The Corrosion of Ships' Bottoms.

Admiral Colomb, who presided at a meeting at the Royal United Service Institution, some time ago, when Mr. Henwood submitted his views on the subject, said very truly that nobody knew very much about the subject one way or another, and yet he referred to the fouling of ships as one of the weakest spots to be feared in a blockading squadron, more so now than it was at the end of the last century. This is a question that also closely affects ship owners, not only in the matter of the wholesale deterioration of their property, but in increased expenditure, owing to protracted voyages and increased consumption of coal. Mr. Henwood instanced the case of the French ironclad Invincible, which had not been docked for ten months. At the end of that time her greatest speed was 9·8 knots, with 51·5 revolutions. When she was docked, fully ten tons of vegetable matter and barnacles were removed from her bottom, and after being cleaned her speed was 13·2 knots, with 53 revolutions. A case nearer home was that of a vessel carrying 3,500 tons dead weight, which maintained a speed of 10 knots on the passage to Cape Town, but, after proceeding to Cocanada, and loading for home, her speed during the remainder of the voyage was reduced to 7 knots. When placed in dry dock, on her arrival in England, she looked exactly like a half-tide rock, and four rail-truck loads of barnacles were removed from her bottom. When cleaned she again made 10 knots with the same boiler pressure.

The direction in which scientific men have been experimenting of late years, with a view to solving this difficult problem, has been toward discovering some means of securely fastening sheets of zinc on to the iron plating, so that, an electric or galvanic relation being established between them, the iron or steel would cease to be susceptible of corrosion, and the outer surface of the zinc would be kept comparatively clean by a slow process of oxidation, which would carry away with it the barnacles and vegetable matter. The plan adopted by Mr. Henwood to obtain this end is the soldering of sheets of zinc, 8 feet long and 3 feet wide, on to the iron or steel plating by means of a zinc solder, the attachments being made at about 12 inches from center to center. A template is made of the size of the sheet zinc, with holes about ⅝ inch in diameter, 12 inches from center to center, and 6 inches from the edges. A zinc sheet has similar holes punched in it, and around each hole a layer of zinc solder is fixed about 1 inch in width; also along the upper and after end. The template is then applied to the side of the ship where the sheathing is to be applied, and its position marked on the ship, and the position of the holes. At the position of the holes the oxide of iron or steel is removed for an area of about 2½ square inches, and covered with a layer of zinc solder.

The sheet of zinc is then put in its place and the solder united with a hot soldering iron, the holes in the sheet are filled up flush, and the attachment is then complete. It is calculated that a practiced hand can make about sixty attachments in an hour, and the largest vessel may thus be sheathed with zinc in about a week or ten days. The cost at present, without special appliances, is about 10s. per square yard.

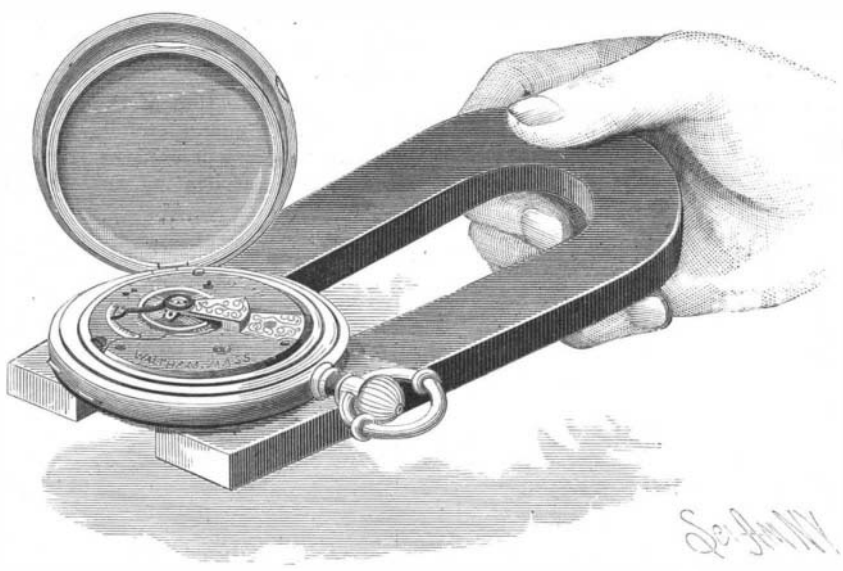
Curious Facts Relative to Alloys.

Alloys, formed by melting two or more metals together, present some very interesting characteristics. One of the most curious is the fact that the melting point of the alloy is usually much lower than that of any of its components. Wood's alloy, for instance, which consists of lead, tin, cadmium, and bismuth, melts at about 150° Fah., while the lowest melting point of any of the metals separately is that of tin, 446°. It has always been supposed that this alloy could only be formed at a comparatively high temperature; but Mr. William Hallock has recently shown that when the several metals are mixed together in filings, and exposed for twenty-four hours to the heat of an ordinary water bath (212°), the alloy is produced, and the mass becomes fluid, and that the previous fusion of either constituent is unnecessary. This fact the *Popular Science News*, from which we copy, thinks is of the highest scientific importance, and that it has never been observed before.

THE Texas wheat-growing counties report the increase of acreage this season at from 10 to 100 per cent.

THE WALTHAM NON-MAGNETIC WATCH.

People carrying valuable watches, or depending upon pocket timepieces of any kind, seldom properly appreciate the risks they run of destroying their accuracy and rendering them totally unreliable by going anywhere near electrical machinery, of which the use is now becoming so general. From this one cause probably proceeds more of the "crookedness" in the watches now made than can be attributed to any other one source, and it is a difficulty which watchmakers have been earnestly striving to meet by the use of anti-magnetic shields, composition balance wheels, etc.



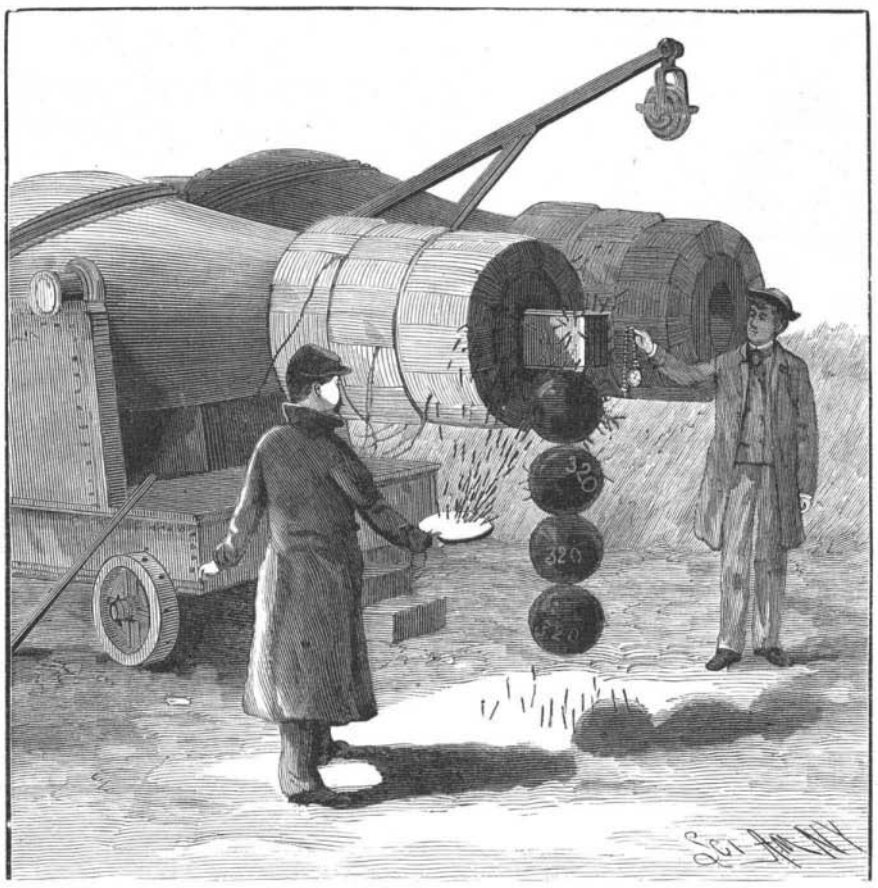
TESTING WALTHAM WATCHES WITH A HORSESHOE MAGNET.

What seems to have been a successful effort in this direction, by the American Waltham Watch Co., was recently made the subject of an interesting test. The company, after a long series of experiments, has perfected an alloy for use in their balance wheel, escapement, and hair spring which is apparently non-magnetizable and not affected by proximity to the strongest dynamos. One of their regular watches, provided with these parts made of this alloy, was subjected for fifteen minutes to the influence of Major King's great cannon magnet at Willets Point, N. Y., without at all affecting the time of the watch. This great magnet was described in the SCIENTIFIC AMERICAN of January 14, and is shown in one of the accompanying illustrations, two 14-inch Dahlgren guns, weighing over 50,000 lb. each, being utilized for its construction. Their muzzles were wound with about eight miles of No. 20 insulated copper wire, three coils to each gun, and the guns were connected at the breech by a pile of railway bars, the electrical current being furnished by a 30 horse power dynamo. The watch was held in close proximity to the muzzle of one of the guns, forming one pole of the magnet, where the magnetic current was strongest. Its main spring and other portions became so highly charged as to retain their magnetism for several days afterward, but the hair spring, balance, and escapement were so totally unaffected that the rate of the watch, as noted by an astronomical clock before, during, and after the experiment, showed no change whatever.

The severity of this test may be imagined when it is considered that, in other experiments with this great magnet, a pull of five tons upon the center of the armature failed to detach it; that four fifteen-inch shells, weighing 320 lb. each, were suspended by magnetic attraction in a vertical line from one of the guns; and that a crowbar was attracted with such force that it required four strong men to drag it away, while a string of carpenter's spikes, placed lengthwise one against another, stood out between three and four feet horizontally, upheld by the magnetic force. As might be expected, a watch which would withstand such a test could not be affected by actual contact with a dynamo, on which the watch was placed and allowed to remain for a time, with no different result from that obtained on the trial with the great magnet.

A further test, however, and one which it is readily within the power of most people to apply to a watch, is shown in one of the illustrations, the submitting of the watch to the magnetic influence of an ordinary horseshoe magnet. Such a magnet as this will at once stop the motion of an ordinary watch, and destroy its time-keeping qualities until demagnetization has been effected, a matter often costing much time and trouble. Yet such trial as this is invited on all Waltham watches provided with their new balance wheel, escapement, and hair spring, thus affording purchasers a ready means of testing the non-magnetizable quality of these watches. The use of dynamos is now becoming so general that one never knows when he may be in close proximity to one, either in traveling on the cars, visiting places of amusement, inspecting goods in stores or warehouse, or in manufacturing establishments of any kind. Their influence is not interfered with by the interposition of walls or partitions, and the hitherto trusted timepiece needs but to be brought sufficiently near to be rendered worthless, or have its value seriously impaired, while the owner may be in total ignorance of the cause.

The result now obtained by the Waltham Company is said to be secured without any sacrifice of the qualities desired in the parts of the watch made of their improved alloy, the latter itself being slightly different in the different parts. In fact, the balance and hair spring made of this new metal are non-oxidizable, which insures greater perfection in the manufacture, as well as being an advantage in use, and the parts are finally hardened in shape, which increases the facility of accurate adjustment. Owners of watches made by the Waltham Company will be pleased to learn that they can now, for a moderate sum, have their watch movements refitted with these non-magnetizable parts, and thus made proof against the influence of electrical machines.



TESTING WALTHAM WATCHES WITH THE GREAT CANNON MAGNETS, WILLET'S POINT N. Y.

Costly Halls in New York Houses.

The *Plumber's Journal*, referring to the costly and elegant halls to be found in a modern New York house of the first rank, says, what we have for some time observed, that the people of wealth and taste have entirely abandoned the straight hall of the narrow block house, where the stairs go straight up and the narrow passage to the back parlor and basement stairs goes straight back. Instead they have made the hall the central feature of the establishment, to which, if necessary, everything else is subordinated. The new type of hall is elaborate in its architectural features, richly antique in its furnishings, and it is upon the hall that the decorative effect of the house is centered. The hall, indeed, is so much of a hobby that people build new houses in order to have halls.

It is not an unknown thing to give up the whole first floor to the hall, putting the parlor on the second floor. Whether the hall be big or little, its furnishing is a thing which its mistress is giving much attention to nowadays. To be quite perfect, it should be done up in old oak and have "settees" standing about in room of chairs. It should have a big oak table, a smaller one to hold a silver salver, on which a guest's card is taken to the lady of the house, and its floor should be of oak, polished till it shines. The hall is of quite as much consequence as the drawing rooms.

THE world's annual consumption of wheat is estimated at 2,165,000,000 bushels.

© 1888 SCIENTIFIC AMERICAN, INC.