

THE NEW HARBOR FOR BOULOGNE.

One of the last acts of the French Parliament, before separating for the holidays recently, was to vote nearly \$3,500,000 for the construction of a new deep sea harbor for this well known watering place. The chief feature of this harbor—as may be seen in the bird's-eye view which we give in our illustration—is a solid stone jetty, A B C, on the southwest, 2,235 yards long, a wooden jetty, F H, on the northeast, 1,570 yards long, a solid stone breakwater, D E, 545 yards long on the outer or western boundary; between this breakwater and the jetty will be two entrances, C D, 272 yards wide, and E F, 163 yards wide. In the middle of the harbor will be a stone jetty, I K L M, 436 yards long and 218 yards wide, alongside of which steamers may embark and land passengers at all hours of the tide. The new port will have an area of 340 acres, and a depth of water varying from 16 to 26 feet at the lowest spring tides. The letters G H indicate the entrance to the present harbor.

The new port was projected by M. Alex. Adam, former Mayor of Boulogne and ex-President of the General Council of the Pas-de-Calais; during many years it was urged on the government and advocated in the Chamber of Deputies by M. Achille Adam, ex-Deputy, and in the Senate by M. Auguste Huguot, Senator, Mayor of Boulogne. Various plans have been designed by Messrs. Legros, Liddell, Laroche, Vivenot, Ploix, and Stæcklin, under the patronage of the Boulogne Chamber of Commerce, presided over by M. B. Gosclin. The plans eventually adopted are those of M. Stæcklin, Chief Engineer of the Ponts-et-Chaussées. We take our illustration from the London *Graphic*.

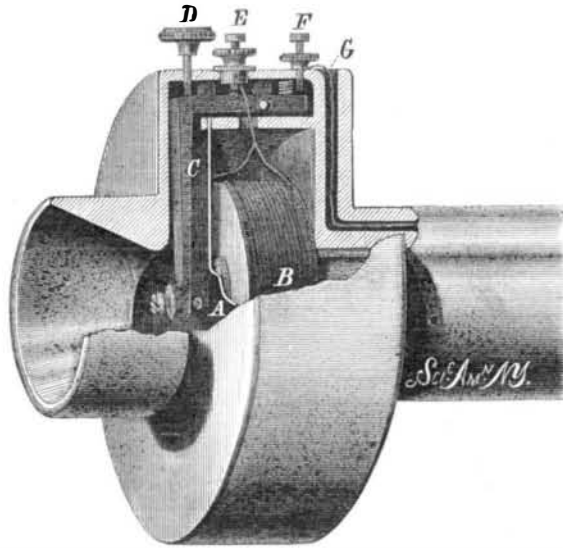
Earth Currents.

The action of the currents of electricity that pass round the earth may be conveniently exhibited to a large audience by the following arrangement, devised by Professor W. Le Roy Broun: A rectangular frame of light poplar wood is suspended horizontally by wires attached to the frame of a hydrostatic balance, its longer sides in the magnetic east and west line, and at right angles with the beam of the balance. About the perimeter of the frame are previously wrapped a number of coils of insulated copper wire, each extremity of the wire being made to terminate near the center of one of the shorter sides; it is there passed through the wood, fastened, and cut off about 3 centimeters from the frame. The index of the balance being brought to zero point, the ends of the short terminal wires are immersed in two mercury cups for electrical connection. When the battery current is sent round the rectangle from east to west on the northern side, and from west to east on the southern, the northern side is attracted and the southern is repelled, and the corresponding deflection of the balance renders this plainly visible. When the current is reversed, the deflection is in the opposite direction. By breaking and closing the circuit at

proper intervals, to augment the oscillations, Professor Broun easily made the large frame oscillate through an arc of 5°. When the sides of the rectangle were placed N. E. and S. W. the current produced no sensible effect.

NEW TELEPHONE CALL SIGNAL.

The accompanying engraving represents a neat little device for giving telephone alarm signals, invented by Mr. Samuel E. Rusk, of Catskill, N. Y. It is contrived so that



TELEPHONE CALL SIGNAL.

the electric current may be rapidly broken and established by the vibration of a diaphragm, when a sound will be produced in the receiving telephone that will be audible throughout a room of ordinary size.

In the body of the telephone there is a bar magnet, upon the end of which, within the diaphragm, A, a helix, B, is placed. The instrument thus far is identical with the well-known Bell telephone.

In one side of the larger part of the telephone body there is a plate, from which the ears project toward the center of the instrument. Between the ears is pivoted a lever, C, whose shorter arm extends backward under the adjusting screw, F. The longer arm of the lever extends toward the front of the instrument, is bent at a right angle, and extends parallel with the outer face of the diaphragm to the center of the instrument, where it is provided with a platinum pointed screw which passes through the lever at right angles to the diaphragm. The diaphragm is provided with a small

platinum disk, which contacts with the screw in the lever when the call signal is in use.

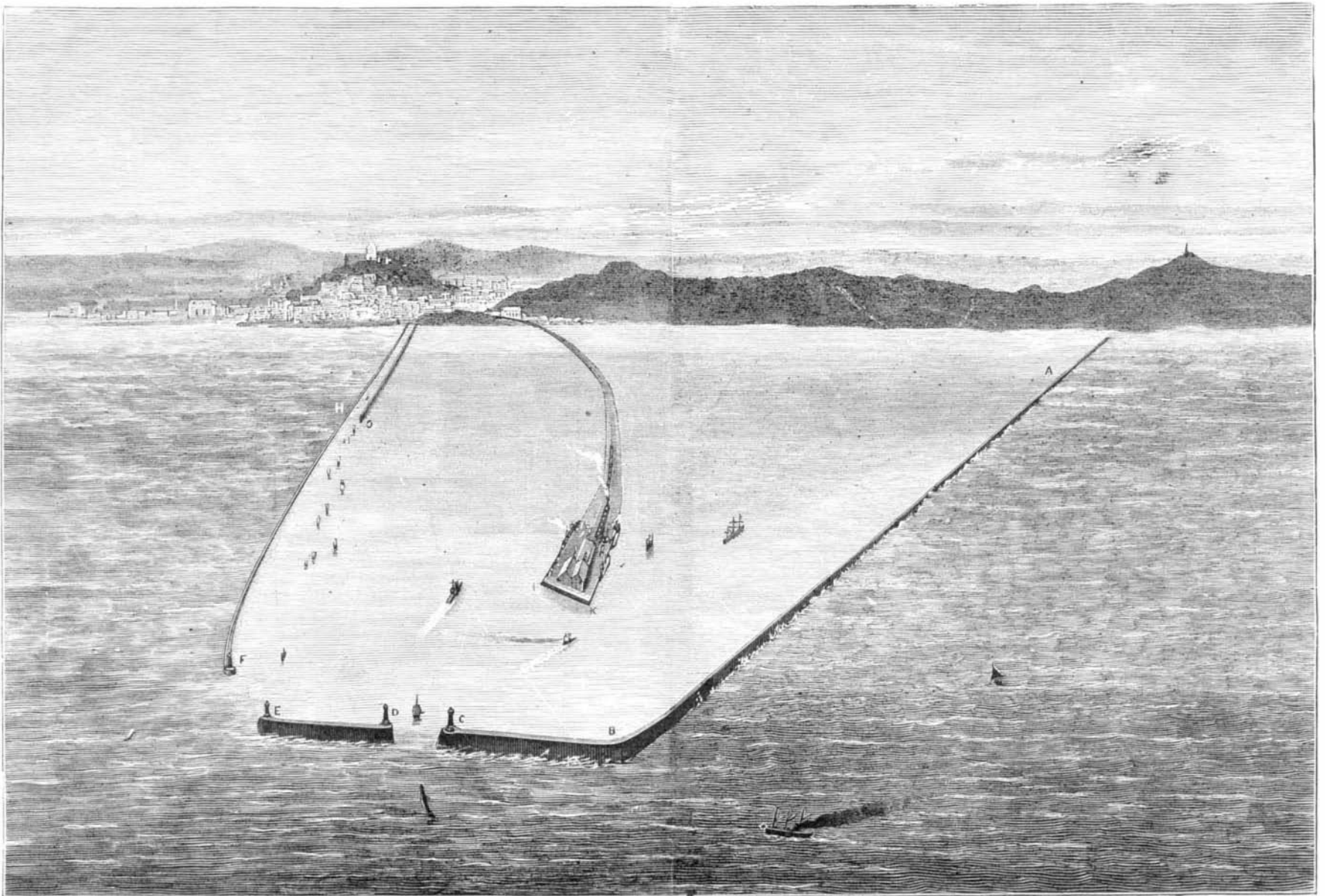
The lever, C, has an insulated knob, D. In the plate there is a vulcanite insulator, through which passes a platinum-pointed screw, E, which, when the alarm is not used, contacts with the lever, C. A milled lock nut is placed upon the screw, E, and binds one terminal of the helix, B, so that it is brought into electrical connection with the screw, E. A spiral spring throws the lever, C, away from the diaphragm and into contact with the screw, E. The diaphragm, A, is in electrical communication with the screw, E, and the plate to which the lever, C, is pivoted is connected by a wire, G, with a binding screw at the smaller end of the telephone case.

When the parts are in their normal position the telephone is used for talking in the usual way; but when it is desired to give a signal the lever, C, is depressed by pressure upon the thumb piece, D, when the shorter arm of the lever is brought into contact with screw, E, and the screw at the center of the diaphragm is brought lightly into contact with the diaphragm, A. The current, which before passed through the wire, G, lever, C, and helix, B, now passes through the wire, G, screw, F, lever, C, diaphragm, A, and the helix, and is broken and established at every vibration of the diaphragm. The current, when thus interrupted, produces in the receiving telephone a loud reed tone, which may be readily heard in every part of a room of ordinary size. After giving the signal the finger may be removed from the thumb-piece, D, and the telephone may be used in talking in the usual way.

American Popular Interest in Science.

In his annual report of the Kew Gardens, for 1877, just published, Sir Joseph Hooker pays a very graceful tribute to American intelligence. Speaking of his visit to this country, he says:

"I cannot adequately express my sense of the liberality with which traveling facilities and hospitalities of all kinds were accorded to me by public companies and private individuals wherever I went in America. The fact of my being connected with this establishment [Kew] was a recognized passport, and this even in the remote settlements of the far West, for I found a reading people everywhere, few of whom had not heard of Kew Gardens. In the Northern States of America the progress of science, and of institutions for the instruction of the people in science, occupy a prominent place in the cheap illustrated periodical literature of the masses; and nowhere on the globe is this literature better or so universally read as in the States. It is hence not wonderful that the progress of such establishments as Kew, the British Museum, South Kensington Museum, etc., should be better known among all classes of the people there than they are in the United Kingdom generally, and so I found it."



THE PROPOSED NEW DEEP-SEA HARBOR AT BOULOGNE.