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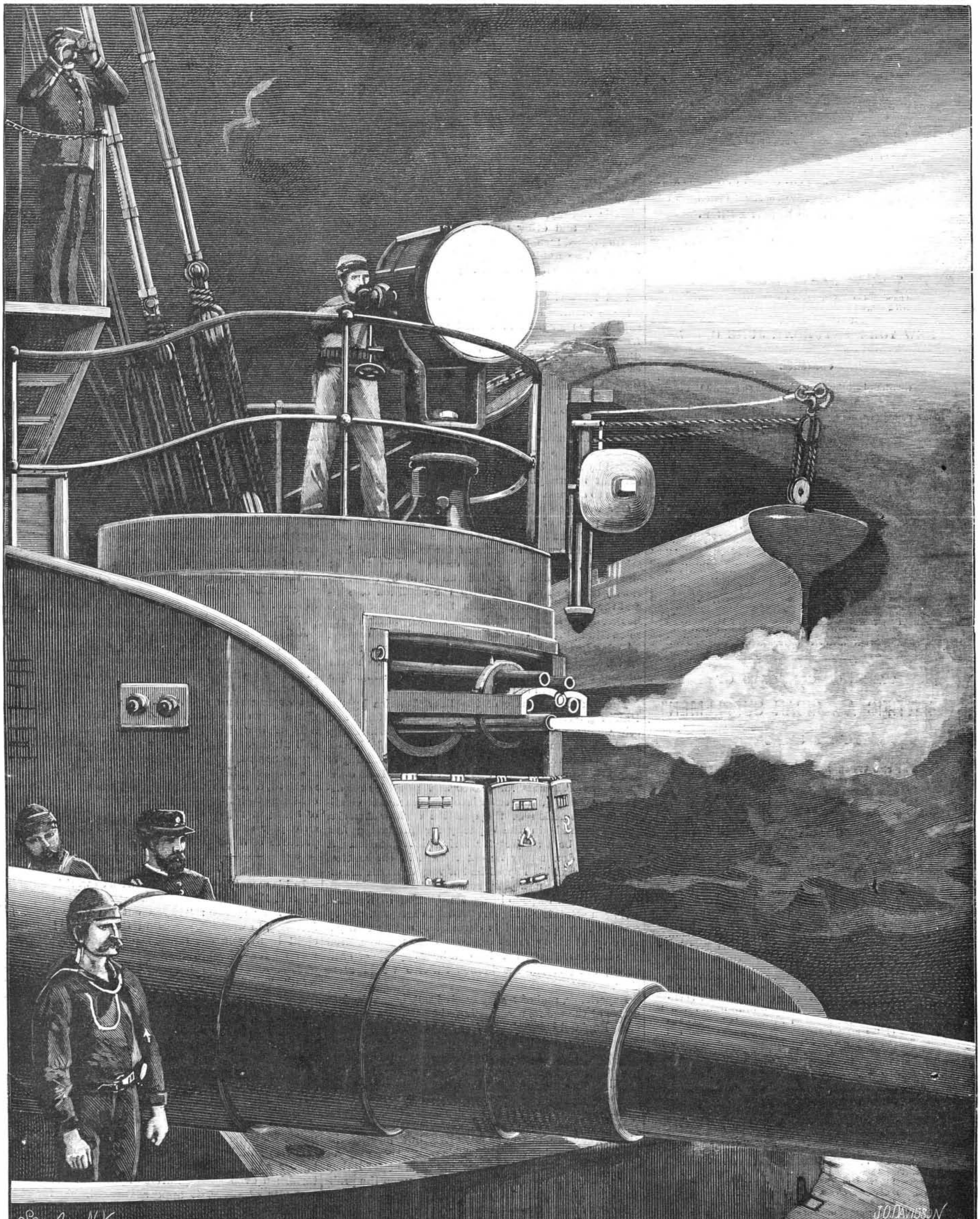

OUR NEW NAVY—SEARCH LIGHT ON THE U S. CRUISER ATLANTA.—[See page 372.]

SEARCH LIGHT ON THE U. S. CRUISER ATLANTA.

The recently completed U. S. cruiser Atlanta is provided with two search lights of great power, one being located just back of the 8 in. long range breech loading rifle on the forward deck, while the other is immediately back of the stern chase 8 in. rifle. These lights are exquisite specimens of mechanism, and, although at first glance they seem to be extremely complicated, there is in reality no part not necessary in order to produce their quick, accurate, and easy universal adjustment.

The tube or cylinder containing the light proper has a length about equal to its diameter, and is mounted upon trunnions placed in bearings in a yoke swiveled upon a post or standard secured to the deck. The tube has a free movement on its trunnions to provide for vertical adjustment, and also moves freely on the pedestal for horizontal adjustment. These movements are accomplished by hand, the operator grasping the tube and manipulating it as may be necessary; but when a fine adjustment is required, the tube is clamped in the bearings and to the standard, when the movement is then controlled by a worm and gear.

Within the tube, the front of which is furnished with a glass door, and in the sides of which are sliding doors, through which the interior can be reached, is an arc light, the carbons of which are three-quarters of an inch in diameter. The arc is located in the focus of a parabolic reflector covering the rear end of the tube, the direct rays being prevented from leaving the tube by a shield held in front of the arc. The carbons are carried by a frame having a movement parallel with the axis of the cylinder, so that the arc can be maintained in the focus. Each carbon is provided with an independent adjusting apparatus, by means of which its point can be moved to either side, forward or back, and up or down. Through the center of the reflector is an opening, covered by a red glass, through which the arc can be inspected, and at the center of the right hand side of the tube is a prism. The light can be cut off by a shield, which can be swung down between the arc and reflector. A switch controlling the current of electricity is placed on the pedestal.

These devices for altering the position of the points of the carbons by hand are, of course, independent of the usual mechanism governing the carbons and regulating the arc. They are intended to provide means for shifting and regulating the arc in its relation to the focus.

In the top and bottom of the tube are openings, so covered as to prevent the light from passing out, which serve to ventilate the interior, the heat of the light being sufficient to create an upward draught.

The beam of light issuing from the lantern diverges slightly, and is sharp and well defined. When required, a lens can be fitted over the plane glass cover so as to produce a pencil of light having parallel rays.

It is evident that, from the elevated position of these two lights, their location on the ship, the extraordinary power of the light they throw, and the ease with which they can be handled, the surface of the water immediately around the vessel and at a long distance off can be brilliantly illuminated. The rapidity with which the beam can be swept around and adjusted to short and long distances will serve to give warning of the approach of any floating craft, and any object once sighted can, by means of the delicate adjusting contrivances, be easily and surely kept in the path of the beam. Provision is also made for keeping the light steady during the rolling of the ship.

For particulars concerning the search lights we are indebted to the courtesy of Lieut. W. P. Clason.

Early Use of Mahogany.

It is said mahogany was first known to Europeans through the fact that Sir Walter Raleigh, when at Trinidad in 1595, used planks of it to repair one of his vessels. The samples thus carried to England were much admired, but for over 100 years it was put to no practical use. In 1720, however, a Dr. Gibbons, of London, received a few mahogany planks from a friend in the West Indies, and employed a cabinet maker to work them up. From that time to the present, the wood has been a staple article of commerce, So far the supplies have practically all come from Spanish America, but there is some possibility that other sections may contribute to the supply. Mahogany, though of an inferior quality, has been shipped from Africa, and certain parts of India have proved to be adapted to its growth. Mahogany is of slow growth.

Steel Oars.

Yates & Co., Birmingham, are making an oar in which the blade is made from the best sheet steel, highly tempered. It is put forward as being much stronger than the ordinary wooden one, and cannot be broken without undue violence. The handle fits into a socket running nearly the whole length of the blade, and forming a backbone of great strength. The oar being much thinner in the blade than the wooden one, enters and leaves the water cleaner. The handles are made separately, of the ordinary spruce or ash, and if broken can be readily replaced.

Two Very Deep Wells.

The Northampton *Herald*, referring to a well boring for Belding Brothers, silk manufacturers, Rockville, Conn., says of the work: When the sandstone was reached, it was thought that at a depth of 750 feet that would be the last of it; but when this depth had been attained, and the sandstone still continued, it was then predicted that by the time the drill had gone down 1,250 feet, it would be through the stratum, but not so; and again another prediction was in order, and 1,500 was the depth named. But the well has been bored some 3,440 feet, all but 200 feet being through sandstone, and now the best geologists are at loss what to say, for the question how far the sandstone does extend is a conundrum which they "give up."

Prof. Emerson, of Amherst College, and other eminent geologists declare that it is impossible to tell anything about it. Mr. Haskell, the solicitor of the North American Mining Company, which is sinking the well, has brought the matter before the geologists of the Boston School of Technology, and they do not attempt to give any theory which affords any encouragement as to how far it will probably be necessary to go down before getting through with the sandstone. The theory is that the sandstone is the deposit of a vast river current in the past ages, and therefore it is difficult to arrive at any conclusion as to what the depth of this deposit may be. The well is now the deepest in the country, and, with one or two exceptions, the deepest in the world. There is one at St. Louis 3,180 feet in depth, which flows seventy-five gallons of water per minute.

Making Solder.

The solder manufacturers make it so easy for tinners to procure solder, and at such a reasonable price, that it may be only a few years before there will be so few tinners who know how to make the article that the process may be counted among the lost arts. In many country towns, old tea lead can be bought so cheaply that it may pay the tinner to make his own solder. To make good solder, care must be taken that the metals are not heated too much, or they become hard, or lose their life. The usual way of making solder is to put a kettle on the forge and melt the pig tin, then the lead is added. If this operation is left to incompetent persons, there is danger that the material may be heated too hot. This should never occur.

The tea lead can be melted quickly by bending a piece of heavy iron in the form of a trough, which can be placed on the forge in an inclined position. By having a proper amount of fire under the iron, and burning resin with the lead, the paper can be burnt off very rapidly. A pot can be placed under the trough to catch the melted lead. As soon as enough lead has been melted, the pot of lead can be weighed, and the proper amount of tin added to make the desired quality of solder. For general use, most tinners prefer half and half; while for rough work, whatever that may be, a solder composed of fourteen parts of tin to twenty-two of lead may do.

The greatest care should be taken that there is no zinc in the solder; if there is a suspicion of any, it can be removed by burning sulphur on the surface of the melted solder. This operation should not be continued too long, as sulphur will eat tin as well as zinc.

When the metal is ready to be dipped out, it should be constantly stirred, so the heavy lead will not settle to the bottom, and leave the tin on top. Its paper can be taken off tea lead by opening out the lead and sprinkling it with water, then folding up again, and allow to stand until the paper will peel off. This saves one heating, and makes the solder richer.

There are two kinds of tea lead. One kind looks more like solder, it is so light colored. This kind is said to contain bismuth. It is better for solder making than the darker colored kind. As long as the solder is melted, its surface should be covered with resin, to prevent the air from forming the oxide of tin; and if the solder is poured into pans, it should be skimmed with a piece of Russia iron as wide as the dish, so, when the solder cools, it will look like cakes of silver. The "scraps" from the solder boards should never be melted with the new solder, as there may be some pieces of zinc or galvanized iron in the collection.

As hot metals are not convenient to weigh, another way of making the solder may be used. The lead can be melted in the kettle, and about as much tin put in as may be thought right. When there is more than half lead, a star will form on a button of the solder as it cools; as more tin is put in, this "star" will disappear, until the button shines like silver. Then the solder is all right. These buttons are made by taking out a little solder in a ladle, and pouring it on a heavy stake, so it will cool at once. A little practice will enable one to tell the quality of solder as well as could be done by weighing.

A little bismuth added to solder makes it melt easier, and teaspoons can be made that will melt on being put into hot tea. This makes a nice joke to play on people, for it is enough to surprise any one to have tea to drink so hot as to melt the teaspoon.

It is by putting bismuth into solder, so it will melt easy, that our brother tinners in China manage to solder the lead lining of tea chests so nicely and cause the "Melican" tinner to wonder how it is done.—*American Artisan.*

How Watch Dials are Printed at Elgin.

The progress of art is nowhere more apparent than in the to-day method of dial making, contrasted with the old system of hand painting and ruling.

We have just examined the present system of printing dials employed at Elgin, a system first invented by Henry Abbott, of New York, and supplemented by the experiments and exertions of Mr. Eggler, the present superintendent of the dial department at Elgin. This system dispenses with all the old army of skilled dial painters and rulers, besides producing work of an accuracy and beauty they could never hope to equal.

As at present employed, the first step taken is to engrave on a steel plate a pattern of the dial they wish to produce. This steel plate once made serves as a model forever, for from it is first formed a matrix of brass, on which is made by the usual electrotyping process a number of copper electrotypes, containing the pattern substantially the same as the first engraved steel plate. These copper electros are next covered with the pigment they wish to mark the dial, and after drying are cleaned off carefully, the pigment of course remaining in the depressions. These copper plates are next placed upon a flat, revolving table, and collodion poured upon them. Centrifugal force disperses the collodion evenly over the plate, and in a few moments the film of collodion, backed by a sheet of paper, is carefully removed, having taken up the pigment from the plate. These coppers, after a limited use, are discarded, as the collodion and friction of rubbing in the pigment tend to mar the distinctness of the image. These collodion sheets are next laid carefully on a dial which has been already baked and polished, and after removing the paper backing, used to facilitate handling, the dial is gently fired to evaporate the collodion and fix the pigment firmly on the enamel. Dials are thus produced of a beauty and accuracy all depending upon the execution of the original model; and as such a model, laid out mathematically and finely engraved, serves to always produce its counterpart, dials are made with an accuracy and cheapness not to be attained by the old process of individual treatment. Various colors may be printed, only requiring care in the first laying on of the pigment.—*C. B. Garrett, Jewelers' Journal.*

Interesting Cure of Insanity.

An interesting instance of fighting insanity by insanity has recently been noticed among the Blackwell's Island patients. Two lunatics had been received who were disposed to commit suicide. In addition each possessed a special delusion, one to the effect that he was a cow, the other that his head was an iron ball, and was to be rolled along the floor. They carried these beliefs into action, one striking his head against the padded walls of his cell, the other rolling his head, and of course his body with it, along the floor. The two patients were placed together, and each was privately informed of the other's weakness and warned to watch his companion to prevent him taking his own life. Thus each had a charge in the other. Their vigilance was unceasing. Each supposed himself perfectly sane, and this belief was accompanied by considerable scorn for the other's weakness of intellect and accompanying delusions. Gradually under the influence of this treatment the patients were observed to improve. To have their attention centered on definite duty and on objects external to themselves proved a tonic for their diseased minds, and gradually a complete cure was effected, and they received their discharges from the asylum.

Absorption of Nitrogen from the Atmosphere.

Soils were placed in vessels of glazed earthenware, and in some cases were protected, in others exposed to air and rain, the rain water being collected and analyzed, and the amount of ammonia and nitric acid in the air being also determined. The results show that vegetable soils continually absorb nitrogen from the air, even when they are not supporting vegetation. The amount absorbed is in all cases very much greater than the quantity of nitrogen existing as ammonia or nitrogen oxides in the air or rain. In fact, the rain removes from the soil in the form of soluble nitrates considerably more nitrogen than it brings in the form of ammonia. At the same time, the amount of nitrogen absorbed is far greater in the case of soil exposed to rain than where soil is protected, probably owing to the greater activity possessed by the nitrogen-absorbing organisms under the former conditions. In the majority of cases, a notable proportion of the absorbed nitrogen is converted into nitrates.—*Berthelot, Compt. Rend.*