Telegraphing Without Connecting Wires.

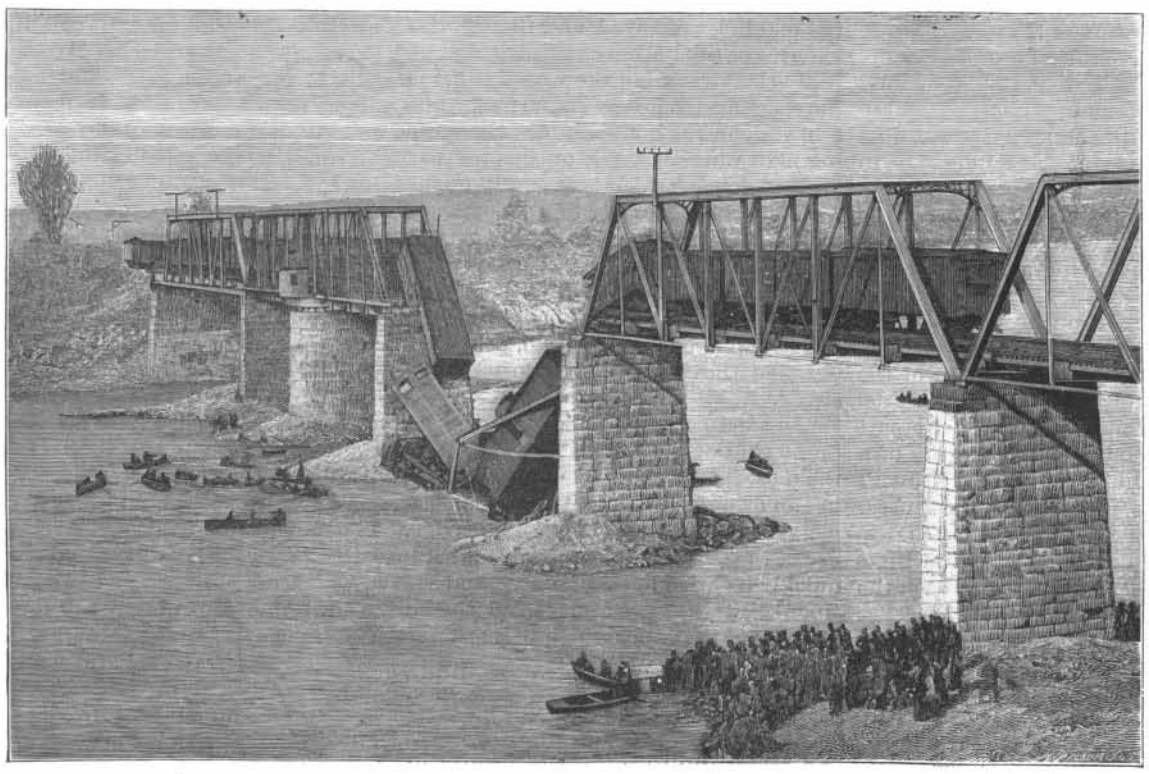
Interesting experiments have recently been made under Mr. W. H. Preece, with a view to electric communication between distant points without wire connection, namely, through air, water, or earth. Mr. Preece proposed to conduct experiments in three different methods. First, by running a wire along the shore on light poles for a distance of about a mile, and a second wire from stem to stern of the ship, the two acting upon each other inductively through the intervening space; secondly, by suspending a short line over the side of the ship, so that it might dip into the sea in the direction of the end of the shore line, to work by conduction through the sea; and, thirdly, by running out a light cable from the shore to the ship, terminating in a coil at the bottom of the sea, near the ship, but not attached to it, while another coil is placed on board. These two coils are expected to act inductively, and to give ample sound on telephones by means of rapid alternations. The experiments by the first method have been carried to a successful issue within the last few days, the shore wire having been erected along the Welsh coast, commencing at Lavernock Point, a little south of Cardiff, and proceeding for a mile in the direction of Lavernock House. The lightship was represented for the occasion by the island of Flat Holme, in the Bristol Channel; and the line there erected, parallel to the first and three miles distant from it, was about half a mile long. The shore line was furnished with a powerful generator at Lavernock Point, and the island line with a sounder to receive the messages. The result was that the words dispatched into the mainland wire were heard on the island with perfect distinctness, but we can scarcely admit that Flat Holme represents the conditions of a ship. This method is analogous to that patented by Mr. Edison for establishing telegraphic communication between two vessels when at sea.

Society of Naval Architects and Marine Engineers.

Prominent men in the shipbuilding and shipping interests of the United States have completed the preliminary organization of a professional society, to be called the Society of Naval Architects and Marine Engineers, whose object will be to promote the art of shipbuilding in all its branches, both commercial and naval. The committee of organization, consisting of William H. Webb, of New York; Lewis Nixon, general manager of Cramp's Shipbuilding Company, of Philadelphia; Col. E. A. Stevens, of Hoboken; Francis T. Bowles, Naval Constructor, United States navy; and (*ex-officio*) Clement A. Griscom, president of the International Navigation Company, expect to incorporate the society in New York and are now sending out invitations to membership.

FALL OF A RAILWAY BRIDGE AT TERRE HAUTE.

Our engraving is reproduced from a photograph showing the very serious consequences which resulted from a rather slight butting collision at Terre Haute, Ind., on October 28. The bridge, which carries the track of the Cleveland, Cincinnati, Chicago and St. Louis road, crosses the Wabash River at an elevation of about 50 feet above the water. The cars which appear at the right of the engraving were those of a train which had been run upon the bridge for a few minutes to get out of the way of another train, switching in the yard. While it stood there it was run into by the stock train from the opposite direction and a truss was broken sufficiently to cause it to give way, letting both engines and eight cars of cattle and coal into the river. One of the engines was entirely submerged. One engineer was killed. The other men on both trains saved themselves. The published accounts indicate, so says the *Railroad Gazette*, that there was fault on both sides; that the brakeman of the standing train did not go far enough with his flag, and that the approaching train was running too fast.



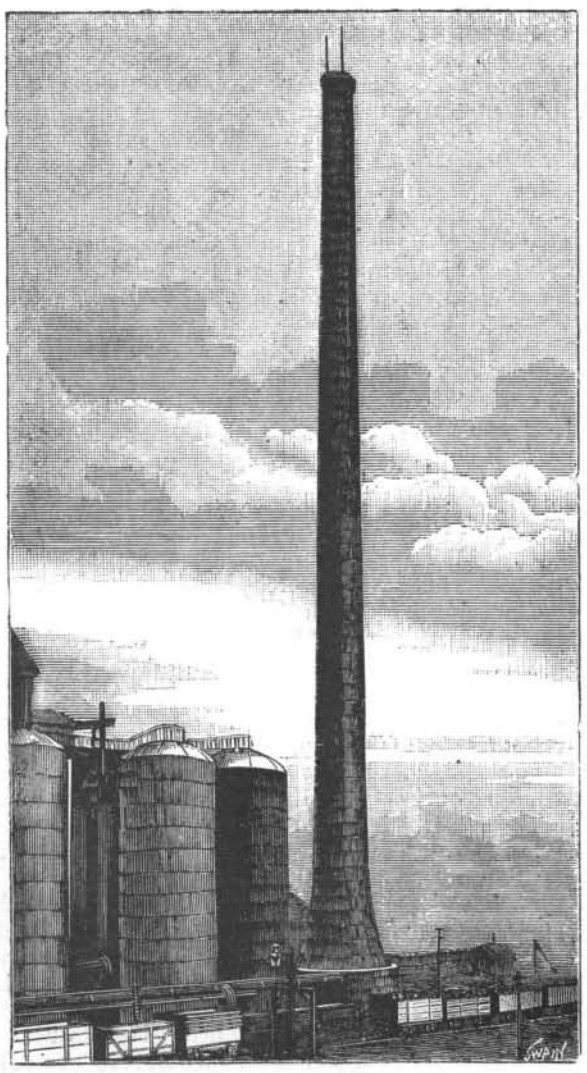
FALL OF A BRIDGE FROM COLLISION.

Morley's Polishing Paste.

Made by calcining flint and grinding the calcined material to a very fine powder, then mixing with fat, oil, or other such liquid to make a suitable paste, which "is put up or sold preferably in tins or boxes," and on the application of a little moisture is ready for use." For cleaning glass the levigated flint is sold dry to be used with water.

THE TALLEST WROUGHT IRON CHIMNEY.

The annexed illustration is from a photograph of a large wrought iron chimney, erected at Darwen, in North Lancashire, by the Pearson & Knowles Coal and Iron Company, of Warrington, for the Darwen and Mostyn Iron Company. It was designed, says the *Engineer*, by Mr. J. T. Smith, of Rhine Hill, Strat-



WROUGHT IRON CHIMNEY AT DARWEN.

ford-on-Avon, and the Pearson & Knowles Coal and Iron Company, to supersede brick stacks of the ordinary description, which were used for carrying off the gases from the blast furnaces of the Darwen and Mostyn Iron Company. This chimney is 275 feet high from foundation to top, and the tallest iron structure of its kind in Great Britain. Shortly after erection, and before more than half the lining was in, it withstood without injury and in a perfectly satisfactory manner one of the severest gales experienced for many years.

The following are a few general particulars of this chimney. As stated above, the total height, including foundation, is 275 feet; height from bottom of base plate to top of chimney, 260 feet 6 inches; distance from bottom to top of cone, 28 feet; distance from top of cone to top of chimney, 232 feet 6 inches; taper from bottom to top of cone, 10 feet 6 inches; taper from top of cone to top of chimney, 6 feet; number of tiers of plates, 66; total number of plates in chimney, 308; diameter of base plate, 27 feet 6 inches; base plate made in six segments; number of rivets used in construction, 17,000; twelve foundation bolts, 16 feet 3 inches long, by 2½ inches diameter, with swelled and screwed ends; total weight of iron work, 114 tons 7 cwt.; thickness of brick lining at bottom, 1 foot 6 inches; thickness of brick lining at top, 3 inches; time occupied in erection of iron work, 11 weeks; total weight of chimney, including foundations and lining, about 1,100 tons; total weight of a brick chimney same height, over 3,000 tons.

This system of construction, for chimneys about the same height, has many advantages. These should receive the careful consideration undoubtedly due to them by all interested in the subject. In the first place, there is a saving in the cost as compared with a chimney of similar height built in any other manner. The time occupied in erection is also much shorter, and, under certain circumstances, this must be a considerable advantage, especially as the work is not affected or stopped by frost. It is well known that the uncertain and imperfect nature of ground upon which a chimney may have to be constructed is often a source of grave anxiety to owners of chimneys, architects and builders. If, therefore, a reduction from the ordinary weight can be effected by building with iron, without, at the same time, in any way impairing the margin of safety, this should be a recommendation to the system. It is proved that iron chimneys are of much less weight. There is also the satisfaction of knowing that chimneys built in this way are necessarily free from the liability to sudden collapse, and to cause accident by material falling from them, due in brick chimneys to the cracking and displacement of the external surface, caused by the high temperature of the gases or defective workmanship. An additional advantage of this form of construction, to the Darwen and Mostyn Iron Company, is the freedom from damage to their chimney by excessive heat, produced in the manufacture of ferro-manganese.

In America there are many wrought iron chimneys erected in connection with different works. The Pennsylvania Steel Company have no less than eight such chimneys, varying in height from 110 feet to 170 feet. The Cleveland Rolling Mill Company, Ohio, has one 213 feet high. In France and Russia iron chimneys are also used. MM. Schneider & Company have one at Creusot, France, 280 feet high, and Mr. Bhekoldin, of Kineshnia, Russia, has one at his paper mills 170 feet high. There are also several smaller chimneys of the same kind in this country, in addition to that at Darwen already described. The Pearson & Knowles Coal and Iron Company, Limited, has seven, varying in height from 50 feet to 87 feet. The Acklam Iron Company, Limited, has two, 165 feet high, at the Acklam iron works, near Middlesbrough. There is one at Messrs. B. Heath & Sons works, Stoke-on-Trent, and also at the Nine Elms cement works, and several at different iron works in the Middlesbrough district.

The tallest brick chimney in the United Kingdom is at Glasgow. It is 468 feet from bottom of foundation to top of coping; diameter outside at ground line, 32 feet; at top, 13 feet 4 inches; thickness of brick work at bottom, 5 feet 7 inches; at top, 1 foot 2 inches. No piles were used in the foundation, the blue clay upon which the chimney was built proving satisfactory. One million and a half bricks were used in its construction, and the time occupied about three years. Total weight, about 8,000 tons; total cost, about £8,000. The next tallest chimney, also at Glasgow, is 455 feet 6 inches from bottom of foundation to top of coping; outside diameter at foundation, 50 feet; at ground line, 40 feet; at top, 13 feet 6 inches.

A short account of the successful demolition of a tall brick chimney may be interesting. Some years ago the tall circular brick chimney at Messrs. Muspratt's chemical works, Warrington, 406 feet high, 46 feet diameter at base, 17 feet diameter at top, was destroyed by gunpowder. The works having been moved to another locality, the chimney was not required. Mr. Stephen Court, engineer and architect to the St. Helens Canal and Railway Company, superintended these operations. A number of holes were dug