## SEPTEMBER.

The monthly meeting of this Society was held on Tuesday, September 8, the President, His Excellency Sir R. G. C. Hamilton, K.C B., in the chair. There was a large attendance of members and ladies.

The following were elected Fellows of the Royal Society :—Ven. Archdeacon Mason, Rev. James Scott, D.D.

His Excellency referred to the paper read on behalf of Mr. A. J. Ogilvy at last meeting on the best means of collecting scientific information, and suggested that the matter should be brought under the notice of the approaching meeting of the Australasian Association for the Advancement of Science. He considered that valuable information would be obtained if, as suggested, there was a representative of the Society in every district to keep his eyes and ears open, and let them know of anything of scientific interest.

Mr. A. J. Ogilvy said he regarded it as very important that in every district the Society should have some one to represent it, and pointed out that if at any time it wanted any special local knowledge there would be somebody to whom application could be made. He thought that the Fellows should consider as to the best means of carrying out the suggestion made, and deal with the subject at a future meeting.

Mr. A. Morton, as General Secretary to the Association, gave a satisfactory progress report *re* the arrangements for the approaching meeting of the Australasian Association for the Advancement of Science, and hoped at next meeting to present a report giving a list of the papers to be read.

### ELECTRIC TRACTION.

Mr. Montague Jones, C.E., read a paper on the above subject. He said that whether the present generation had discovered the ultimate force in nature most applicable to the service of men was a question for the scientist of the future to decide, but he thought they could claim the present to be an electrical age, as in pre-historic times there were ages of stone and bronze. The practical utility of the application of electricity to the propulsion of railway and tramway cars was first demonstrated at Berlin in 1879 by Siemens and Halske on an experimental line of 500 metres, in the form of an oval. The train consisted of a small electric locomotive and carriages, which had very small wheels, with two rows of seats running parallel to the rails. The success of this experiment led to other attempts of an exhibitional nature at Brussels, Dusseldorf, Frankfort and other places, and then electrical traction passed from the experimental to the commercial process of development. The Lichterfelde electric tram near Berlin was the first of its kind. The length was 1½ miles, and the equipment in 1881 consisted of two motor cars, the motion being transmitted to the wheels by belts working on grooved pulleys outside the wheels. The prime source of power was a steam engine, with a Siemens motor and generator, but the installation differed in some respects from the Berlin line, the central rail not being used, but the one rail acting as a lead, and the other as a return for the current. Up to 1887 this line carried 100,000 passengers yearly. These instances showed that the inception of electrical tramways took place in Europe, the principle being the generation of electricity by dynamo, and conveying the current through conductors connected by sliding contact with the cars

while in motion. Modern electrical railways were now built chiefly on this principle, although America had far succeeded Europe in the improvement and perfecting of the system. The remainder of the paper consisted of a description of the various systems in vogue, after which he dealt with the "overhead system," which had most successfully operated commercially and practically. Many objections of an æsthetical nature had been urged against the overhead gearing, but they were more apparent than real, and he recommended such objectors to look to the telegraph cables so obtrusively conspicuous in big towns. It was superior to other systems of traction. Traction expenses on horse tramways amount to two-thirds of entire working expenses, to say nothing of its inhumanity, and steam was a clumsy, though effective, method of applying force. He considered that the citizens of Hobart would be wanting in public spirit if they permitted steam engines to run along their streets. If a draughtsman sat down and deliberately attempted to design an affront to a decent community, he could not have succeeded better than at Sydney, where the working expenses amounted to three shillings per tram mile. It was now generally admitted that the struggle for existence lay between the cable system and the electric. The cost of the construction of the former in Melbourne amounted to £34,000 per mile and 75 per cent. of the available energy was lost by dragging the cable itself. At Minneaopolis, £80,000 was spent in the purchase of cable plant which was cast on one side as scrap iron to make way for an electrical system. The cable tramway could certainly surmount phenomenal grades, but on the other hand the electrical tramway could negotiate 1 in 8 grades, or even less. It was only a question of power, and Mr. Reis, an electrical engineer, had made some very valuable discoveries as to electrical braking and adhesion, which he hoped to see practically demonstrated at an early date. It was difficult to surmise what shape electrical developments would take place in future, its potentiality being apparently infinite, but it was no stretch of imagination to say that it was the locomotive power of the future. The various stages in the history of electric traction as described in the paper were illustrated by diagrams shown with limelight effects by Mr. Nat Oldham, and assisted greatly in conveying a clear comprehension of the lecture to the minds of the audience.

Mr. JOHN MACFARLANE said he had an opportunity of gathering information on this interesting subject, being in correspondence with the Thomson-Houston Company, makers of electric railway plant. Electric traction had left the region of scientific experiment and was an established commercial success. In the United States there were 310 tramways or railroads worked by electricity, with 4,000 cars and 7,000 motors. It was estimated that one-third of the street railway mileage in the States was worked by electric traction, and he referred to a number of companies which paid 8 per cent. With regard to steep grades he believed that 1 in 7 was not too steep for working, but he believed that the steepest grade in the proposed Hobart line was 1 in 16. It was interesting to note further that electric traction had also been successfully applied to tramways for mills and manufactories. In conclusion, he referred to the testimony as to the safety of the overhead wire system.

Mr. C. W. S. JAMES said he had been deeply interested in the paper read, and had tried to think how far the electric traction system could be applied to Hobart. A few months ago he had estimated what could be done in Launceston by utilising the South Esk River and he thought that there from 1,000 to 1,300 horse-power could be available. In regard to Hobart, however, there was not the same

power available, and he believed they would require to look to generated power in any electrical system introduced. He thought the system could be usefully applied to carrying minerals on the West Coast, and that the "overhead system" was well adapted for the streets of Hobart.

Mr. J. FINCHAM said he had followed the paper with interest, but they had no reference to the length of the steep grades surmounted. He believed that in any scheme for electrical traction in Hobart this would be one of the difficulties. He was aware that there were about 300 tramways in America, but he had not been able to get any particulars as to the grade, or whether it was equal to such a grade as they had to contend with in going up Elizabeth-street.

Mr. A. W. LAWDER thought the length of grade to be overcome simply resolved itself into a question of the power of the accumulator.

Mr. FINCHAM said that was just the difficulty the engineers found. They had not been able to provide enough accumulation to overcome a sustained strain.

His EXCELLENCY, in bringing the proceedings to a close, thanked the author of the paper, and all who had taken part in the discussion. He was pleased to see such a large meeting, and was quite sure that Mr. Jones, by his interesting paper, had justified the expectations of all present.

The proceedings then terminated.