

DISCUSSION.

Mr. W. H. German, in proposing a hearty vote of thanks to the author for his very instructive, very interesting, and certainly very novel paper, said it had never occurred to him before the amount of ingenuity that had been bestowed upon this important problem of lighting our ships on their way. He was afraid that the subject would be too ingenious to discuss and certainly to criticise. Nevertheless, the paper had been extremely instructive, and would be more so when it was down in pamphlet form and in our volumes; and in that respect we were much indebted to Mr. Shirra for the trouble he had taken to bring this matter before us. The printing of the papers in pamphlet form appeared to him to be a very happy system that the Association had recently adopted. He could quite imagine that many of our members and many of his colleagues, as they passed up the North Coast would be induced to take the pamphlet with them, so as to peruse its pages as they came upon each lighthouse to see the means by which the frequency of the flashes were obtained. In the matter of illuminating power it was quite news to him that oil was holding its own in comparison with gas and electricity. He would like to ask Mr. Shirra if in any lighthouses coal gas had been used under pressure, or experimented with, as there had been considerable discussion about it for use on land. Another point that occurred to him was as to the motive power used in revolving the lantern. We readily understood that it was easily obtained where electricity was used, but where the oil lamp was used he would be interested to know how the motive power was obtained.

Mr. R. Sinclair, in seconding the vote of thanks to Mr. Shirra, said he did so with great pleasure, he could endorse all the words Mr. German had said. The amount

of research and time Mr. Shirra had put into the paper was really a great compliment to us, because it must have taken him a very long time to get it together. It was very good of members who had the time and who were willing to take the trouble to write up papers like this, to bring before us subjects that we have not time to read up for ourselves, and he had enjoyed it very much. He was much struck with the considerable amount of ingenuity required in lighthouse work, and particularly in relation to the explanation of the floater and mercury bath. It seemed to get rid of friction, and he had often wondered if clockwork had ever been used for revolving lights, but he was afraid sufficient power could not be got to revolve a large light. But as Mr. Shirra has said, the mercury had eliminated all friction. He would like to ask the author if any trouble had been experienced by the mercury thickening by exposure to the atmosphere, because when mercury was exposed it got a sort of scum on it, and he desired to know if that interfered with its action.

Mr. Kilburn Scott (visitor) prefaced his remarks by a reference to the labours of Hopkinson, the father of the dynamo machine, and spoke at some length on the nature and use of mercury in lighthouse work. South Head Lighthouse had been mentioned, and there was one very interesting fact, so far as he was concerned with it. It possessed De Meritens' dynamo machine, one of the oldest in existence in the world. When arc lamps were first used for lighthouse illumination, objection was taken to it because of its very blue light. The blue light was not penetrating enough. When the electric light came into use in the city of London, it was found that the arc lamp was not so effective during the fogs as the gas light. They had been able to take a leaf out of the books of the gas engineers, and he believed that the difficulty with the

blue light would be overcome. One trouble with the flame arc was that the carbon parts were consumed much quicker, and the cost of renewal was considerable. The carbon used in arc lamps was manufactured by a Continental trust, and an effort was being made to break the trust down. It was certainly true that the element used in the manufacture of the carbon on the Continent was received from the gasworks of England. The price of the carbon was a considerable item in lighthouse illumination. He made a passing reference to the Mercury Vapour Lamp introduced by Mr. Cooper. It occurred to him that lighthouse illumination might be used as a means of signalling, and he explained how this could be done by sending telephonic messages with a flash, and in this respect selenium was the most interesting material in the world. Telephonic communication had been made at a distance of nine miles, and so perhaps lighthouses could be made to signal to ships.

Mr. Shirra in reply, desired to thank the members for the reception given to his paper, and Mr. Sinclair's kind words especially, which, however, he hardly deserved. The paper was written as much for his own information as for the Association, as he had found it necessary to read the subject up, and the best way for one to fix the information he has acquired in his memory was to put it down in black and white. The information he had had to dig for from extraneous sources, as (there were no particular records nor facilities for getting it in the New South Wales Government Departments. The drawing of Norah Head optic, indeed, was taken from an official blue print. He found that one might look at a drawing and think he knew all about it, but if he wanted to know all the outs and ins of it the best way was to make a drawing for oneself. As regarded using gas under pressure it had been tried, and Commissioners for Irish lights had made a

specialty of using gas in their lighthouses. The flame was very good for thick weather, and one really did see thick weather in Ireland. The lanterns used were very high, two or three optics and burners superposed so as to get a bi-form or tri-form apparatus, and were literally pillars of fire. France was facile princeps in lighthouse design, and had used gas under pressure with Welsbach mantles for ten years. Acetylene had been used under pressure with a mantle at Chasseiron, in the Bay of Biscay, but it required very expensive purification before the mantles could be got to stand. The Scottish Northern Lights Commissioners were doing good work and were progressive like the French, but in England—in the words of the late M. Bourdelles, the inventor of mercury rotation and of many improvements in France—they had not only a mania, but an idolatry, for everything old. With regard to trouble with mercury, it had been found necessary to clean out the bath at Cape Byron Light once; it was noticed that the speed was falling off slightly taking about 11 seconds, instead of ten per revolution, and as a slight increase of viscosity in the mercury would cause this it was looked into; and a film or scum of mercurial soap or ointment found on it and the castings, which retarded the rotation. It was supposed the iron had not been cleaned from the protecting grease when the mercury was first introduced. There was no such trouble at Norah Head, where everything was well cleaned at first. With regard to the old De Meritens dynamo at South Head, he was of opinion that when the old is good stick to it. During its 23 years' running it had worked without a hitch. The same experience had been had at St. Catherine's, Isle of Wight, where the optic and lamp were renewed last year, but the De Meriten's dynamo, which had run since first installing electricity there in 1888, was retained, owing to the perfect satisfaction it was giving.

In one or two recent French lighthouses, the Labour dynamo was in use, which took up little floor space and gave a good output and efficiency, but it had the extra complication of a double winding and a commutator, and was not so suitable for men without technical knowledge like light-keepers. The carbons used at South Head were cored, and five-eighths inch in diameter—at first one-inch carbons were used, but they were inferior to those now in use, and needed far more current to give the same light, they would split and burn irregularly. Carbons were being manufactured on a large scale now in England, at Witton, according to "Page's Magazine."

