

selenium was then coated with shell-lac varnish, and about two hours afterwards again tested in the same manner as before, when the light was found to produce a deflection of 220 divisions, or more than twice the previous amount. The action of radiant heat was similar to that of light in the case of this particular specimen, but I have little doubt that *any* specimen may be rendered more sensitive to light by coating it with varnish or lampblack. I hope that this suggestion will prove of service to those philosophers who may aspire to "hear a beam of light" or to "see by electricity," and shall be glad to hear that such has been the case.

HERBERT TOMLINSON

King's College, Strand, March 7

Cave Animals and Multiple Centres of Species

THE readers of Seaper's "Existenzbedingungen der Thiere," now translated into English, will find (vol. ii. p. 268 of the German edition) an interesting discussion on the question of monophyletic or polyphyletic evolution of species, the author decidedly inclining to the latter hypothesis. Considering that at the root of the manifold and difficult problems here involved, there is the relatively simple one of single or multiple centres of each species in a biographical sense, I take leave to ask the following question, hoping for an answer from among your readers versed in these matters.

To me it seems impossible to maintain the single centres of species in a strict and definite sense without also maintaining the single progenitor of each species, which latter view, formerly considered as a necessary assumption, has been given up by Mr. Darwin in Chapter IV. of the later editions of the "Origin of Species" (5th ed. p. 103, 104). Of course the acceptance of single centres, in the sense of more or less restricted areas of origination, may remain valid for the vast majority of species—but this is very different from considering it, once for all, as "a necessary consequence of the adoption of Darwinian views," as has been formerly said by Mr. Bentham (NATURE, vol. ii. p. 112).

Now, I have sometimes thought that there might be a test for the possibility of multiple centres, which, eventually, would amount almost to an experimental demonstration—namely: *whether there are cases of the same species of blind animals occurring in different caves distant from and without subterranean communication with each other?* Should such cases occur it would be most improbable that the animals in question had been transported from one cave to the other in the modified state, and most probable that they had been independently evolved in each cave from identical species which entered it from without. I formerly noted one instance perhaps in point, viz. a statement of Prof. Cope's (NATURE, vol. vii. p. 11) that "the blind fish of the Wyandotte Cave is the same as that of the Mammoth, the *Amblyopsis spelaeus*, Dekay," but I am not aware whether subterranean communication is, or has been, impossible in this instance. Perhaps more decisive cases have become known of late?

Freilburg im Breisgau, March 4

D. WETTERHAN

Prehistoric Europe

WILL you kindly allow me to correct a clerical error in my letter which appeared in NATURE, vol. xxiii. p. 433. For "hash-up" of the species," read "hash-up" of species." A number of the species from the Upper or Interglacial Bone-bed of Mont Perrier (and some of which are mentioned in my letter) are of course too characteristically Pleistocene to be claimed by Prof. Dawkins as Pliocene forms, and do not therefore appear in his list of Upper Pliocene species to which I referred.

Perth, March 14

JAMES GEIKIE

Measuring the Height of Clouds

IN NATURE, vol. xxiii. p. 244, Mr. Edwin Clark gives a method whereby the height or distance of clouds may be measured. This end has already been attained by me, several years ago, and I believe with adequate success. I have also worked out the method in detail, so that its practical realisation no longer offers any difficulty. It is very simple and easy, and the apparatus ("nephoscope") is not difficult to make. A full description of the nephoscope will be found in the *Zeitschrift der Oesterreich. Ges. für Meteorologie*, edited by Jelinek and Hann, vol. ii. p. 337, in so far as the instrument serves for measuring the direction and velocity of the passage of clouds. In order also to ascertain the absolute height of clouds (N.B. all without calcula-

tion) I have introduced an improvement. This and a guide to practical use I have published in the same *Zeitschrift* (vol. ix. September, 1874, pp. 257-61). I believe Mr. Edwin Clark will find in the article referred to his idea fully worked out.

C. BRAUN,

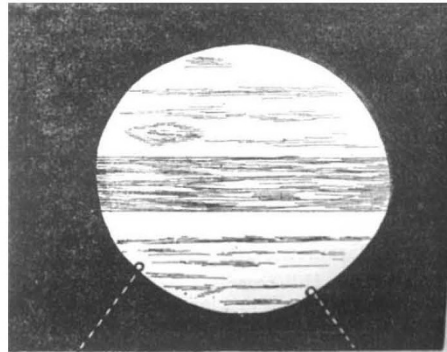
Kalocsa, Hungary, March 3 Director of the Observatory

Occultation of 73 Piscium

I OBSERVED here this evening the occultation of 73 Piscium by Jupiter, which was predicted in your "Astronomical Column" under the date December 23, 1880 (NATURE, vol. xxiii. p. 183). At 1h. 52m. 30s. G.M.T. the star was hanging on the limb of the planet, and by 1h. 54m. it had entirely disappeared.

The phenomenon strongly resembled the occultation of a satellite, except that the disappearance was more rapid. But it was not instantaneous as I had expected. The planet and star appeared to cohere for about one and a half minute. The contrast in their colours was very marked, Jupiter appearing of a yellowish tinge, while the star shone out white like a diamond. During the occultation the red spot was on the planet's disk, and its following end was in about the same meridian as the point of the star's occultation.

I had no micrometer, but I inclose a diagram showing the estimated points of occultation and reappearance.



Point of disappearance

Point of reappearance

The G.M.T. of reappearance was 2h. 44m., when the star was again observed to hang on to the planet's limb.

The telescope used was a 4½ inch refractor by Cooke equatorially mounted, with a power of 96.

The planet was well placed for observation, being nearly in the zenith.

Before and after the occultation Jupiter appeared as if with five moons, the star being almost indistinguishable from the satellites.

As the occultation could not be observed in Europe these few notes may possibly prove of some interest.

A diagonal (prism) eyepiece was used in making the sketch.

Meean Meer, Lahore, February 3

H. COLLETT

Colours of British Butterflies

MOST of the protectively coloured British butterflies pair either on the ground as the "Blues," or on low herbage as the majority, or on the leaves of trees, as some of the "Hair-streaks," and with closed wings. The wings of both sexes are usually opened as widely as possible immediately before copulation.

I have been struck by the fact, which I may mention in reference to the remark of Mr. J. Innes Rogers (NATURE, vol. xxiii. p. 435), that I have never seen the "peacock" attacked by any British bird, and I have often watched him flaunting his colours in the presence of shrike, flycatchers, and other—one would imagine dangerous—company.

W. CLEMENT LEY

Ashby Parva, Lutterworth, March 11

Lecture Representation of the Aurora Borealis

I HAVE recently employed a simple device for giving to an audience a vivid idea of an aurora, and that has been to paint a