

8h. 20m., says that at disappearance it burst into a suppressed shower or halo of red; and a third relates that it travelled from S. to E. downwards, leaving two trains of sparks, and then finally bursting into fragments. It looked like an immense firework bomb, and many people, at the first impression, considered it so near as to mistake it for a large rocket. One observer avers that as the meteor burst he found himself enveloped in a "wave of heat" for several seconds!

Carefully comparing the descriptions of the path and direction, it is found difficult to determine with precision over what point of the earth's surface the fireball first became visible. Probably, however, this occurred above the English Channel, about 25 miles S.E. of the Isle of Wight, when the height of the body would be about 70 statute miles. From thence it slowly pursued a direction to the N.N.W., and entered the English coast over Gosport, after skirting the eastern boundary of the Isle of Wight. The meteor was descending to the earth at an angle of 30° ; at Gosport its height was 50 miles, and it afterwards passed over Winchester at an elevation of 38 miles, finally disappearing a few miles north of Swindon, when its height had further decreased to 14 miles.

This path apparently satisfies the majority of the observations, but there are, as usual, a few discordances. Thus, the Watford observation (NATURE, May 12, p. 30) gives an altitude of 30° for end-point in the W.S.W. (magnetic bearing). This seems far too great; about half, or 15° , would be consistent with the other observations. At Staines, where the altitude must have been nearly the same as at Watford, it was given as 13° , and at several places in London the altitudes are mentioned as 17° and less. Mr. Horner's observation at Montagu Street, W. (NATURE, May 12, p. 30) proves conclusively that the altitudes were very low. He saw the meteor first near γ Geminorum (alt. 23°), and it disappeared after moving slowly in the direction of Jupiter. If we adopt the end-point from this description as at $80^\circ + 16'$, we get the terminal altitude as only 12° , which is in exact conformity with the adopted height of 14 miles at disappearance. The altitude of 17° from Highgate (NATURE, May 12, p. 30) is somewhat excessive, but it is well known that in estimates of this character the figures are nearly always too great. Lieut.-Colonel Tupman states: "Most persons (as has been often before remarked) guess altitudes at double what they really are, and 'the zenith' means anything higher than 45° or so" (see his paper on the great meteors of 1875, September 3, 7, and 14, Appendix, *Astronomical Register*, vol. xiv. p. 1).

The observations at Staines, Hartfield, and Montagu Street, W., are very fairly consistent as regards the direction of the meteor, and, taken in combination with the especially valuable notice from Stafford and the average of the Bristol observations, the radiant-point is found to have been situated in the S.S.E., altitude 30° , which is about 10° N.W. of Spica Virginis, or at $191^\circ - 5'$. No definite meteor-shower is known from this point in May, though Heis gives a position at $191^\circ + 7'$ for April 18 to May 18, which can hardly be the same. The great fireball of May 12, 1878, diverged from a radiant at $214^\circ - 7'$, and it can scarcely be associated with that of May 8 last, as the two radiants are 23° distant.

The recent fireball had a real path in the atmosphere of about 110 miles. Its motion was very slow, but there are great discordances in the various estimates of duration. A large proportion of the observers only saw the latter part of the flight, but it would seem that the whole duration was fully 6 seconds, probably more, in which case the velocity was certainly less than 18 miles per second. The fireball, if moving in a parabola, would have had a velocity of 13 miles per second.

As to the actual size of this brilliant visitor, nothing can be definitely concluded, because it is impossible to discriminate between the glare and flaming effect of the nucleus and what extent of it represented the material diameter. The fireball was probably a very diminutive body, and much smaller than its conspicuous aspect would lead us to suppose. Had it withstood disruption and dispersion during another $1\frac{3}{4}$ second, it would have completed the remaining 28 miles of its path, and it must have fallen to the earth near Winchcombe, in Gloucestershire.

W. F. DENNING.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—We regret to hear that Prof. Prestwich has resigned the Chair of Geology which he has held for the last thirteen years.

CAMBRIDGE.—Last week the grace authorizing the Vice-Chancellor to enter into negotiation with Downing College with a view to securing a site for the Geological Museum in the grounds of Downing College, opposite the New Museums, was carried by eighty to seventy-one votes. Prof. Hughes, in a previous discussion, had objected to the site on the New Museum grounds because it would soon become too crowded. The Downing College site would afford plenty of room. Whether the University and the College can agree on the question of the price to be paid remains to be seen.

The Botanic Garden Syndicate have issued a modified report, proposing a different site for their necessary new plant-houses, namely, palm-house, stove, warm fern-house, and orchid-house, and recommending that authority be given them to obtain a detailed plan and estimate for building these, together with a new propagating-pit, the cost not to exceed £3000. They also strongly recommend the erection, in connexion with these houses, of a small research laboratory.

The examiners for the Adams Prize—the Vice-Chancellor, Prof. Stokes, Prof. Darwin, and Lord Rayleigh—have given notice that the subject for the Adams Prize to be adjudged in 1889 is "The Criterion of the Stability and Instability of the Motion of a Viscous Fluid." It appears from experiment (see Phil. Trans. for 1883, p. 935) that the steady motion in a tube is stable or unstable according as the velocity is less or greater than a certain amount; and it is inferred from theory, confirmed by experiment, that in two geometrically similar systems the motion is stable or unstable according as $\mu/\rho c U$ is greater or less than a certain numerical quantity n ; c , U being a length and a velocity which define the linear scale and the scale of velocity in the system, and ρ , μ the density and coefficient of viscosity of the fluid; but the quantity n has not hitherto been obtained even in a simple case except by experiment.

It is required either to determine generally the mathematical criterion of stability, or to find from theory the value of n in some simple case or cases. For instance, the case might be taken of steady motion in two dimensions between two fixed planes, or that of a simple shear between two planes, one at rest and one in motion.

Should the investigation not be found practicable for even a simple case of the motion of a viscous fluid, some substantial advance might be made in what has been done for a perfect fluid (see Proceedings of the Mathematical Society, vol. xi. p. 57), the title of the essay being modified accordingly.

The prize is open to all Cambridge graduates.

Each essay should be accompanied by a full and careful abstract, pointing out the parts which the author considers to be new, and indicating the parts which are to be regarded as of more importance than the rest.

The essays must be sent in to the Vice-Chancellor on or before December 16, 1888, privately. Each is to have some motto prefixed, and to be accompanied by a paper sealed up, with the same motto and the words *Adams Prize* on the outside, and the candidate's full name, with his College and degree, written within. The papers containing the names of those candidates who may not succeed will be destroyed unopened. Any candidate is at liberty to send in his essay either written (but not in his own hand) or printed or lithographed. The successful candidate receives about £170. He is required to print the essay at his own expense, and to present a copy to the University Library, to the Library of St. John's College, and to each of the four examiners.

SCIENTIFIC SERIALS.

The Quarterly Journal of Microscopical Science for March 1887, vol. xxvii. Part 4, contains:—On the termination of nerves in the liver, by A. B. Macallum (plate 36). These researches were made on the livers of man and Menobranchus (Necturus): the liver cells of the latter are from two to four times the diameter of those in man, and so were very favourable for these investigations; in man fibrils from the intercellular plexus of nerves give off excessively minute twigs, which terminate each in a delicate bead in the interior of the hepatic cells, near the nucleus; in Menobranchus the simple intracellular nerve-twigs always terminate in the neighbourhood of the nucleus, either singly or after branching, each terminal point being a delicate bead.—On the nuclei of the striated muscle-fibre in *Necturus (Menobranchus) lateralis*, by A. B. Macallum.—The development of the Cape species of *Peripatus*, Part 3; on the changes from Stage A to Stage F, by Adam Sedgwick, F.R.S. (plates

34-37). This elaborate memoir does not permit of being usefully summarised.—Morphological and biological observations on *Criodrilus lacuum*, by Dr. L. Orley.—Studies on earth-worms, No. 3: *Criodrilus lacuum*, Hoffmeister, by W. B. Benham (plate 38). This little worm was first discovered by Fritz Müller in 1844, near Berlin, and was in the following year described by Hoffmeister; it was next found near Linz, and more recently in Italy and at Buda-Pesth by Dr. Orley, whose paper thereon has been translated from the manuscript by Mr. Benham. In the Danube this worm occurs, often in large numbers among the roots of *Sium latifolium*, the egg-cases looking like certain forms of Enteromorpha. The specimens dissected by Mr. Benham were sent to Prof. Lankester by Dr. Orley.—Notes on the chromatology of *Anthea cereus*, by Dr. C. A. MacMunn (plates 39 and 40). The pigments of *Anthea* are the pigments of certain marine Algae, and are without doubt the pigments of the "yellow cells" which are now known to be unicellular Algae.—On *Ctenodrilus parvulus*, nov. spec., by Dr. Robert Scharff (plate 41). This little Annelid was recently discovered by Mr. Bolton, of Birmingham, but its exact habitat is unknown.—On the relation of the Nemertea to the Vertebrata, by Prof. A. A. W. Hubrecht (plate 42); with permission from Prof. Hubrecht's Report on the *Challenger* Nemerteans.

American Journal of Mathematics, vol. ix. No. 3 (Baltimore, April 1887).—A memoir by Prof. Cayley on the transformation of elliptic functions, develops the algebraical theory established by Jacobi in the "Fundamenta Nova" (1829), and discusses other researches in this field by Jacobi, Brioschi, and the writer (see Brioschi's second appendix to his translation of Cayley's "Treatise on Elliptic Functions," and other papers cited in the present memoir).—Mr. G. P. Young contributes a long account of "Forms, necessary and sufficient, of the roots of pure uniserial Abelian equations"; and the number closes with some eighteen pages of tables under the heading "Symmetric Functions of the 14^{ic}," by W. P. Durfee,—these are arranged according to the second of the author's methods used in vol. v., where tables are given for the 12^{ic}. In vol. vi. it may be noted Capt. Macmahon does a similar work for the 13^{ic}.

In the numbers of the *Journal of Botany* for March and April, a species (or sub-species) of *Rubus* new to science is described by Mr. E. F. Linton, from Norfolk, under the name *R. lucens*, afterwards substituted by *R. letus*. The remarkable *Equisetum littorale*, differing from all other species of the genus in the absence of elaters, is recorded as British (and figured) by Mr. Beeby, on the faith of specimens from Surrey. Mr. Spruce concludes his elaborate description of his new species of Hepaticæ, *Lejeunia Holtii*, from Killarney. The remaining articles are of merely local or technical interest.

THE number of the *Nuovo Giornale Botanico Italiano* for April is almost entirely occupied by articles of interest to Italian botanists. In addition to those referring to the distribution of species, Sig. L. Savastano has two short papers. The first refers to the parasitism of *Agaricus melleus*. From experiments made on a number of different trees, the author concludes that this fungus does not attack healthy trees, but only those that are weakly or diseased. In the second paper, on Gummosis, he adduces facts to show that this morbid phenomenon is to a large extent dependent on temperature, being less frequent in the northern than the southern portion of the zone of cultivation of any given species.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 5.—"The Proteids of the Seeds of *Abrus precatorius* (Jequirity)." By Sidney Martin, M.D. Lond., Pathologist to the Victoria Park Hospital. Communicated by Prof. E. A. Schäfer, F.R.S.

Two proteids were found in the saline extract of the crushed seeds; one a *globulin*, identical with that occurring in papaw-juice, and belonging to the group of vegetable paraglobulins; the other an *albumose*, identical with what the author has described as α -phytalbunose in the papaw-juice. Attention was called to the differences between the class of vegetable paraglobulins and the vegetable myosins, which differ in the fact that the latter become readily changed into an albuminate when the sodium chloride holding them in solution is dialyzed away.

The investigation of the proteids is preliminary to that of their physiological action

"Note on the Microscopic Structure of Rock Specimens from Three Peaks in the Caucasus." By Prof. T. G. Bonney, D.Sc., LL.D., F.R.S.

These specimens are from three localities in the Caucasus, all difficult of access, viz. the peaks of Tau Tetnuld, Guluku, and Elbruz. The first and second are peaks near together in the central part of the Caucasus; the specimens were collected in 1886 by Mr. W. F. Donkin. (1) Tau Tetnuld: one specimen from near the summit, representative of the rock forming all the upper part of the mountain. It is a mica-schist, which has been much crushed subsequent to its first crystallization. (2) Guluku: a series of rocks representing the upper part of the mountain—granitoid and gneissoid rocks and strong schists. These afford indications of more or less mechanical disturbance. In one, the garnets have been flattened out into elongated ovals, and ultimately cracked. The specimens indicate a succession of different rocks, possibly resulting from original stratification, though true granite probably forms part of the mountain. (3) From the western crater-peak of Elbruz, collected, in 1874, by Mr. H. Walker (from the highest rocks, more than 17,500 feet above the sea). It is a hornblende-andesite, not containing quartz, and thus is different from those on the lower part of the mountain.

Linnean Society, May 5.—Mr. W. Carruthers, F.R.S., President, in the chair.—Mr. E. W. Forrest, and Mr. G. Perrin were elected Fellows; Mr. W. H. Beeby, Mr. A. D. Kent, and Mr. J. M. Wood were elected Associates; Prof. G. A. Schweinfurth, Prof. H. Solms-Laubach, Dr. Franz Steindachner, Dr. M. Treub, and Prof. A. Weismann were elected Foreign Members of the Society.—The auditors chosen to examine the Treasurer's accounts were Mr. F. V. Dickins and Mr. G. Maw, to represent the Fellows, and Mr. J. E. Harting and Mr. A. D. Michael for the Council.—Mr. J. W. Willis-Bund exhibited specimens of the rainbow trout (*Salmo irideus*) reared in the fish-culture establishment, Delaford Park. Though from eggs of the same batch, the fish were very unequal in size. From the evidence of its being a migratory fish and other facts, Mr. Bund doubts the value of its introduction into this country as a stream trout.—Photos were shown and a letter read from Mr. J. G. Otto Tepper regarding a gall formation on *Scevola spinescens* observed by him at Yorke's Peninsula, South Australia.—On behalf of Mr. W. Brockbank, there was exhibited photographs of a series of forms of *Narcissus reflexus* of Brotero, from Ancora, North Portugal, and grown in his garden at Didsbury. *N. reflexus* is ranked as a species by Nyman; but the variation in the Portuguese plant is so great in the size and shape of the corona, that it is evident no definite line of demarcation can be drawn between the Spanish *N. triandrus* and the Brittany *N. calathinus*. It would seem, therefore, that all the varietal forms of the section Ganymedes constitute a single species.—Mr. J. Harris Stone exhibited the flowers of *Nicotiana glauca* from Fuerteventura and Sanzarote, Canaries. The plant is a native of Buenos Ayres, where it grows 10 feet high. It seems to have been introduced into the Canary Islands about 1867-69, since which date it has run wild, and is now to be met with flourishing as a weed on the path sides and in the villages, attaining a height of 3 or 4 feet. The natives call it "mismo" (same), as spreading everywhere the same over the islands.—Photographs of the mud volcanoes of Trinidad, and of the Peak of Rakata, volcano of Krakatão, after the eruption, were exhibited respectively by Mr. R. V. Sherring and for M. Verbeek.—Mr. F. J. Hanbury called attention to specimens of hybrid Primulas.—A paper was read, viz. experimental observations on certain heterocœcious Uredines, by Mr. Chas. B. Plowright. Among these, *Puccinia phalaridis*, *P. arenariicola*, *Gymnosporangium clavariaforme*, *G. juniperinum*, and *G. sabinae* more particularly engaged the author's attention; full details of the cultures and analyses of the experiments being given.—There followed a paper on *Vaccinium intermedium* as a new British plant, by Mr. N. E. Brown. It was discovered by Prof. Bonney at Cannock Chase, August 1886, growing plentifully in certain spots; *V. myrtilloides* and *V. Vitis-Idea* being also abundant. Mr. Brown regards the plant in question as a hybrid between the two latter species, and to have originated independently at Cannock Chase, and not been introduced from the Continent.—A paper was read by Mr. R. A. Rolfe, on bigeneric orchid hybrids, the subject being treated chiefly with reference to its bearing upon classification. After pointing out that these hybrids, as in the case of those between species of the same genus, were more or less intermediate between the two