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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 588

For the Week Ending April 24, 1886.

Price 10 cents. For sale by all newsdealers.

THE SINKING OF THE STEAMER OREGON.

Although more than a month has now passed since the Cunard steamer Oregon joined that large navy at the bottom of the sea, it cannot be said that the cause of the disaster has yet been satisfactorily explained. It is even uncertain what vessel gave the fatal blow. Circumstantial evidence still points to the Charles H. Morse as the unfortunate collier, since she would in all probability have been just off Fire Island Light at the time of the collision, and no news has been received from either schooner or crew.

It was thought that the steamer's share in the mystery would be fully explained as soon as divers could succeed in visiting the wreck and examining the present condition of the vessel. But a series of driving winds and consequent heavy seas made their work utterly impossible until a few days ago, when moderately smooth water permitted the first descent to be made.

In addition to this, the orders of the Cunard Company appear to have limited the investigation to the exterior of the vessel. The reports are of much importance, however, in one respect, since they show that the steamer is now broken in two, and that all hopes of ever raising her must be permanently abandoned. It will be remembered that the vessel plunged down, bow foremost, throwing her stern high in air. As the result of this unequal sinking, the after part of the hull has been twisted out of line with the forward part, and discloses a large opening about twenty-five feet in front of the bridge and on the port side.

The hole which sank the steamer was found to be about twelve feet below the main deck, and to be six feet deep by three and a half wide. The iron sides of the vessel were bulged in, and had crushed a part of the cargo, while scratches along the paint indicated that the fluke of an anchor had been dragged along the side of the vessel. The hole was covered with canvas, secured by cords passing under the keel.

The testimony of the passengers and crew has been from the start very conflicting. Beyond a natural desire to know the real cause of the disaster, there are several legal points involved which make a thorough investigation of the matter very important. All of the passengers lost their personal effects, and in several cases the individual loss amounted to many thousand dollars. The American representatives, at least, deny the company's responsibility; and while some of the passengers have been asked to submit statements, they have not been encouraged to believe that any voluntary reparation will be made. The legal responsibility, however, turns upon whether the sinking of the vessel was unavoidable or due to inefficiency on the part of the commanding officers. A very strong impression prevails on this side of the water that, had Captain Cottier and his subordinates exercised even a limited amount of presence of mind, the Oregon could have been kept afloat, and all these losses prevented.

Captain Cottier's own admissions before the Board of Directors at Liverpool show that one of the doors of the flooded compartment could not be properly closed, owing, he adds, to the volume of inflowing water and the coals washed against it. He states under oath that all of the doors were in good order on the previous day. This is widely at variance with the statement of a sailor now on his way to give testimony in behalf of the passengers. He is equally positive that this was not the case. He states that in one instance the door was so rusted that it was impossible to get it closed. However this may be, it seems incredible that such a comparatively small hole, and very near the surface at that, should send a magnificent craft like the Oregon to the bottom.

It is very easy, we know, when one is safely on shore, to say what *might* have been done; but, in this case, there was certainly a great deal which should have suggested itself to the mind of a commander whose very qualification for a post of so great importance should be dependent upon his resources in the face of danger. No effort seems to have been made to list the vessel by shifting her cargo or by blowing off the water from her port boilers, although all agree that such a course would have thrown the vessel sufficiently on her side to have lifted the hole above the water line. These omissions are the more inexcusable as all the attending circumstances were unusually favorable.

Even the simple expedient of beaching the vessel could scarcely have been tried in earnest. A very general doubt existed that any effort had been made until Captain Cottier stated before the Directors that his first idea was to make for the shore, but the putting out of the fires prevented his getting very near. People still feel, however, that the course he steered in carrying out such a plan was, to say the least, decidedly oblique. Everybody agrees in stating that the machinery worked for half an hour after the collision. The vessel at the time was so near the shore that lights could be seen from deck, and was going at the rate of twenty miles an hour.

It is odd that she now lies ten miles off Fire Island, if she was immediately headed for the shore. It is probable that a number of interesting facts will be brought out when the legal counsel for the unfortunate passengers presents the other side of the story.

INTER-STATE COMMERCE.

A bill is now before Congress which provides that the residents of each State and Territory may solicit orders for goods and merchandise anywhere within the United States without the payment of any license or mercantile tax. It was prepared by the Traders' and Travelers' Union of New York city, and introduced by Mr. James. At the present time fourteen States and Territories, besides the District of Columbia, impose such a tax upon the commercial traveler. The Union takes the ground that he is nothing more than an animated catalogue, and that while he displays his samples or other illustrations, and transmits orders to the home office, the real business transaction takes place at the desk of his employer. It maintains that any tax upon his performance of such a service is an evil which requires to be remedied. This position receives the support of the major part of the mercantile community and of the press, for the tax is regarded as an unjust restriction upon inter-State commerce. It is significant that many of the citizens of the localities where such a tax is imposed have declared themselves in favor of the bill. Recognizing the jealousy with which State rights are guarded, the advocates of the bill show conclusively that Congress has the proper authority to enact such a measure, since the Constitution expressly declares that the regulation of commerce among the several States is the function of the general Government, and the contracting parties in this instance are clearly the residents of different States and Territories. Believing, as we do, in a strong national policy, we hope to see the passage of the bill, both on account of its inherent merit and as an expression of unimpeded intercourse between the several commonwealths of the republic.

SIGNALS AT SEA.

In the last number of this journal, a correspondent, referring to the recent disaster to the Oregon, offers a suggestion looking to the prevention of such collisions at sea. He says:

"I would suggest that all steamers carry an additional white headlight on their bow, furnished with movable red and green screens, that can be quickly drawn in front of the light (thereby changing the white to a red or green light) by wires running from the light to the pilot house.

"The wheelsman of a steamer, seeing a sailing vessel near, can decide on which side he should pass; if to 'starboard,' he can quickly draw the green screen in front of the light, thereby notifying the sailing vessel that she is to pass to the 'starboard' side; or if the wheelsman considers the 'port' the proper side to pass, he could draw the red screen, then the navigator on the sailing vessel could quickly know on which side the steamer intended to pass."

It is not easy to see how such a system of signal lights could serve to lessen the danger of collision. Indeed, it would seem—and the writer asks pardon for the remark—as if it would add to them. If the present rules are to be changed, it is manifest that whatever code succeeds should be equally simple. And here it may be said that in cases where lights can be seen—and this correspondent's plan makes no allowance for others—there is not, or, rather, there should not be, any difficulty in avoiding a meeting. Generally stated, the present rules compel a steamer to keep out of the way of a sail, and of two sailing vessels meeting, that with a free wind must give way. When a great steamer like the Oregon, running at full speed, meets another vessel in foggy weather or in a haze, which seems to have been the prevailing conditions at the time of her mishap, there is no reason to believe that any code of signal lights would avail to arrest disaster. A ship which, with her helm hard down, does not fairly begin to respond until the end of half a mile's run, can scarcely be expected to keep out of the way of another vessel when sighted close aboard.

Again, sailing vessels cannot always go as they will, their movements being restricted by the wind. A vessel close-hauled and jammed up against the wind cannot be turned any further in the direction whence the wind is blowing, without stopping her headway and leaving her helpless and unmanageable. Hence, to signal to such a vessel to "pass to the port side," as suggested, would, if such "passing" was to windward, be idle, if not positively ridiculous.

It is true that the masters of these big steamers do pretty much as they please on the high seas, and are not inclined to confine themselves to a strict interpretation of the rules of the road. If proof of this were wanting, it might readily be found in the letters recently sent to the press by the skippers of coastwise craft. These men allege, in effect, it has come to that pass that, when they meet a big transatlantic liner, they know the sea-going rules are "off" for the time being. Experience has taught them that she will hold her course, willy nilly, and it only remains for them to get out of her way—to sheer off or even to luff up into the wind and let their sails flap.

Such mishaps as that which befell the Oregon seem not to proceed so much from any defect in the sea-go-

ing rules as from a wanton disregard of their observance. To run a great, unwieldy hulk at high speed in foggy or even hazy weather on a commercial highway, where scores of sail continually ply, seems to be a greater offense than a fine will atone for. It ought to be criminal. The men who are responsible for this flagrant violation of the law boldly affirm that there is no more danger in running at full than at half speed in thick weather; and the course of reasoning by which this conclusion is reached, if not logical, is at least unique. If we run at half speed, they say, we may only come up in time to run head on to a vessel crossing our track, whereas, had we been going at full speed, we would have safely crossed her bows and been on our way with plenty of sea room.

A fair answer to this would seem to be that the slower a steamer is going the more chance there is of avoiding collision when it is imminent. The law says that a steamer sailing in thick weather shall go at half speed and keep her whistle going; and a careful navigator, more concerned in the safety of his own ship and the craft that may be in his path than in making fast time, will stop his engines when he hears the whistle of a steamer or the horn of a sailing vessel, while he locates the direction of the sound, and then keep his engines turning very slowly—only fast enough to insure steerage way—until the danger is over. No system of signal lights could be of much service in thick weather at sea, because they are rarely seen until it is too late for effective warning; and as, when strong winds prevail, a vessel with the wind behind her cannot hear sounds from a-lee, it is the duty of those sailing in the teeth of the wind, as the master of the Oregon was, to go very slow and take more than the usual care.

Not long ago a trial was made of a code of sound signals to be used in fogs at sea; these being made up of short and long sounds blown by steam or horn, by which the course of a ship hid by the fog could be sent to one that was likely to meet her. A short sound meant, "I am out of the west by north," or, in other words, "I am bound east by south." If the wind never blew when it was thick, this would have been a great help at sea; but the fact that, save when the wind is dead ahead, sounds do not come true from the point whence they start, but are heard first over one bow and then over the other, would do much to make this plan of no avail, and so, though it found much favor ashore, did not gain any friends at sea.

THE CLAPP-GRIFFITHS STEEL PROCESS.

In our article on the Clapp-Griffiths steel process, March 27, we inadvertently transposed the reactions occurring in the Bessemer converter. It is the silicon of the pig iron which first suffers combustion, and forms with the oxides of iron and manganese a siliceous slag which floats upon the molten metal. The carbon then oxidizes, and the disappearance of this flame indicates the end of the reaction.

PHOTOGRAPHIC NOTES.

Directions for Making a Gelatino-Bromide Emulsion by the Ammonia Method.—Mr. W. K. Burton in the *Photographic News* says: I have always rather avoided giving ammonia formulæ for emulsion making because, although I have been able to get the highest degree of sensitiveness by this method, I have not in my own practice been able to find any method whereby I could be sure of producing an emulsion free from green fog. The introduction of the alkaline carbonates in place of ammonia in the developer has, however, made the appearance of green fog a matter of comparatively little importance. Even if the carbonates be not generally used, the photographer may make use of a carbonate developer—such as Beach's—when he finds that he has had the misfortune to get a batch of emulsions showing green fog.

The following is a formula which has given excellent results:

A.—Nitrate of silver	200 grains.
Water	2 ounces.
B.—Bromide of potassium	160 grains.
Iodide of potassium	10 "
Nelson's No. 1 gelatine	40 "
Water	4 ounces.
C.—Dry gelatine	300 grains.

Into A is poured very slowly the strongest ammonia, or the stock solution of one part strong ammonia, one part water. Darkening of the solution will immediately take place. The addition of the ammonia is continued, with constant stirring, till the solution just becomes clear again, which will probably occur when about half an ounce of strong ammonia has been added. The clear solution now obtained is called ammonia nitrate of silver. It has to be made up with water to a quantity of four ounces.

When the gelatine in B is soft, the whole is heated till the solution reaches a temperature of about 160° Fah. It is then allowed to cool to 120° (a chemical thermometer must be used in this process), when emulsification is performed by pouring A *cold* into B, in three or four operations, with stirring after each.

The jar containing the solution is now placed on one side to cool, the gelatine, C (still dry), being torn up with the fingers into pieces about the size of a pea, which are dropped into a jar of clean water, where they remain for twenty-four hours, the water being changed several times. At the end of twenty-four hours the pieces of emulsion—which will have swelled very considerably—are placed in a small jar, water being poured over them to make the quantity up to eight ounces. Heat is applied to melt the whole. Half an ounce of alcohol (not methylated spirit) is added, and the emulsion is ready to spread on glass.

In coating with this emulsion it is advisable to have it as cool as possible—not over 100° Fah. If it will not run on the plate as cold as this, these must be very slightly warmed before the coating operation commences. By the process just described, emulsions giving plates of a sensitiveness 25 on Warnerke's sensitometer, and at the same time giving clear shadows and ample density, have been produced many times in succession. This sensitiveness is very high, but it appears that such plates do not keep so well as those of more moderate rapidity. They are liable to show a slight fog after having been stored for a few months.

I can recommend Beach's developer for plates prepared in the way just described.

Note.—The developer referred to is prepared as follows:

No. 1. PYRO SOLUTION.

Warm distilled or melted ice water	4 oz.
Chem. pure sulphite soda (437 grs. to oz.)	4 "

When cooled to a temperature of 70° Fah., add:

Sulphurous acid	3½ oz.
Resublimed pyrogallol (437 grs.)	1 "

The pyro is best dissolved by pouring the sulphite solution into the pyro bottle and then out into a graduate, repeating the pouring until completely dissolved.

If pure, it will dissolve very rapidly. When completed, the solution should measure nine and a half fluid ounces.

No. 2. POTASH SOLUTION

is prepared with two separate solutions as follows, each ounce of the salt containing 437 grains to the ounce:

a	Water	4 oz.
	Chem. pure carbonate of potash	3 oz.
b	Warm water	3 oz.
	Chem. pure sulphite soda	2 oz.

a and *b* are now combined, forming one concentrated solution.

Each ounce of No. 1 contains approximately 48 grains of pyro. Each ounce of No. 2 contains approximately 154 grains of potash.

It will be seen that the potash solution is quite concentrated, so that a small quantity is only necessary for use in development.

A normal developer would be made up as follows:

Water	2 oz.
Pyro solution (No. 1)	1 drachm.
Potash solution (No. 2)	30 minims.

If more density is required, from one to two drachms more of No. 1 may be added. If the development proceeds too slowly, from one to one and a half drachms of the potash solution may be added in small quantities at a time, until the right speed of development is attained. By thus varying the proportions, the developer can be made to suit either an over or an under exposed plate.

The negatives possess a brilliant, clear, bluish gray color.

Government by Snap of the Finger.

A few days ago a cigarmaker walked into the office of Mr. William Strange, of Paterson, N. J., who employs 1,200 persons in his large silk mills, and demanded that he sign an order which would revolutionize the dyeing shop. Mr. Strange declined to do so, whereupon the cigarmaker at once went out, and as he passed the dyeing shop snapped his fingers, at which signal all the operatives in the shop dropped their work and left the premises. They subsequently admitted that they had no grievance, and that they were indignant at being ordered to stop work, but they claimed that under the laws of their labor organization they had no option.

Mr. Strange, who seems to have acted coolly and fairly, told his people that he could not do business on that plan. If it had come to this, that a stranger and an outsider could walk along the corridors of his mill and stop all the work he had in hand by a snap of his finger, he would shut up his manufactory and employ his capital in other ways. And he should do this, not in passion or out of spite, but because he could not afford to do business under such conditions. He would not feel justified in assuming the responsibility of contracts, in making investments in real estate and machinery and the like, if his whole business could be paralyzed at any moment at the whim of a dictator.

The love of power is an instinct with all, and it is not surprising that the labor element, now that it sees the strength to be derived from association, should like to use that strength more or less wantonly. But ignorance and passion will ruin any cause. Labor can only be really strong by being right. And the labor cause will break down unless it studies the principles of human society and obeys them. In the case just cited, if the facts are as reported, these fundamental principles of liberty and order were ignored; and the result can only be confusion and ruin. Whatever the remedy for labor troubles may be, certainly it is not the snap of the finger.—*N. Y. Commercial Advertiser.*

Hypnone.

In a recent number of the *Bulletin General de Therapeutique*, Dr. Dujardin-Beaumetz and Dr. G. Bardet give an account of the physiological action and therapeutic uses of a substance to which they propose to apply the term "hypnone." It has many names, the best known being acetophenon; but although they may be useful as indicating its chemical composition, they are ill adapted for the requirements of the practical physician. It is made by distilling together a mixture of benzoate and acetate of lime. At ordinary temperatures it is a clear, colorless liquid; but on exposure to even a moderate degree of cold, it is converted into a mass of beautiful crystals.

It is simply a laboratory produce, and as yet has not been manufactured for commercial purposes. Its price is somewhat high; but as the dose is small, this is a matter of little importance. It has a most persistent characteristic odor, so that few patients would care to take it unless inclosed in capsules. Its physiological action is very marked, and there is reason to suppose that we are in possession of a hypnotic only second to urethan. In cases of simple insomnia, unattended with pain, its action is marvelously prompt, and there are absolutely no after-symptoms, such as nausea, headache, or constipation, which so frequently follow the administration of opium or morphia. It has as yet been but little used in this country, but the reports so far are said to be most favorable. We owe a debt of gratitude, says the *Lancet*, to Dr. Dujardin-Beaumetz for giving us this new remedy.

THE *Age of Steel* has been informed that the Brush Electric Company, of Cleveland, are building the largest dynamo in the world. It will be 12 or 13 feet long, 5½ feet wide, and weigh ten tons. It will give a current of 122,500 amperes; number of watts, 245,000. In other words, it will be four times the size and capacity of the "Jumbo" machine exhibited by Edison at the Electrical Exposition at Philadelphia. The latter was adequate to the task of running 5,000 sixteen candle power incandescent lights. This monster machine of the Brush people will be shipped to Lockport, N. Y., and used for the smelting of "aluminum," it is said. Five hundred horse power will be required to drive it, which will be furnished by water, with the aid of turbine wheels.