tion of antenniform characters by the crustaceous ophthalmite, received from M. Alphonse Milne-Edwards, was exhibited by Prof. G. B. Howes. Mr. C. Baker showed Dr. Carl Zeiss's apochromatic objectives and eye-pieces, made of the new Abbe-Schott glass. The "Secohmmeter," a direct reading instrument for the absolute measurement of the coefficients of self and mutual induction, and for the absolute measurement of a capacity, was exhibited by Profs. Ayrton and Perry. On a future occasion we shall have something to say about this instrument. Mr. J. Norman Lockyer exhibited photographic comparison spectra of sun and metallic elements, taken at Kensington with Rowland grating. The metallic spectra were obtained in the usual way by putting metallic salts between the poles of an electric lamp. The lamp was placed at a distance of about 9 feet from the slit, and the rays of light diverging from it were rendered parallel by a lens of 9 inches focal length. An image of the sun was focused between the poles of the lamp by another lens of 10 inches focal length placed between the siderostat and the lamp. The light from the sun was thus sent through the slit under exactly the same conditions as that from the arc, so that both were brought to the same focus. The slit was covered with a piece of paper having four tongues, one of which was turned back for each exposure. The exposures varied from five to ten minutes. Mr. Lockyer also exhibited photographs of the spectra of compounds of carbon under various conditions, and a map showing the passage from flutings to lines in the spectrum of alcohol with increase of temperature, and the distribution of the various carbon flutings in the spectrum of the electric arc. The photographs, especially those of carbon dioxide, show how the spectrum of each compound depends upon the conditions of temperature and pressure to which it was subjected. A comparison of the spectra of different compounds will also show the general relations which exist between them; it will be seen that some of the flutings are special to certain compounds, while others are common to all. The accompanying map (approximately to a wave-length scale) represented the changes in the spectra of alcohol vapour produced by changes of temperature and pressure. The part of the map to the right of 4900 was mapped from eye-observations, and the remainder from the photographs. The lower half of the map shows the distribution of the carbon flutings in the spectrum of the electric arc, the spectrum of each portion of the arc being represented on the same horizon. A point of great interest is the appearance, in the flame which surrounds the negative pole, of three sets of flutings which shade off towards the red. The two most refrangible flutings shown in the alcohol spectra are apparently coincident with two of the five-membered ultra-violet group occurring in the spectra of the arc and cyanogen. Photographs of stellar spectra taken at Harvard College by Prof. Pickering (Henry Draper Memorial) were also shown by Mr. Lockyer. Spectra of α Lyræ, β Geminorum, α Cygni, α Tauri. These have already been referred to in NATURE. Twelve-inch Indian sun photographs taken at Dehra-Dun, India, March 4 and May 2, 1886, were exhibited by the Solar Physics Committee. The Rev. Dr. Pritchard showed (1) original negative of the Cluster in Perseus. Taken with the De la Rue reflector, 13 inches aperture; 120 inches focal length; exposure 30 minutes; diameter of plate-holder 6½ inches. This is one of a series of photographs taken in order to ascertain the greatest angular extent of the field, in which all the star impressions are free from deformation of circular contour. All the stars on this plate, even to the angular points, at a distance of 80′ from the centre, are sensibly free from ellipticity. Positive enlargements on glass of the above. (2) The Macromicrometer presented by Dr. W. de la Rue to the Oxford University Observatory, carrying one of the original negatives of 61 Cygni, as used for the determination of the parallax of the two components of that star. (3) Original negative showing the photographic genesis of star impressions formed during varying durations of exposure, and viewed under high magnifying power. Dr. Edgar M. Crookshank exhibited micro-organisms: — (1) Microscopical specimens, including living micro-organisms and permanent preparations. (2) Cultivations on nutrient jellies, potatoes, &c., of the following micro-organisms:—

Bacillus tuberculosis.
Micrococcus tetragonus.
Bacillus typhosus.
Koch's comma-bacillus.
Finkler's comma-bacillus.
Deneke's comma-bacillus.
Emmerich's bacterium.
Bacterium of rabbit septicæmia.
Bacillus of mouse septicæmia.
Bacillus of swine-erysipelas.
Bacterium of pneumonia (Friedländer).
Staphylococcus pyogenes albus.
Staphylococcus pyogenes aureus.
Staphylococcus pyogenes citreus.
Streptococcus of erysipelas.
Bacillus of anthrax.
Micrococcus prodigiosus.
Bacillus indicus.
Bacillus of blue milk.
Bacillus violaceus.
Bacillus pyocyaneus.
Red bacillus from water.
Red spirillum.
Black yeast.
Pink yeast.
Yellow sarcina.
Bacillus figurans.
Phosphorescent bacillus.

Water-cultures of the garden bean (*Vicia Faba*), the roots of which are infested with tubercular swellings, due to the parasitic action of a fungus, the extremely minute germs of which are common in the soil, were exhibited by Prof. H. Marshall Ward. Dr. E. Klein exhibited microscopic specimens and culture-tubes of the microbe of (1) foot-and-mouth disease; (2) scarlet fever; (3) several different forms of septicæmia; (4) swine plague.

THE METEOR OF MAY 8.

ON Sunday evening, May 8, at 8h. 22m., hundreds of people witnessed the flight of the brilliant slow-moving fireball, about which three letters were printed in NATURE last week. At the time of its appearance daylight was still so strong that only Venus, Jupiter, Saturn, and a few first-magnitude stars were visible in the firmament. At stations in the eastern part of England the fireball fell in the western sky; at Bristol and the west it descended in the east; while at Stafford it is described as falling in the south.

Descriptions of the apparent path and appearance of the meteor have been received from Eastbourne, Staines, Stafford, Hartfield near Tunbridge Wells, London, Clevedon, Bristol, &c. It is referred to by most observers as a strikingly brilliant object, in comparison with which the planet Venus looked small and faint.

The following are quotations from some of the reports which have reached me from various places:—

The Rev. F. B. Allison, of Eastbourne, says:—"An exceptionally bright fireball was seen to fall to-night [May 8] at 8h. 30m. There was so much light in the sky that I could only detect α and β Aurigæ. The meteor was considerably larger and brighter than Venus, of a bluish tint, with train of sparks, slow motion: 6 seconds over the path indicated." Mr. Allison sends a diagram, in which the observed part of the course is shown extending under α and β Aurigæ, at an angle of about 42°, to a length of about 24°.

Mr. Francis Gare, of Staines, writes:—"The fireball was observed about 8h. 20m. to 8h. 25m., and was about half the size of the moon; its light was pale blue in colour, and was very bright, startlingly so. It left a train of red sparks about 6° long. The first part of its track was invisible to me as I was in a room with a S.W. window; this, too, would have prevented my hearing the detonation had there been any. The motion was slow." Mr. Gare sends a sketch, in which the fireball is represented as traversing 40° at an angle of 38°, and terminating 10° east of a line joining Venus and the horizon.

The Rev. E. Allen, of Castlechurch Vicarage, near Stafford, says:—"The time was within five minutes of 8h. 20m., May 8. It was so light that to see Spica as a reference-point, and whose place I knew exactly relatively to that of Jupiter, which was plainly visible, I had to fetch a binocular. The meteor was very large, and brilliantly white. Its light seemed to rise and fall in pulsations about two-fifths of a second in period, and its general power and effect was like what an extremely brilliant Roman candle ball would appear in somewhat deeper twilight at a distance of 50 or 60 yards from the spectator. Its motion was very slow, taking, I estimate, 5 seconds in passing along its total path of about 12° of arc. Estimating proportions of distance by eye, with the space between Jupiter and Spica as a guide, the path was something as follows: It was inclined about 25° to a perpendicular, the angle lying on the west, and fell from about R.A. 12h. 35m., Decl. 13° 30′ S., in a line nearly parallel to δ and ζ Corvi, and east of those stars."

At Hartfield, near Tunbridge Wells, the fireball was observed passing a little below Venus from right to left, and inclined 30° or 40° to the horizon. Duration, 3 or 4 seconds.

At Bristol, the meteor appears to have been pretty generally observed, and a large number of reports have come to hand. These, though differing in some essential particulars, sufficiently prove that the motion was from S.E. to E. by N. at an angle of 30°, the altitude at disappearance being about 20°. One observer describes it as being as large as a tennis-ball, and having a duration of 6 seconds. Another, who mentions the time as

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 fire-work 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° + 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° − 5°. No definite meteor-shower is known from this point in May, though Heis gives a position at 191° + 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° − 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 $\mu/\rho cU$ 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