THE ROMAN AQUEDUCT AT NIMES.

One of the most interesting old cities one visits in his travels abroad is Nimes, in the south of France, about 60 miles from Marseilles, founded so long ago that the historian tells us that it was subjugated by the Romans one hundred and twenty-five years before the Christian era. Like nearly all the old cities of France, Nimes contains a cathedral, a weather-worn citadel, and a Roman amphitheater—all in a fair state of preservation. The latter, in size, is next to the Coliseum at Rome, and is in quite as good condition, and before its partial destruction was capable of seating 20,000 persons. The date of its construction is unknown, or the name of its founder, but it has been attributed to the reign of Titus and Hadrian. History tells us it was used as a citadel at one time by the Visigoths. It is now sometimes the scene of bull fights.

The next building of importance, and perhaps the most interesting of all, is the Maison Carrée, a beautiful Corinthian temple in good state of preservation. The tomb of Mr. Jay Gould, which was illustrated in these columns not very long ago, closely resembles this ancient temple, and there is little doubt the Gould tomb was copied from it.

After about ten or a dozen miles ride from Nimes, on the road to Avignon, another interesting old walled city, full of historical interest, we come to the famous aqueduct known as the Pont du Gard, which our engraving very perfectly represents. This interesting and stupendous structure, the historian tells us, dates back to some twenty years before the Christian era. It is supposed to be part of the aqueduct erected by Agrippa, son-in-law of Augustus, for the purpose of conveying water from Uzez to Nimes. It is built in the Tuscan order, and is composed of three separate bridges or rows of arches, one above the other, the river Gardon flowing under the lowest, which is 530 feet long and 65 feet high; the next above is 846 feet long and 24 feet high; the upper tier is 870 feet long and 25 feet high; the whole structure being 188 feet high, 19½ feet wide at the base, and 4½ feet at the top. The lowest bridge has 6 arches, the next 11, and the uppermost 36. The watercourse at the top is large enough to permit a person to walk through it. The stones of which it is constructed are of immense size, and devoid of all ornament. The picturesqueness of the valley over which this stupendous structure stands makes it one of the most attractive curiosities to visit in the south of France, and one of the best preserved monuments of Roman greatness. It is solid and indestructible in appearance, as the structure has proved to be, having very fortunately escaped destruction during the middle ages. In 1600 it sustained some injury, when a portion of the second tier of arches was broken away by the Duke de Rohan in making a passage for his artillery. This has since been repaired, and in 1881, when the writer visited this remarkable bridge and walked through the aqueduct which, nearly two thousand years ago, conveyed the water to Nimes, supplying her luxurious mosaic baths, it was difficult to discover in what part the injury had taken place.

THE PONT DU GARD—ROMAN AQUEDUCT AND BRIDGE AT NIMES—2,000 YEARS OLD.

Unsafe Safes.

At a recent meeting of the Liverpool section of the Society of Chemical Industry, Mr. Thomas Fletcher, F.C.S., gas engineer, of Warrington, gave a demonstration of the application of some new gas heating appliances, devised by himself for workshop emergencies, one of the feats of the evening being the fusion of a large hole in a plate of ¼ in. thick wrought iron, in a few seconds, without preparation, and with apparatus which could be carried by a man up a ladder and used in any position. The secretary, in the discussion which followed the experiments, raised the very serious point that with such apparatus as Mr. Fletcher had exhibited and used, a burglar proof safe no longer existed, as it was simply a question of minutes to fuse a hole large enough for a man to enter in any wrought iron or steel door in existence. Chilled iron or steel was powerless to resist the small blowpipe Mr. Fletcher used, which would penetrate thick iron and steel plates as readily as ordinary carpenter's tools would penetrate wooden doors. The apparatus was devised by Mr. Fletcher for works repairs, and was noisy in action; but, as he explained, the apparatus could be made silent, and small enough to carry in a hand bag. This is a very serious matter for bankers and others who have valuable property, and one which will have to be taken up at once by the safe and strong-room makers.

It is very well known that the professional burglar is ready to utilize the latest applications of science for his own ends. In fact, Mr. Fletcher's furnaces designed to assist in chemical research are well known as being used by receivers of stolen goods to reduce plate and jewelry to ingots, and these furnaces may be seen in the detectives' museum at Scotland Yard. Bankers have already taken the alarm, and have visited Mr. Fletcher's works with the object of seeing the extraordinary ease with which large openings can be fused in heavy iron or steel plates. It is hardly necessary to say that Mr. Fletcher plainly declares his intention not to devise a silent form of the apparatus, which naturally would be required only for burglars' use, but the light fingered profession will no doubt take the matter in hand, and most probably succeed in making the apparatus silent—a modification which Mr. Fletcher states can be done. During our own interview with Mr. Fletcher on this very serious matter, he informed us that the present danger is possibly not so great as it appears, owing to the fact that the apparatus necessary to manufacture and prepare the silent arrangement is both costly and large, and, therefore, as the person who prepares it must have fixed machinery and plant, he will most probably be one of the class on whom the enterprising burglar would first try his powers.—*Warrington Guardian.*

A Sculptor's Casts at Auction.

The veteran sculptor, Sir John Steell, having given up his large studio in Edinburgh, the models and contents of it were recently sold by auction. To use the words of an English contemporary, the prices were miserable. The cast of the head and face of Sir Walter Scott taken after death was sold for 5s., but, small as was the sum, it was fourfold what was given for casts of Napoleon and Canova. Six heads of celebrities, including the Prince of Wales, went for 9s., and for another series of six the price was 5s., although Dr. Chalmers was one of the subjects. Four plaster busts realized 24s., a recumbent figure of the Earl of Shrewsbury 20s., and a statue of Lord President Boyle 21s. The casts from the antique were not more in favor. Twenty shillings were paid for four sections of the Elgin marbles, 22s. for the Venus of Melos, 5s. for the Medicean goddess, and 5s. for the Townley. The casts of the large statues, equestrian, seated, and standing, could find no bidders. The sculptor's modeling tools went for a guinea.

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.

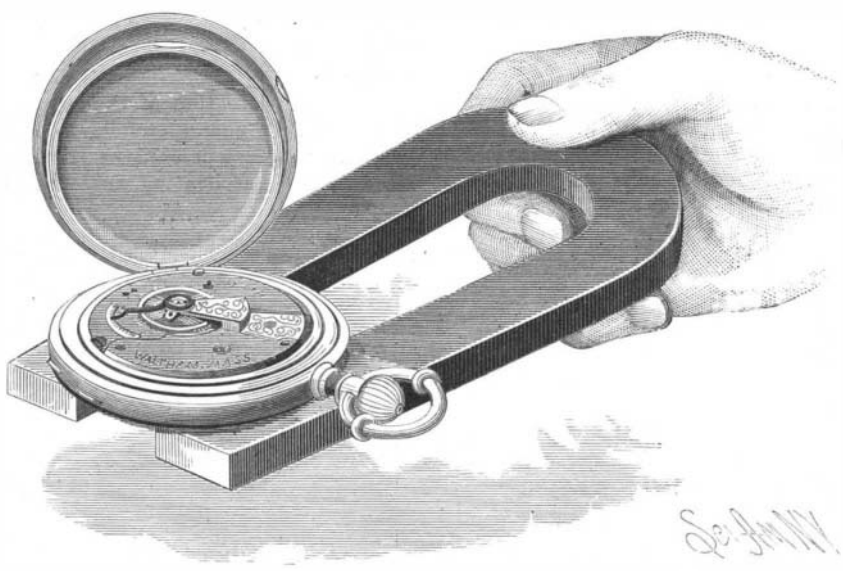
Curious Facts Relative to Alloys.

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.



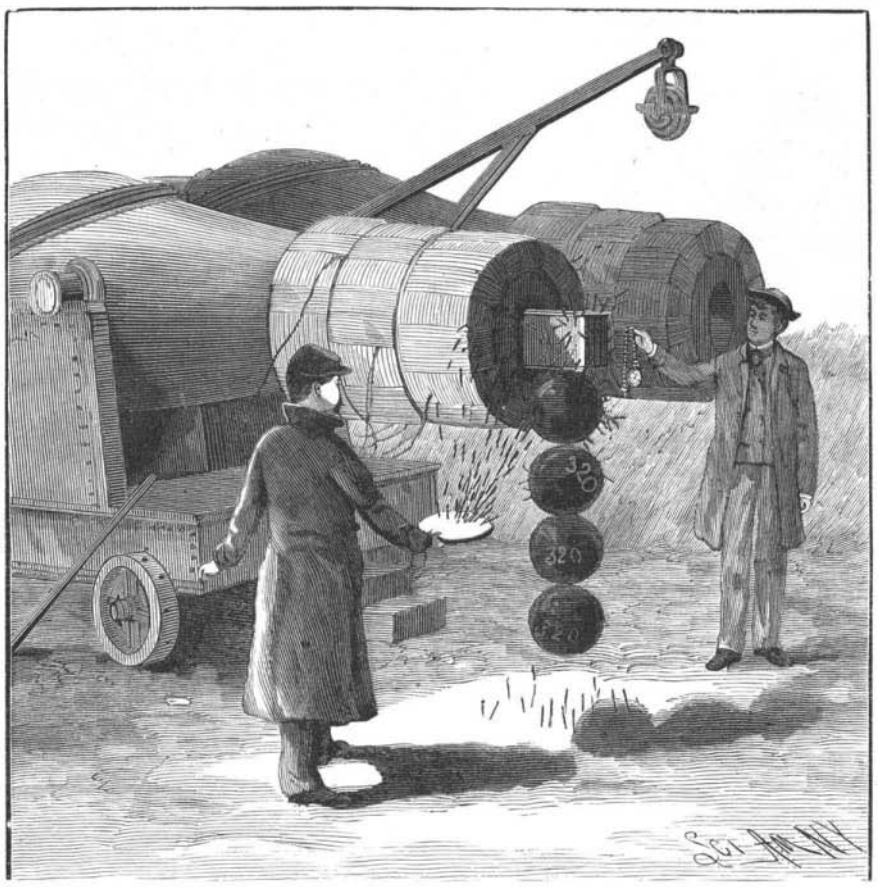
TESTING WALTHAM WATCHES WITH A HORSESHOE MAGNET.

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.