Mr. Salmond.

	£
Hyper-radiant lenticular apparatus	3,996
Lantern	1,563
Siren and engines	1,691
Building contract, exclusive of roads	3,640
Total	£10,890

Correspondence.

Mr. Stevenson. Mr. CHARLES A. STEVENSON stated that there were several points of dissimilarity between the "Bishop" and other rock lighthouses. He thought that it was very bold to erect a tower of such a large diameter on such a narrow rock, and it was to be hoped that the rock was more than ordinarily sound. Great skill had been displayed, and great trouble and expense must have been incurred in working the new tower in with the old. The system of dovetailing seemed to have been carried out in the most perfect manner; and the method of carrying the floor stones in from the outside of the tower, which was first designed by Mr. Robert Stevenson for the floors of the Bell Rock (now the oldest British rock lighthouse in existence), had been adopted in the new stone floors of the "Bishop," but in this case strengthened by ironwork. The new apparatus was composed of hyper-radiant lenses of 1,330 millimetres focal distance, which were originally designed by Messrs. Stevenson to suit burners of large diameters. The first of these lenses was made for the Commissioners of Northern Lighthouses by Messrs. Barbier in 1885. In designing the arrangement of these lenses for the "Bishop" a stronger light would have been given if the apparatus had been composed of eight lenses in place of ten, or in the ratio 4 to 5, or nearly one-fourth stronger, the apparatus being made to revolve proportionally faster. The 1,330-millimetre lenses for the Fair Isle lighthouse had been so arranged, and were a two-group flash light. Messrs. Stevenson designed an even larger hyper-radiant apparatus in 1883, but as yet none had been made. The focal compactness, or avoidance of divergence by using these large lenses and burners, was very marked. The hyper-radiant lenses used in the South Foreland experiments showed its superiority over smaller lenses; and lighthouse authorities in this country and abroad seem to have realized this, judging from the number which had been ordered.

Mr. L. F. VERNON-HARCOURT observed that the force of the sea, and height of the waves at the Bishop Rock afforded an additional proof that the exposure of any site depended upon the length of fetch, and the depth of the sea in the neighbourhood, in which respects the Bishop Rock was as much exposed as any part of the British coasts. The effect of waves striking against the new lighthouse had not been alluded to, but probably the cylindrical base proved very advantageous, as in the case of the new Eddystone lighthouse, in diverting the waves from running up the tower, as well as in affording a stronger structure at the most exposed part, and a wider foundation for the tower to start from at a higher level. The comparatively large proportionate cost of the work, exceeding by over one-half the cost per cubic foot of the new Eddystone lighthouse, must be attributed to the peculiar difficulties of building round the old structure, fastening the new work to the old, and maintaining the light during construction, which rendered this new lighthouse a unique example of lighthouse reconstruction. Mr. Vernon-Harcourt.

It was unfortunate that the available area of the rock did not admit of the erection of machinery for working a siren, which had been provided on the low outlying rock on which the Ar-men lighthouse was erected in the Bay of Biscay; for fog-signals, serving to warn vessels by day as well as by night, had acquired increased importance now that rapid passages of fast Atlantic steamers were deemed imperative. The recent wreck of the "Eider" on the Atherfield Rocks, only 3 miles distant from St. Catherine's lighthouse exhibiting the most powerful electric light in the world, as well as previous wrecks in the same neighbourhood, demonstrated that distinctive fog-signals formed indispensable adjuncts to the lighthouses round our coasts, to make up for the deficiency in penetration of the strongest lights during fogs. The most powerful siren trumpets appeared to have a maximum range of 6 miles in still weather; but a sonorous signal with this range would be extremely valuable in a dense fog. Perhaps Mr. Douglass could furnish some particulars as to the distance at which the explosion of the gun-cotton charges in use at the Bishop Rock lighthouse and elsewhere, could be heard under normal conditions; for, if the explosion was audible 3 or 4 miles off, this system of fog-signals should be more generally employed. Any information also as to the range of the siren at Tory Island lighthouse would be valuable, as he was convinced that sonorous signals should be far more extensively adopted, as furnishing much more efficient warnings in foggy weather than the most powerful lights.

Mr. Wigham. Mr. JOHN R. WIGHAM stated that the use of gas-engines for driving the fog sirens at Tory Island, referred to by Mr. Salmond, had proved a very great success, as also at other places, chiefly because they could be put into full work at a moment's notice; in that respect contrasting favourably with hot-air engines or steam-engines. He also considered that the Trinity House had done well to attach a gun-cotton explosive fog-signal to the lantern at the Bishop Rock. The details of this rocket were not given in Mr. Douglass's Paper; but, in his opinion, it was very important to attend to the light given by the rocket as well as to its sound. He had known the sudden exhibition of light, high in the air, to arrest the attention of a mariner, when the sound of the explosion did not reach his ear. Hence it was important that the light, as well as the sound of these signals, should be of the highest possible standard of efficiency.