

ing a space between two clouds, leaving behind it a fiery track of red.

A Worcester correspondent gives the time as 8.20. He describes the colour as brilliant blue and orange, and behind was a streaming trail of brilliant sparks, which remained visible for a few seconds after the brighter light had disappeared.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—At a Congregation on November 22, the University seal was ordered to be affixed to a letter of thanks to his Grace the Chancellor of the University for his munificent gift of a complete apparatus of scientific instruments for the Cavendish Laboratory.

A meeting of the members of the University to consider the propriety of securing a personal memorial of Dr. Darwin, was held on Monday in the combination room of Christ's College, the Rev. Dr. Cartmell, Master of the College, presiding. It was proposed by Prof. Humphry and seconded by Prof. Fawcett, "That it is desirable that the University should possess a personal memorial of Mr. Charles Darwin, LL.D." Proposed by Prof. Newton and seconded by Mr. Piele, of Christ's, "That the members of the University now present form themselves into a committee, with power to add to their number, for the purpose of collecting subscriptions from members of the University to carry out the foregoing resolution." Proposed by Prof. Liveing, seconded by Mr. J. W. Clark, "That Mr. A. G. Dew-Smith, of Trinity College, be treasurer and secretary to the committee, and be authorised to receive subscriptions." It was understood that the memorial should assume the form of a portrait, and about 75% was subscribed in the room.

EDINBURGH.—The subscriptions to the Edinburgh University Extension Fund now amount to 82,000*l.*, and Government has now promised to add 80,000*l.* to the amount on condition that 25,000*l.* is raised by public subscription, of which the sum of 10,000*l.* must be subscribed by December 31st next. The University Professors at Edinburgh have already contributed among themselves 5,360*l.* towards the additional 25,000*l.* required.

ST. ANDREWS.—Lord Selborne has been elected Lord Rector of this University. The students had much difficulty in getting any eminent man to allow himself to be nominated, and it was only on the day previous to the election that it was resolved to pit Lord Selborne against the Right Hon. Gathorne Hardy.

Prof. Alleyn Nicholson has been appointed Swiney Lecturer on Geology by the Trustees of the British Museum.

LEIPZIG.—Prof. Leuckhart, the newly-elected Rector of the University, was installed into the duties of the office on October 31, and delivered on the occasion an able address "On the Development of Zoology up to the Present Time, and its Importance." The students already number nearly 3,200, an attendance, as usual, far above that of any other German university.

AMSTERDAM.—The new University of Amsterdam has lately made a most flattering offer to Prof. Gegenbaur, of Heidelberg, which has, however, been declined.

BERGEN.—It is intended to establish a new university in the Norwegian town of Bergen. Eighty thousand crowns have already been subscribed towards this object.

### SOCIETIES AND ACADEMIES

#### LONDON

Mathematical Society, November 8.—Lord Rayleigh, F.R.S., president, in the chair.—The following were elected to form the Council during the session:—President: Lord Rayleigh, F.R.S. Vice-Presidents: Prof. J. Clerk Maxwell, F.R.S., Mr. C. W. Merrifield, F.R.S., Prof. H. J. S. Smith, F.R.S. Treasurer, Mr. S. Roberts. Hon. Secretaries: Messrs. M. Jenkins and R. Tucker. Other members, Prof. Cayley, F.R.S., Mr. T. Cotterill, Mr. J. W. L. Glaisher, F.R.S., Mr. H. Hart, Dr. Henrici, F.R.S., Dr. Hirst, F.R.S., Mr. Kempe, Dr. Spottiswoode, F.R.S., Mr. J. J. Walker.—Prof. Cayley made two communications, on the function  $\phi(x) = \frac{ax+b}{cx+d}$  (a singularly neat expression was got for  $\phi^n(x)$ , the late Mr.

Babbage had considered the matter in 1813), and on the theta functions.—Mr. Tucker read a portion of a paper by Mr. Hugh MacColl (communicated by Prof. Crofton, F.R.S.) entitled the calculus of equivalent statements. A short account of this analytical method has been given in the July and November numbers (1877) of the *Educational Times*, under the name of Symbolical Language. The chief use at present made of it is to determine the new limits of integration when we change the order of integration or the variables in a multiple integral, and also to determine the limits of integration in questions relating to probability. This object, the writer asserts, it will accomplish with perfect certainty, and by a process almost as simple and mechanical as the ordinary operations of elementary algebra.—The president read a paper on progressive waves. It has often been remarked that when a group of waves advance into still water the velocity of the group is less than that of the individual waves of which it is composed; the waves appear to advance through the group, dying away as they approach its anterior limit. This phenomenon seems to have been first explained by Prof. Stokes, who regarded the group as formed by the superposition of two infinite trains of waves of equal amplitudes and of nearly equal wave-lengths advancing in the same direction. The writer's attention was called to the subject about two years since by Mr. Froude, and the same explanation then occurred to him independently. In his work on "The Theory of Sound" (§ 191), he has considered the question more generally. In a paper read at the Plymouth meeting of the British Association (afterwards printed in *NATURE*), Prof. Osborne Reynolds gave a dynamical explanation of the fact that a group of deep-water waves advances with only half the rapidity of the individual waves. Another phenomenon (also mentioned to the author by Mr. Froude) was also discussed as admitting of a similar explanation to that given in the present paper. A steam launch moving quickly through the water is accompanied by a peculiar system of diverging waves, of which the most striking feature is the obliquity of the line containing the greatest elevation of successive waves to the wave-fronts. This wave-pattern may be explained by the superposition of two (or more) infinite trains of waves, of slightly differing wave-lengths, whose direction and velocity of propagation are so related in each case that there is no change of position relatively to the boat. The mode of composition will be best understood by drawing on paper two sets of parallel and equidistant lines, subject to the above conditions, to represent the crests of the component trains. In the case of two trains of slightly different wave-lengths, it may be proved that the tangent of the angle between the line of maxima and the wave-fronts is half the tangent of the angle between the wave-fronts and the boat's course.—Prof. Clifford, F.R.S., communicated three notes. (1) On the triple generation of three-bar curves. *If one of the three-bar systems is a crossed rhomboid, the other two are kites.* This follows from the known fact that the path of the moving point in both these cases is the inverse of a conic. But it is also intuitively obvious as soon as the figure is drawn, and thus supplies an elementary proof that the path is the inverse of a conic in the case of a kite, which is not otherwise easy to get. (2) On the mass-centre of an octahedron. The construction was suggested by Dr. Sylvester's construction for the mass centre of a tetrahedral frustum. (3) On vortex-motion. The problem solved by Stokes as a general question of analysis, and subsequently by Helmholtz for the special case of fluid motion may be stated as follows: given the expansion and the rotation at every point of a moving substance, it is required to find the velocity at every point. The solution was exhibited in a very simple form.

Zoological Society, November 6.—Mr. A. Grote, vice-president, in the chair.—A letter was read from Mr. R. Trimen, containing remarks on the African species of *Sarcidiornis*.—A letter was read from Mr. A. O. Hume, containing some remarks on Mr. Howard Saunders' recent paper on the Sterninae.—The secretary exhibited, on the part of Mr. Geo. Dawson Rowley, an egg of *Pauxis galata*, laid by a black female.—Prof. W. H. Flower, F.R.S., read a paper entitled "A Further Contribution to the Knowledge of the existing Ziphioid Whales of the Genus *Mesoplodon*, containing a Description of a Skeleton and several Skulls of Cetaceans of that Genus from the Seas of New Zealand."—A communication was read from Lieut.-Col. R. H. Beddome, containing the descriptions of three new species of reptiles from the Madras Presidency. These were proposed to be called *Oligodon travancoricum*, *Gymnodactylus jeyaporenensis*, and *Bufo travancoricus*.—A communication was read from the Marquis of Tweeddale, F.R.S., containing an account of a collection of