

in the backwaters and marginal pools of the lower reaches of larger rivers; we are not only entitled, but we are bound to consider this to have been the case in Greenland, and to base our estimate of its climate in the lower tertiaries upon this view and no other. Now what geologists and physicists ought to do, and what they resolutely won't do, is before going farther afield for cause and effect, to take the map of the world on Mercator's projection, and consider how far, if the Atlantic were a closed ocean to the north, as we know it must have been, the required climatic conditions would be produced. The difference between the arbutus nooks of Ireland on the one side and the desolation of Labrador on the other is brought about solely by ocean currents. At the period of the Greenland floras the arctic currents were excluded, and consequently the whole Atlantic basin was filled with the circulation of equatorial and temperate waters only. The distribution of plants and animals renders it extremely probable that during much of the tertiary period, the antarctic waters were equally excluded from the Atlantic by land connecting Africa and South America. What, under these circumstances, would happen to the climate of the Atlantic littoral? It would, it appears to me, be more philosophical to dispose of this question, which is supported by a weight of evidence, before invoking shifting of the earth's axis, or other hypothetical causes supported by none.

J. STARKIE GARDNER.

London, February 13.

An Optical Phenomenon.

IN NATURE, vol. xviii. p. 303, you mention that "a beautiful optical phenomenon, which has not yet been satisfactorily explained, is described by M. F. Folie in the *Bulletin* of the Belgian Academy." From what follows, it is evidently the same as that described in Tyndall's "Glaciers of the Alps" (Murray, 1860), p. 177 *et seq.* Tyndall gives a description of it in a letter from Prof. Necker to Sir David Brewster, from which I quote the following:—"You must conceive the observer placed at the foot of a hill between him and the place where the sun is rising, and thus entirely in the shade; the upper margin of the mountain is covered with woods, or detached trees and shrubs, which are projected as dark objects on a very bright and clear sky, except at the very place where the sun is just going to rise; for there all the trees and shrubs bordering the margin are of a pure and brilliant white, appearing extremely bright and luminous, although projected on a most brilliant and luminous sky. You would fancy you saw these trees made of the purest silver."

Prof. Necker says that he saw it at the Saleve, which is not so high above the Lake of Geneva as some of our British mountains above the sea, and has no permanent snow near it; so that M. Folie's suggestion, that it is due to light reflected from snow, must be wrong. I have seen it from the König-See, near which I believe there is no permanent snow.

This appearance is always to be seen under the circumstances described, when the sky is clear and bright enough. I had read of it in Tyndall's book, and when in the Alps I sought for and found it. I have often seen a distant approach to it produced by furze bushes, quite near, seen against sunlight, and by leaves against moonlight.

JOSEPH JOHN MURPHY.

P.S.—Ruskin somewhere describes this phenomenon.

Belfast, February 6.

Foraminifer or Sponge?

A PAPER by A. Goës "On a peculiar type of Arenaceous Foraminifer from the American tropical Pacific, *Neusina Agassizi*," has just been published in the "Bulletin of the Museum of Comp. Zoology, at Harvard College," vol. xxiii. No. 5, in which the author describes some remarkable forms dredged by the *Albatross* expedition in the Pacific of Central America. They are supposed to be foraminifera, are of leaf-like shape, measure up to 190 mm. in breadth, and are marked by concentric lines of growth. Their interior shows a stroma, consisting of fine chitinous threads, enclosing sand and *debris* of shells. Without wishing to recapitulate all the various points of structure, I will only say that there can be no doubt that these forms belong to Hæckel's deep sea *keratosa* (see *Challenger* report, vol. xxxii.) from the tropical Pacific, and I should think that *Neusina Agassizi* is identical with *Stannophyllum zonarium*, Hæckel. I happen to have here a *Challenger* specimen of this latter species, kindly lent to me by the Manchester Museum, and its microscopic examination convinces me of the identity of the two forms.

University College, Liverpool.

R. HANTSCH.

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Unusual Origin of Arteries in the Rabbit.

TOWARDS the close of last month Prof. W. N. Parker reported in your columns an abnormality in the veins of the rabbit, and although the same interest does not attach to it, it may be worth while recording an unusual arrangement of the vessels arising from the aortic arch. In the case which has just come under my notice, the two carotids arise together from the arch, at the point usually occupied by the innominate artery, while the right subclavian artery arises beside the left subclavian, which occupies the usual position.

PHILIP J. WHITE.

University College of North Wales, February 7.

Holmes's Comet.

ON February 11, 10h. to 10h. 35m., I re-observed this object with powers of 40 and 60 on my newly-silvered 10-inch reflector. The comet was in the same field as β Trianguli and south preceding that star. I found it fairly conspicuous. The nucleus, or brighter portion of the head, presented a distinctly granulated appearance. Applying a power of 145, single lens, I saw that it really consisted of a number of very small knots of nebulosity, so closely approximating the stellar form that they might readily have been mistaken for one of the very faint, barely resolvable clusters in which the components are only to be caught by glimpses. The multiple nucleus was involved and surrounded with feeble nebulosity, and a faint tapering tail flowed from it in a N.E. direction. I believe that outlying this there was an excessively faint fan-shaped tail, but could not be absolutely certain.

The sky was not good, being lighter than usual, with suffused mist. On February 12, at 10h. 15m., I picked up the comet again, but details were invisible, owing to the veil of thin cloud overspreading the N.W. sky at the time.

Bristol, February 13.

W. F. DENNING.

HELMHOLTZ ON HERING'S THEORY OF COLOUR.

THE following translation of the critical account given by von Helmholtz of the colour-theory of E. Hering, in the new edition of his *Handbuch der Physiologischen Optik*, commencing at page 376, has been made by Prof. Everett for NATURE. The translator aims at clearness rather than literal rendering, and three obvious misprints in the paragraph on the transformation of coordinates have been corrected. "Lambert's colour-pyramid" is another name for the "cone of colour" described in Maxwell's papers and in § 1074 of Everett's "Deschanel."

This much-talked-of theory is a modification of Young's theory, which, by the choice of other fundamental sensations, endeavours to give better explanations of what it regards as immediate facts of internal observation. It assumes three elementary sensations, related to three different parts of the nerve-apparatus or "visual substance." Two at least of these physiological processes exhibit the opposition of positive and negative. One of the three "visual substances" gives in the condition of excitement the sensation of white, and in the condition of rest the sensation of black. The second gives the two sensations of blue and yellow, which are accordingly designated "opposed colour-sensations." The third gives the other pair of "opposed colour-sensations," red and green. But by "red" is denoted not the colour usually so called, but the complementary of green, which is purple.

It is possible to specify "elementary sensations" (in the sense in which we have previously defined the term) which would correspond to Hering's elementary sensations, and would be capable of giving by their combination all other colour-sensations. If we take three rectangular axes of coordinates, x, y, z , as the edges of Lambert's colour-pyramid, x corresponding to red, y to green, and