'Proceedings of the New Zealand Institute.' Accidentally, I, the other day, found Dr. Gray's letter, and now send you the extract from it which relates to the rat-skin which I sent to him:—

"'*(Copy.)*

"'British Museum, 4th February, 1850. * * * I have not been able to discover any satisfactory character to separate the Native Rat which you sent me, from the Rat of India and Australia, and suppose that it must have been originally introduced from thence by the early vessels.—Yours, etc., J. E. Gray.'"

2. "Description of a new Species of the Genus *Cicindela*," by Captain T. Broun. (*Transactions*, p. 374.)

3. "Description of some new Species of *Coleoptera*," by Capt. T. Broun. (*Transactions*, p. 371.)

Third Meeting. *4th September*, 1876.

The Honourable Colonel Haultain in the chair.

New Members.—F. G. Ewington, D. Fallon, A. Rubery.

1. "Notes on the approaching Eclipse, to take place on 18th September, 1876," by T. Heale.

ABSTRACT.

From the time of the publication of Mr. Bailly's paper, in 1836, on the luminous prominences seen round the limb of the moon during a total eclipse—and which were thence named "Bailly's beads"—down to the eclipse of 1870, total eclipses of the sun were looked to by astronomers and physicists with the greatest anxiety; and expeditions were fitted out to the most distant places to observe the phenomena of the corona with the best procurable instruments. The suggestion made by Mr. Norman Lockyer, in 1866, and afterwards independently by M. Janssen, while observing the eclipse of August, 1868—that the prominence lines in the corona, which until then had only been seen in eclipses, might be rendered visible during sunlight by the use of spectroscopes with sufficient dispersive power—has taken away almost all the interest from the phenomenon, and we hear no longer of expeditions for its observation; but, still, we ought not to pass over the occurrence of an eclipse which will be total very near to us, and which will be large here, without some notice.

The eclipse of the 18th of this month will be total over a long oblique line, from about lat. 58° S. to near the equator; and from long. 85° W. to 145° E. The line of totality will, however, be very narrow along the whole of that long line: it will vary from about 15 miles where the moon is near the horizon, to about 55 miles in width where the moon is vertical, and her shadow is consequently widest. The times, therefore, during which the total phase of the eclipse will last will vary from 29sec. to 1min. and 48sec.

Here, about one-half the sun's disc will be covered: the first contact will be a few seconds after eight in the morning (Telegraph time), the greatest phase will be reached at nearly nine minutes past nine, and the last contact will be at 10hr. 17min. 24sec.

At the East Cape the eclipse will be considerably larger, nearly two-thirds of the sun's diameter being covered. At Wellington, the times of first and last contact will be slightly different, and ·48 of the sun's disc obscured.

The accurate computation for any particular place of the circumstances of a solar eclipse from the elements given in the Nautical Almanac is a very simple and easily

intelligible matter. It involves the getting out the spherical co-ordinates of the moon's parallax in altitude at times assumed to be pretty near those of the beginning and ending of the eclipse. By applying these to the R.A. and declination of the moon, taken out for these times from the Nautical Almanac, it is obvious that we shall get the accurate apparent position of the moon; the sun's place can then very easily be taken out for the same times, and from their comparison we obtain the differences in R.A. and declination of their centres at those moments. If, then, the assumed times were exactly those of the contact of the limbs it is obvious that the hypothenuse of the pair of right-angled triangles now pointed out on the diagram exhibited would, each of them, exactly agree with the sum of the apparent semi-diameter at the same moment. In practice, of course, this is rarely or never the case, but the error is capable of being easily computed.

Still, this method is not rigorously exact, since the triangles are nearly spherical, and the moon's motion, which is assumed uniform and rectilinear for the interval between the first and last contacts, is really subject to appreciable variation from the assumption in both respects. A more strictly accurate method is that known as Bessel's, which is based on the true law of the cone, and takes into account every possible element of variation. But this method involves the use of a great number of logarithmic quantities, some of which, being dependent on the latitude and longitude, are constant for any particular place, and may be computed once for all for a particular station, as an Observatory. A number of others are constants for each eclipse or occultation for any part of the world, and these are all given in that fine publication, the "American Nautical Almanac." To anyone in possession of these two sets of constants, the computation, though tedious, is not difficult; but to get out all these quantities for a single eclipse would be a labour far too great to undertake, unless peculiar circumstances demanded it.

2. "The Elements of Mathematics," by J. Adams, B.A. (*Transactions*, p. 309.)

Mr. Heale agreed for the most part with the views expressed by Mr. Adams. It had always appeared to him that the time occupied in teaching boys the six books of Euclid was to a great extent wasted. No doubt the general method of Euclid, so elaborate and logical, was of essential service in education, but to avail oneself of this it was not necessary to wade through the whole of the propositions. On the contrary, a very small number would be sufficient. So long, however, as Euclid was retained in the Universities and examinations at home, he feared it would be premature to make any change here.

FOURTH MEETING. *2nd October*, 1876.

His Honour Mr. Justice Gillies, President, in the chair.

New Members.—J. Rees George, L. Lessong, Ph.D., M. Niccol, T. Niccol, Lewis Rye, F. H. Troup, A. Judd.

An animated discussion took place on Mr. Adams's paper on Euclid, read at the last meeting.

1. "On Savage and Barbaric Survivals in Marriage," by the Rev. J. Wallis, D.D. (*Transactions*, p. 249.)

2. "On Lime as a Manure; and its beneficial Effects when applied to the Cultivation of the Soil," by D. Hay. (*Transactions*, p. 206.)