posed, but also the character of the case, the arrangement and finish of the dwelling, and passage thence to the watch-room and lantern of the latter; and also the arrangements for securing the boat for taking in stores; the position of the fog-bell; the keeping of the oil, water, and fuel, &c. &c.; and all other particulars, even to the size of the material employed, &c. Talbotypes of the elevation and vertical section of each reduced in scale to about 1-282, are also appended to the report.

It is now necessary to explain in what manner it is proposed to establish either work on the shoal. It was stated, when describing the applicability of screw-piles and pneumatic-piles for founding the proposed structures, that as the latter required no mechanical force to insert them into the bottom, for employment of a fixed staging, from which to apply such force as was required in the use of the former, would be unnecessary; and that although a floating body might, by well digested measures, in favourable weather, be successfully employed in sinking them singly, it would not be practicable to give the number of piles required to found the work their proper relative positions from so unsteady a footing. The utter hopelessness of constructing a fixed platform, under the circumstances, at so exposed a point as New South Shoal, at least by such time in the working-season as to render it available for the intended purpose, was also shown. What other course, then, shall be adopted in the emergency? It is, in my opinion—not lightly formed—to carry out and deposit on the shoal, by one bold measure, the entire lower or foundation portion of the structure described as the octagonal prism, and by Dr. Pott's process, so simple in its character and wonderful in its results, to sink it in the sand to the required depth. It will not escape attention, that in taking this course, the necessary bracings, down to the very level of the shoal, will be secured to the work; whereas, in putting down the piles separately, the attaching of them is barely possible under the most favourable circumstances, at so exposed a point.

The foundation or lower portion of the structure, already in part described, is formed of nine piles, occupying the angles and centre of the prismatic figure, bound together by two sets of horizontal braces—one 20 feet from the bottom, the other at the top—and by three sets of diagonal braces between these planes. It is necessary to state here, that the lower part of each pile is received by a cylinder having a conical base or foot, through which, by a separate pipe, provided for the purpose, extending to the top of the framing, it is designed to excavate the sand by the pneumatic process. By this arrangement, the advantages of the two systems—of the screw-pile and pneumatic pile—have been combined; the means, on the one hand by which the soil may be penetrated to the required depth, and the use, on the other, of a shaft, presenting, with a proper bearing, the least exposure, strength considered, to the action of the sea. For the character of this arrangement, and for all other details, reference is respectfully made to the model of the foundation section, on the scale of 1-24, which will be deposited in the bureau. The work, as designed, including the cylinders with the conical bases to receive the solid piles, and all necessary appendages, such as air pump and receivers, and air and sand piles, &c. &c., for sinking it into the bottom, weighs 238 tons. To receive and float this great weight, distributed as it is throughout such large bounds, will require twin-camels, each at least 100 feet in length, 15½ feet beam, and 10 feet depth of hold, or say about 160 tons. These camels, when light, will draw little over 3½ feet of water; and when loaded about 7 feet Carrying the foundation as proposed, with the lower set of horizontal braces resting on the rail, the cones or shoes of the cylinder will extend nearly 4½ feet below the keels. In this same position, 61 tons of the weight will be suspended below, while the balance, or 177 tons, will stand above the rail It will be time enough, should the present design be approved and ordered to be carried out, to digest all necessary details, to insure a full efficiency to the camels; to determine whether they shall consist, as now proposed, of two similar vessels of ordinary model, or of two having, when combined the general outline of a single vessel; the most perfect way of securing them to each other, and to their burden; the best arrangement for towing, mooring, and flooding; and, finally, the proper mode of removing them from under the framing when it rests in position on the shoal. It is even now evident that it is desirable so to modify the lower framing that a larger proportion of the weight may be carried below the body of the camels than the present arrangement provides for. Again, it further appears, as far as experiments with the model may be relied upon, that to insure the uniform descent of the foundation, it is necessary to have either an air-pump for each pile, or, if one air-pump only is used, to communicate with the soil-receivers by air-pipes of equal lengths. The weight on each pile, when resting on the bottom, is 26-2 tons, which distributed over 19-6 feet, the area of the base of the cones, 5 feet in diameter, gives 1-33 ton for each foot. The entire weight of the lighthouse structure is 640 tons; of the beacon, 466 tons; giving 71-1 tons on each pile, or 3-6 tons on each superficial foot in the case of the first, and 51-6 tons, on each pile or 2-6 tons on each superficial foot, in the case of the second work. To sink the cylinders 19 feet in the sand, the depth proposed, will require the raising in each case of a column of sand of that height, 5 feet in diameter, or 373 cubic feet, or about seven times the contents of the receivers, calculated at 54 cubic feet. As there is, however, a large admixture of water with the sand, raised by pumping, the descent of the cylinders will necessarily call for the filling of the soil-receivers much more frequently.

In recommending the carrying out of the foundation in one body to the shoal, the hazards which belong to the entire proceeding, from the departure of the camels with their burden from the selected harbour, to their arrival, and the complete establishment of the work at the site, are, it is believed, in no wise underrated. So far from this being the case, it is not improbable that, by dwelling on the subject, I may have rather magnified them. The towing the camels in a sea-way with their load, a large proportion of which is, on the one hand, high above their decks, and on the other, far below their water-line; the placing, and then securely mooring them at the selected site; the flooding the camels, and then relieving the foundation, on resting on the bottom, from them, without injury from the heave of the sea to either, particularly the former; and, lastly, the sinking of the piles by the pneumatic process, are all operations, under the circumstances, of much delicacy, liable to great risks, and, as a consequence, involving the issues in much uncertainty. The velocity and ever-changing direction of the currents at the site, and through the group generally; the exposure, and the distance of the shoal from the land; and, above all, if it be possible to draw a distinction where each controlling condition holds so important a place, the distance of the point of destination from a harbour, all go to show that the difficulties and dangers of the operation are of no ordinary character. As its success depends on the vicissitudes of the weather, that is the true turning-point in carrying out the final