Sir Robert G. C. Hamilton, K.C.B., LL.D., presided, and there was a large attendance.

The Secretary stated he had received a telegram from Mr. Russell, the Government Astronomer of New South Wales, informing him that it would be impossible for his paper to arrive in Hobart by that night's train. The paper was one of very great importance, dealing as it did with the late Leake bequest in connection with astronomy. Under the circumstances he would ask for the paper to be postponed till next meeting.

SOME PLANTS NEW TO TASMANIA.

Mr. LEONARD RODWAY read some notes on this subject.

Mr. A. J. OGILVY read a paper entitled "Artificial obstructions to the occupation of the land."

The Rev. Dr. SCOTT, and Messrs. C. H. GRANT and A. J. TAYLOR spoke on the subject.

The Secretary (Mr. A. MORTON), on behalf of Colonel W. V. Legge, R.A., read a paper "On the Occurrence of some Australian *Ardeidæ* in Tasmania," discussion being postponed.

The meeting closed with a vote of thanks to all who had taken part in the proceedings.

AUGUST, 1892.

The monthly evening meeting of the Royal Society of Tasmania was held at the Museum on Monday, August 8. The President (His Excellency Sir Robert G. C. Hamilton) K.C.B., LL.D., presided, and there was a good attendance of Fellows.

CORRESPONDENCE.

The SECRETARY (Mr. Morton) read a letter from Mr. H. C. Russell, the Government Astronomer of New South Wales, with reference to his paper on the Leake bequest. The writer said he had ascertained that it would not be possible to get for Tasmania one of the telescopic instruments sent to South America. It would, therefore, be necessary to order one from the manufactory—either Sir Howard Grubb or M. Gautier, of Paris. Sir Howard Grubb's price was £1,800. He was unable to ascertain M. Gautier's figures. About 12 months would elapse from the date of the order until the instrument was ready for use. He had made no provision in the paper for architect's fee, as he had drawings and specifications for the Observatory which would serve the builder's purpose. For teaching purposes it would be convenient to have the Observatory close to the University, but as far from the railway as possible, as the vibrations caused by trains passing would to some extent interfere with photographic work. He hoped the Leake trustees and the Council would be able to carry out the proposal. The time for the institution of an Observatory in the southern hemisphere was most opportune and might not come again for years.

THE LEAKE ASTRONOMICAL BEQUEST.

Mr. A. MORTON (Secretary), in the absence of the author, read a paper entitled the proposed "Leake School of Practical Astronomy," by Mr. H. C. Russell, F.R.S., the Government Astronomer of New South Wales :—

Mr. RUSSELL said during his visit to Hobart in January last he was struck with the brightness and translucency of the atmosphere, and it

was evident to him that the weather of the fortnight he was in Hobart would have enabled him to do as much as he had done in Sydney during the preceding two months. And, in conversation with some friends, he expressed regret that such fine skies for the astronomer should not be taken advantage of, and an Astronomical Photographic Observatory established. He was told that Tasmania, like other parts of the world, was passing through a period of commercial depression, and the Government did not seem to be disposed to add to expenditure by starting an Observatory, but that the late Mr. Leake had left a sum of £10,000 for the foundation of a School of Astronomy, and it was hoped that an Observatory would be established very soon. And it seemed to him most fitting that the colony in which this noble bequest was made should be the first to take it up and benefit by its provisions; and the establishment of a Tasmanian University would, with the co-operation of the Council, enable the trustees to carry out in a most satisfactory manner the wishes of the testator, who indeed seemed to have contemplated such a natural combination as that now proposed between his trustees and the Council of the University for the establishment of a School of Astronomy. Such an addition as this to the functions of the University would be an immense advantage. In the first place, it would add to the curriculum another subject which students may take up, either as technical education or as a most valuable mental training in a general course of study. Next, it would induce some students to come to the University in order to attend the lectures on Astronomy, and if provision were made for non-matriculated students to attend the teaching in practical astronomy on payment of fees, there could be no doubt that many would enrol their names. The desire to contribute in some way towards the consummation of the proposed Observatory scheme, which seemed to him so desirable, and so easy of attainment with the means at command, had induced him to make the following suggestions; but before going on to these Mr. Russell said he would wish to point out that Hobart, in addition to its clear atmosphere, possessed in its high southern latitude a great advantage over any other available place for the new Observatory in the southern hemisphere. It was true that a slightly higher latitude was available in New Zealand, but the climate was less favourable, and the means to build an Observatory were apparently not forthcoming, and if one were erected in New Zealand it would no doubt be at Wellington. So that, practically, Hobart not only possessed the means, but also the best available site in the southern hemisphere for the Leake Observatory.

The paper dealt very fully with the subject, giving an estimate as to cost, etc.

The Rev. George Clarke, Vice-Chancellor of the University, said: I am sure that I only express the universal sentiment when I say that our very warmest thanks are due to Mr. Russell for the able and practical paper which has been read to this meeting. It is full not only of his interest in the general cause of science, but of his interest in the particular honour and welfare of Tasmania. One does not need to be an expert to accept his assurance that for position, climate, and atmospheric conditions the neighbourhood of Hobart is probably the best place in the Southern Hemisphere for astronomical observation. There are problems waiting to be solved for which we can furnish the *data* more easily than they can be obtained elsewhere; and of Mr. Russell's kindly feeling towards us, and his desire that we should have the benefit of our position, his paper is sufficient indication. As far as I can gather, it is the feeling of all the colonies that we should have the first and fullest chance of appropriating Mr. Leake's munificent bequest, and that it should only be on our failure in power to take it up that its benefits should be thrown open to the competition of the outside world. It would be satisfactory to

know how far our opportunity of acceptance may be extended. We have not, of course, the slightest right to dictate to the executors of Mr. Leake's will, but we might suggest that the matter should not be finally disposed of until ample time is granted to us to avail ourselves of the bequest. As far as regards the proposed association of this fund with the University, I can only speak for myself, and may not commit the Council to any opinion that I may now express. We must all be struck with the very direct and practical character of Mr. Russell's suggestions. He contemplates chiefly the establishment of an Observatory, and the means of carrying on its work. No doubt in a new community like ours the immediate practical work is a great consideration. But as far as I can judge, the University Professorships in Astronomy in the Old Country look to the teaching of higher mathematics very much more than to the manipulation of instruments for the necessary qualification of professorship. I think we should have to invert the order of requirement and to look more to practice than theory, which would involve our taking a course for ourselves for which we need time and consideration. I received to-day a note from Mr. Waterhouse of Launceston, which indicates some of the questions we should have to thrash out. It is not an official note, and I will trust to my friend's forgiveness if, with your permission, I read it.

"LAUNCESTON, August 4th, 1892.

"MY DEAR MR. CLARKE,—I am afraid that Mr. Walker has considerably over-estimated my powers of making any helpful suggestions as to Mr. Russell's paper on the Leake trust, and the relation of the University to it. I have ransacked my ideas very fully, but cannot get anything very satisfactory out of them. I must take Mr. Russell's figures as correct, viz., £3,000 for apparatus, etc., and £7,000 for investment, producing £350. If the Lecturer in Mathematics and Physics is to give instruction in popular Astronomy, and is to supervise and control the University, it would not be fair to ask him to do this extra work,—work which is quit eoutside the duties set forth by the University in inviting applications,—without receiving extra remuneration, and this extra remuneration should come out of the Leake trust. The £100 a year proposed by Mr. Russell seems to be a fair estimate. The late Professor Adams (Professor of Astronomy and Geometry) at Cambridge, was entrusted with the superintendence and management of the Cambridge Observatory at an extra stipend. I knew very intimately the Observer at the Observatory, and I know this, that he did the usual every day work connected with the Observatory, reporting to the Professor from time to time. If the proposed lecturer has graduated as a wrangler at Cambridge, or has taken a degree in honours at any University where the course requires a knowledge of astronomy at all equal to what is required in the Cambridge course, there can be, I think, no doubt of his ability to do all the duties required of him under the Leake trust, especially if he rubbed up his knowledge of the instruments by attending for a few months at the Melbourne or Sydney Observatory prior to taking up his duties here. But what we shall require in order, in my opinion, to qualify the University to take the benefits under the Leake trust, is an Observer or assistant. There will be, after providing for the £100 a year additional salary to the lecturer, and the £50 required for annual incidental expenditure (according to Mr. Russell), only £200 for the observer's salary. That might enable us to get a capable man, without addition, although I rather doubt it. An extra £50 or £100 from the University funds might do so. Such an observer would, of course, be able to demonstrate at the lecturer's astronomical lectures, and might be able to demonstrate in Physics and do the photography. But I do not think that £250 or £300 a year would get us a man with both these capabilities. Still, with a lecturer and an observer to demonstrate at the astronomical lectures, we should, I think, qualify for the Leake trust, though, of course, net so fully as under Mr. Russell's scheme. If to the £200 left from the Leake trust the Government would add the £150 or £200 per annum recently voted to the meteorologist on

condition of the observer's taking up those duties, which, of course, would fall in most easily with his ordinary duties, we ought to be able to get a very good man, and able to demonstrate in physics, and with some skill in photography. I wish to say again, and more emphatically than I have before, that I do not think we need import an astronomical expert in order to give the instruction in astronomy and to superintend the Observatory. When the late Professor Adams made his calculations which led to the discovery of the planet Neptune, he was engaged at tutorial work in mathematics generally, and had only taken his degree two years before; he made his calculations, apart from observations, and then communicated the result of them to Professor Challis and the Astronomer Royal, who, by observations, verified his calculations. And again, his *locum tenens* during his illness; and I believe now his successor, Mr. Hobson, of Christ's College, took that position, not by virtue of any special practical experience at the Observatory, but by virtue of his general excellence in mathematics, and I know that when he took his degree his astronomy was not his peculiar forte. I am afraid that we cannot, as I hoped we should have been able, provide for a lecturer in mathematics and a lecturer in physics out of the Leake trust and probable Government aid, *i.e.*, meteorologist's salary, for we shall have to provide for an observer and for incidental expenses.—Believe me to be, yours very sincerely, G. W. WATERHOUSE."

I think that in the circumstances such a resolution as I will now propose will best meet the case :—

"That the Secretary be requested to communicate with the Council of the University, and to ask if they are willing to appoint a committee to confer with a similar committee of the Royal Society on the Leake bequest to promote the study of astronomy, the joint committees to suggest and report to the Society and the Council such a scheme as may be practicable in order to secure the benefit of Mr. Leake's bequest to the colony of Tasmania."

His Honor, SIR LAMBERT DOBSON, Chancellor of the University, on seconding the resolution, eulogised the munificent nature of the bequest. To carry out their wishes it was necessary they should have the co-operation of three bodies, namely, the Leake trustees, the Government, and the Council of the University. If it was in no sense contrary to Mr. Leake's directions, he did not think that there would be great objection to the Observatory being established in this part of the Southern Hemisphere. So far as the Government was concerned, there was a sum on the estimates for the meteorological establishment, which he thought the Government would be glad to hand over towards the carrying out of such a scheme if the Observatory did the work. He was glad to notice the attention being given to that important branch of the subject—astronomical photography—and its great value in the science had already been abundantly demonstrated by experiment. It was for them now to work out all the details, and approach the trustees with a scheme which fully complied with all the conditions of Mr. Leake's bequest.

Mr. T. STEPHENS, Director of Education, anticipated that two or three years might elapse before funds were at the disposal of the trustees to give effect to the bequest. This was a serious obstacle to any immediate attempt to combine the functions of University Lecturer in Mathematics with the duties to be performed under the Leake bequest. The University must act at once in the matter of its own appointment. He moved—"That it is highly desirable that a school of practical astronomy should be established at Hobart in accordance with the suggestions of Mr. H. C. Russell, subject to such modifications as circumstances may require."

Mr. J. B. WALKER said that the paper which had been read was most valuable, not only as the testimony of a high authority to the pre-eminent

advantages of Hobart as a site for astronomical work, and especially for stellar photography, but also for the clear and practical directions it contained as to the requirements of an Observatory and the cost of apparatus and maintenance. He thought that Mr. Russell's proposal would offer a strong inducement to the Leake trustees to bestow this noble gift within their own colony. Co-operation with the great Observatories of the world in the special work proposed would at once give the Leake Observatory a certain prestige, and the name of its founder would be associated with a scientific undertaking of universal interest and importance. This would be attained without detriment to the express object of the donor, which was the practical teaching of astronomy in connection with a University. It was premature to discuss details; but he might suggest that as it was impossible to divorce astronomy from the study of the higher mathematics, the Leake professor would naturally take the higher mathematical work of the University. With the co-operation of the different bodies mentioned by Mr. Clarke, arrangements might be made for two University lecturers. The lecturer in physics could take a part of the mathematical course, leaving the Leake professor free to give his whole attention to the astronomical work and the higher branches of mathematical study.

Extract from the will of Mr. Arthur Leake, late of Ashby, Ross, Tasmania :—

"I direct my said trustees to stand possessed of a third sum of £10,000, upon trust for the purpose of founding or establishing a school for the practical teaching of astronomy, in any of the Universities, colleges, or leading schools mentioned in Clause 6 of this, my will; [*i.e.*, in either of the Australian cities of Hobart, Sydney, Melbourne, Adelaide, or Brisbane;] a part of such teaching to consist of demonstrative lectures with diagrams and instruments. And I declare that it shall be lawful for the persons for the time being holding the said sum of £10,000 to lay out and employ £3,000, part thereof, in purchasing and providing instruments in aid of such teaching."

Another clause of the will authorises the trustees to pay over the said sum of £10,000 to the University in connection with which the school may be founded.

The Rev. Dr. Scott thought there would be insuperable obstacles the way of attaching the Leake bequest to the chair of mathematics. in The Leake bequest at the very outset contemplated the establishment of a school for the teaching of astronomy, and the whole terms of the will implied that the teacher should be a teacher of astronomy, having also attached his chair to the work of demonstration in such a way as to give up his time very largely to this important branch of learning.

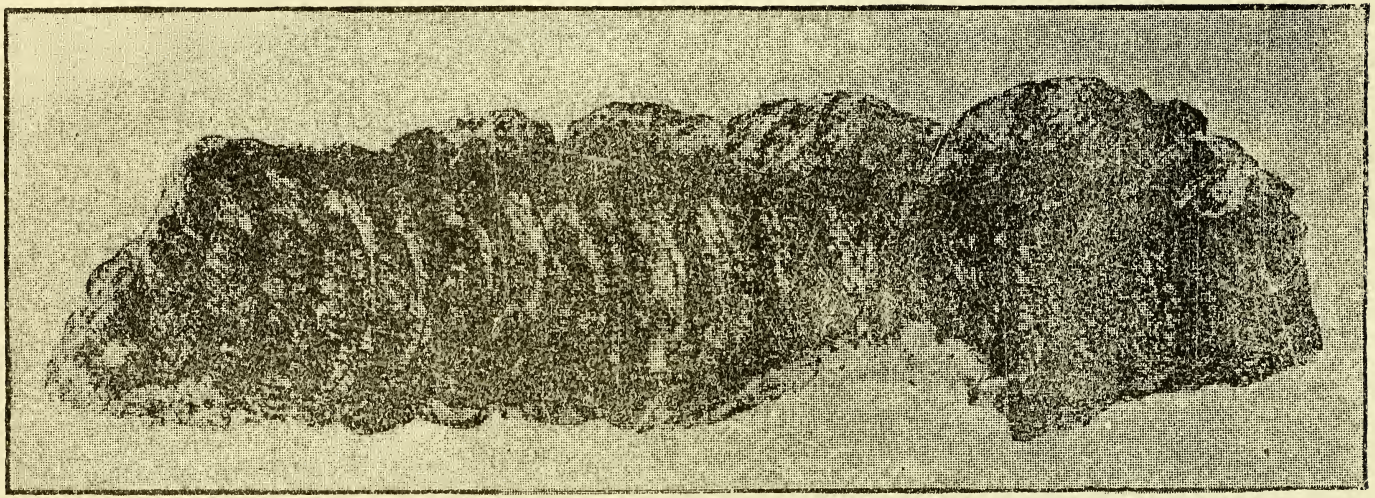
Mr. H. C. Kingsmill, M.A., dealt with the teaching aspect of the question, and thought that whilst the scheme contained many excellent points the duties in connection with the Observatory could not very well be undertaken by the professor of mathematics.

A further resolution was passed, on the motion of Sir Lambert Dobson, seconded by the Hon. N. J. Brown,—"The Royal Society having placed itself in communication with the Council of the University with the view of formulating a scheme for securing the benefit of the Leake bequest to the colony of Tasmania, the Premier be requested to refrain from making any permanent appointment to the office of meteorologist pending the result of such conference."

Remarks on Sir Robert Ball's Paper (read at the Hobart Meeting of the Australasian Science Association), entitled: "The Astronomical Explanation of a Glacial Period."

By A. B. Biggs.

The author said he wished to refer to Sir Robert Ball's paper (read at the Hobart meeting of the Australasian Science Association),



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entitled "The Astronomical Explanation of a Glacial Period." He said that the purport of Sir Robert Ball's paper, which disputed some of the deductions of Sir Robert Herschel in his "Outlines of Astronomy," shows that the successive periods of glaciation, alternating with periods of genial or tropical temperature, which geologists infer from the indications of the rocks and strata, are necessary corollary from astronomical data. Having fairly stated the conditions of the problem, Mr. Biggs proceeded to say that the statement on which Sir Robert Ball founded his charge against Herschel could only be that on page 333 of the fifth edition of Herschel's "Outlines of Astronomy"—"Supposing the eccentricity of the earth's orbit were very much greater than it actually is, the position of its perihelion remaining the same, it is evident that the character of the seasons in the two hemispheres would be strongly contrasted. In the northern we should have a short but very mild winter, with a long but very cool summer,—that is, an approach to perpetual spring; while the southern hemisphere would be inconvenienced and might be rendered uninhabitable by the fierce extremes caused by concentrating half *the* annual supply of heat into a summer of very short duration, and spreading the other half over a long and dreary winter, sharpened into an intolerable intensity of frost when at its climax by the much greater remoteness of the sun." Reading this, however, with another extract from the same author, he thought Herschell's meaning would be sufficiently apparent, although he had in this case failed to express himself with his customary preciseness. His statement, said Mr. Biggs, is that "the hemisphere would be inconvenienced . . by concentrating half *the*" (not *its*) "annual supply of heat into a summer of short duration," etc., which is, of course, apportioned between the summer of one hemisphere and winter of the other alternately, and he can only be referring to that portion of this "supply" which pertains to the summer or winter of either hemisphere. That he could have meant nothing else is still more evident from a further quotation (page 230), in which he admits the unequal distribution of heat between summer and winter:—"Whenever, then, the sun remains more than 12 hours above the horizon of any place, and less beneath, the general temperature of that place will be above the average; when the reverse, below;" that is, the summer and winter portions of the year respectively. The extent of the inequality of the distribution of the annual supply of heat between the summer and winter portions of the year in either hemisphere depends wholly and solely upon the inclination of the earth's axis, and no one could be more cognisant of this fact than Sir John Herschel.

Mr. STEPHENS exhibited a specimen of an *Orthoceratite*, belonging to the genus *Actinoceras*, from the Silurian limestone at Railton, in the Mersey district, and stated that he had sent a portion of the fossil, which, when found by Mr. Hainsworth, was in three pieces, to Sydney for identification; but Mr. Etheridge said that it was not perfect enough to determine the species. The rock in which it was found was the same as that in which extensive borings had been undertaken on the pretence of searching for coal, and that too where the Silurian rock cropped out on the surface, and no coal measures existed.

TASMANIAN MOSSES.

The SECRETARY drew attention to a fine collection of Tasmanian mosses, beautifully mounted, and presented to the Museum by Mr. W. A. Weymouth, consisting of 57 specimens representing 50 species, making a total of those previously presented in May last by Mr. Weymouth, of 117 species.

The meeting terminated with the usual votes of thanks.