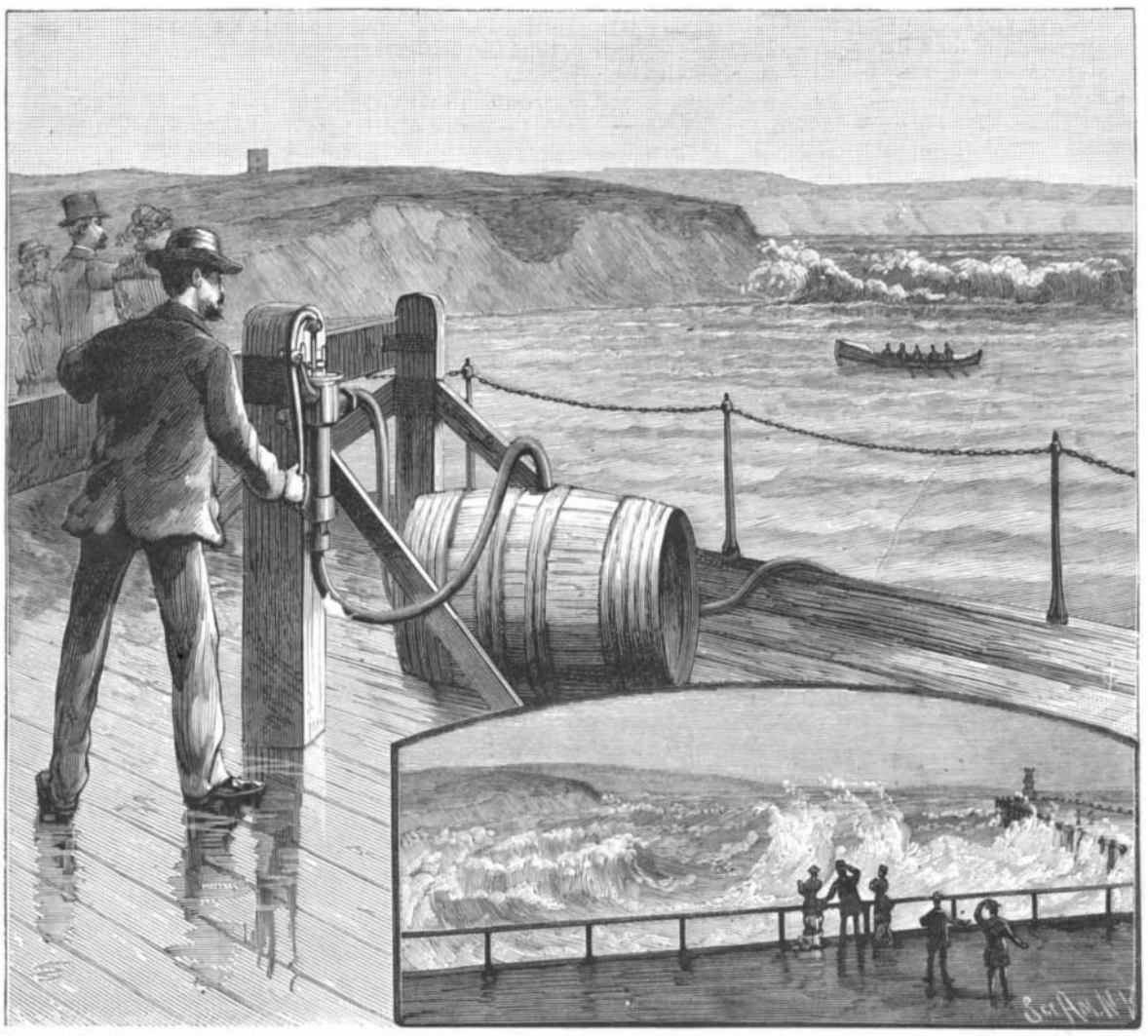
Various other instances are reported in which the saving of ships was believed to be directly due to the diminished force of the waves caused by pouring oil in the sea.

On October 8, 1880, a three ton boat sailed from Montevideo for Naples, the voyage being undertaken, not in a foodhardy spirit, but to test the value of a little oil on rough water. The olive oil used was inclosed in small bottle-shaped bags each containing about half a gallon. When it became necessary to lie to in a gale, a large bag was attached to the bow of the boat and thrown overboard. This served as a floating anchor, or drag, and kept the boat's head to the wind. Two small bags were then thrown over, one fore and one aft. Each bag had a small hole through which the oil slowly escaped. Although the oil did not reducethe size of the waves, it was claimed to render them comparatively harmless by preventing them entirely from breaking.

On February 4 last, the ship Jan Mayen left Dundee for St. Johns. She met a heavy storm that smashed the binnacle, carried away the compasses and part of the bulwarks, and finally threw her on her beam ends. As a last resort to save his ship, the captain tried the oil experiment. Three bags were filled with oakum saturated with oil; one bag was hung over the weather bow, another amidships, and a third on the quarter. In a short time the sea ceased to break over the ship, which soon righted. The oil lasted until the next morning, when the sea had considerably calmed down.

On January 26, the ship Lauderdale, from Junin to Hamburg, was struck by a heavy sea and soon began to make water. The next morning the captain of the Medea lowered a boat to go to her assistance, but it was capsized and all on board lost. If the boat had got only a little nearer the Lauderdale she would have been in smooth water, as on board the latter vessel they were pouring oil into the sea through a pipe in the forecastle, and this had a wonderful effect on the water all around. In view of this statement, the fact that a boat should be lost when oil was actually running into the sea from the forecastle of the ship looks rather bad for the oil theory. During the following morning the crew of the disabled vessel left in their own boat and got on board the Medea. Three trips were made in the boat, which was supplied with a can containing about five gallons of oil, from which a stream about the thickness of a pencil was allowed to flow into the water, and the result was that the sea was calm and no water broke on board.

The accompanying engraving represents Folkstone Harbor, England, where a method of putting the oil upon the water when needed has been recently effected. From each side of the South-Eastern Railway Company's pier had been laid under water several hundred feet of lead pipe about one and one-quarter inches in diameter. The pipe is furnished with a series of upright branches eighteen inches high at intervals of about one hundred feet, each branch terminating in a valve and a brass rose like that of a watering pot. The lead pipe is connected at its shore end with a force pump placed on the pier. By means of the force pump oil is driven through the pipe and out of the small perforations in the roses under water. On January 29, 1884, the plan was tested, about one hundred gallons of oil being pumped through the pipes. Soon there was a wide stretch of rolling sea, only at the edges of which the waves broke, and in the center of which a life boat rode easily. Seal oil was used. A second experiment was made at the same time, consisting of firing shells filled with oil, which, when the shells burst, spread itself over the water. The shells were simply oil flasks, each being provided with a fuse so timed as to burst when required. Our engraving, which is from some English pictures taken on the spot, purports to represent the condition of the water both before and after the application of the oil. On one side we behold the sea lashing itself into a fury wherein no small boat could live. On the other side is seen the appearance of the same water after a little oil has been discharged thereon. All is calm and peaceful, and the boat is observed to be gliding, as it were, over a surface as smooth as a lake in a summer day. This is fully equal to the statement above made by Bishop Bede more than a thousand years ago, and so far as the oil virtue is concerned, one story is about as true as the other.



EXPERIMENT WITH OIL ON TROUBLED WATERS.