

Glaciers have, however, without doubt caused lakes in cases where they have dammed up the mouth of glens with detrital matter. The enormous masses of such matter which dam up the waters of the northern Italian lakes are most impressive. But it does not follow that the glaciers which left those great masses also scooped out the deep bed and rocky walls of the Lake of Como.

My own belief is that the great recency of large earth movements is one of the facts of geological science which has yet to be accepted; and that the slowness with which it has made progress, or has even been overborne, is entirely due to very natural preconceptions and general assumptions about the stability of the earth surfaces, such as those which find expression in Mr. Wallace's very interesting and significant paper.

ARGYLL.

Inveraray, Argyllshire, March 11.

P. S.—Recent calculations in America seem to bring down the possible date of the close of the glacial epoch there to little more than 10,000 years.

The Cause of the Sexual Differences of Colour in *Eclectus*.

MR. F. E. BEDDARD says in his suggestive work on "Animal Coloration" (1892, p. 3):—

"Sometimes differently coloured animals have in reality the same skin pigments. The attention of the reader will be directed in a later chapter to the remarkable difference in colour between the males and females of certain parrots. In *Eclectus polychlorus* this sexual dimorphism is extremely marked. It would be an exceedingly anomalous fact if the same species of bird were to possess different pigments in the two sexes; and as a matter of fact it is not so in this parrot, different in colour though the two sexes are. The same pigments are present, but the structure of the feathers is different, and thus the resulting colour as seen by the eye is different."

The last sentence (the italics are mine) is not consistent with late Dr. Krukenberg's investigations on the colours of feathers. The case is not one of structural difference in the feathers, for the differences in colour between male and female of *Eclectus* are occasioned by the presence or absence of the pigment itself. The green colour of the male results from a yellow pigment (*psittacofulvin*) lying over a blackish brown one (*fuscine*), but the blue colour of the female (*E. timnei*, auct.) simply results from the absence of the yellow pigment. The dark pigment (*fuscine*) is present and the incident rays of light are reflected from it, passing through a zone without pigment, which zone absorbs the rays of the red extremity of the spectrum. Here the same conditions occur which effect the blue colour of the sky. The blue is an optical colour, as is the green, but a different structure of the feathers does not come into question. The red colour both in male and female is effected by a red pigment, which is the same in both sexes, the differences in shade (as also the violet in *E. grandis*, e.g.) depend on the quantity of this colouring substance and in the absence or presence in different quantities of the underlying *fuscine*. The pigment of the yellow feathers in the female of *E. grandis* is the same as the yellow pigment in the green males. Dr. Krukenberg supposes that these different pigments are derived from one and the same ground substance, a supposition which appears to be very plausible.

Why the yellow pigment of the male is not developed in the blue parts of the female we do not know, nor why the different pigments in *Eclectus* are disposed just as they are, since we are in general quite ignorant about the causes of the disposition of colours in bird feathers; but in the case under discussion a "different structure" of the feathers would not give as sufficient an explanation of the facts as does the above. Touching the *causa movens* of the different colours in the sexes of *Eclectus*, we can only say that it is sexuality, but this, of course, is no mechanical explanation, i.e. no true explanation at all. We can only say that in most birds the male offers an *overplus* of colour as compared with the female, which *overplus* no doubt has a relation to the more vigorous biological processes or superabundant vitality in the male during certain periods, and this also holds good in *Eclectus*, as we see that the female wants the yellow pigment which the male possesses. But we must bear in mind that in *Eclectus* the young ones from the egg display already these sexual differences of colour, a fact which is as remarkable as it is rare.

NO. 1221, VOL. 47]

For reference see C. Fr. W. Krukenberg, "Die Farbstoffe der Federn," four papers in *Vergl. phys. Studien*, 1881 sq., and my papers, *Mitth. orn. Ver. Vienna*, 1881, p. 83, and *Sitz. ber. Akad. Wiss. Berlin*, 1882, p. 517 sq.

Dresden, March 8.

A. B. MEYER.

Blind Animals in Caves.

MR. CUNNINGHAM's notion as to what constitutes "a fact" would appear from his letter published in your issue of March 9 to be peculiar. It is of course only through inadvertence that he declares a mere supposition to be a fact, and states that I have "overlooked" it. His words are "he (Prof. Lankester) has overlooked the fact that blind cave-animals are born or hatched at the present day with well developed eyes." Further on he proceeds to state that no such fact is known or recorded, but that he is "quite confident" that the young of blind cave-animals have well developed eyes.

I am quite aware that an important test of the truth of my theory of the origin of blind cave-animals would be found in the details of their embryonic development, but cannot think that Mr. Cunningham is justified either in his confidence as to the result of a hitherto unattempted embryological research or in asserting what is at variance with his own subsequent avowal, viz. that there are facts ascertained as to the condition in which blind cave-animals are born, which I have ignored.

E. RAY LANKESTER.

Lunar "Volcanoes" and Lava Lakes.

I HAVE waited some time to see what replies might be made to Mr. J. B. Hannay's suggestion, that lunar walled plains may have been due to tides in the molten nucleus during crust formation (*NATURE*, vol. xlvii. p. 7).

There seem to be at least two objections to the "volcanic" theory of lunar surfacing. First, that there must have been during the earlier, and indeed later, stages of it a vast gaseous and vaporous envelope, which, as secular temperature slowly declined, would be condensed to form seas, giving rise to a long era of erosion, and extensive denudation, and formation of sedimentary strata, as on our earth. There are no traces of this on our moon, the surfacing of which is conspicuously destitute of evidences of drainage phenomena. Secondly, there is an entire absence of distinct local colour in the detail, which should be easily seen in volcanic deposits unencumbered by vegetation and weathering.

I leave it to geologists and physicists to say if they think it at all likely or possible for any globe like our moon to pass from the semi-incandescent, lava-crust stage, with huge vaporous envelope, to the cold, airless, and waterless condition of our satellite without passing through a very prolonged era of erosion, which, as in our case, would obliterate all traces of the former era.

Judging by our vast series of stratified rocks, we are led to conclude that an exceedingly long temperate era of erosion must, in the very nature of things, supervene on the heated lava stage in all planetary development, quite obliterating the relics of the volcanic era and relaying a sedimentary surfacing.

Taking up the second objection, *in re* the marked absence of colour, I would point out the abnormal brightness, or even brilliancy, of the lunar cliffs and steep inclines all over the surface. It is precisely at such places that astronomers expect to see the nature of the surface and degradation due to the effect of gravitation, i.e. where (exposed to unmitigated solar heat in the day, and a cold probably below - 100° C. at night) the cliff-falls would be most frequent, and the true colour of the strata most visible.

Proctor in his "Moon" (pp. 301-2) says:—"In each lunation the moon's surface undergoes changes of temperature which should suffice to disintegrate large portions of her surface, and, with time, to crumble her loftiest mountains into shapeless heaps. In the long lunar night of fourteen days a cold far exceeding the intensest ever produced in terrestrial experiments must exist over the whole unilluminated hemisphere."

Neison, on page 113 of his "Moon," also says:—"That physical changes of various characters must be still occurring upon the moon is rendered certain by . . . the alternate heating and cooling of the lunar strata; from the nature of the expansion and contraction thus brought into play must, through numerous fractures of the resulting general disintegration, gradually ruin all the lunar formations." Thus "considerable changes must