

most generally accepted theories in geology," is it possible to avoid a smile at the very sanguine temperaments with which the promoters of this theory would appear to be so happily endowed?

I have, however, to thank Prof. Green for so fairly raising what is the real point at issue in this controversy—that of the relation between the effects of subterranean and subaerial forces. He tells us that he and his friends are prepared to admit that *before* denuding agents can carve out hill and valley, the subterranean forces must have brought the rock-masses within their reach; he is moreover convinced that the *original* lines of drainage must have been determined by the action of the same forces; and, still further, that, though the details of the contours of mountains are due to meteoric agencies, their superior elevation is the result of the concentration of subterranean energy beneath them.

So far well! But will my friend permit me to invite him to accompany me just one step farther in the same direction. Is it not certain that *not only before the commencement* of the slow process of sculpturing by meteoric agencies (in which we are both such firm believers), but actually *while those forces are in operation*, subterranean actions, attended by more or less local surface movements, were going on *side by side* with, and modifying the effects of, the subaerial forces? Does he shrink from this admission? If so, why? Has he any grounds for the belief that all the subterranean action took place at one period, and all the subaerial at another? Such an admission as I ask him to make would never have alarmed either Lyell or Scrope, who fought a good fight for the Huttonian doctrines before almost any of us the younger champions of the theory were born! Is there anything in it inconsistent with the teachings of Hutton and Playfair themselves?

Have not our perceptions become just a little numbed through our dwelling too long in the region of glaciers? Geology has had its day of universal deluges; it is now passing through its "*great ice age*." We are persuaded, however, that as it has survived the former, it will emerge safely from the latter; and even now we begin to see the signs of the setting in of more temperate mental conditions. I cannot help venturing to hope (for may not I too be *sanguine*, for once?) that at no very distant date I may have the pleasure of wandering with my four opponents of to-day among Alpine or Scottish lakes, all joining in a hearty laugh at the strange theory that was once maintained concerning their origin.

JOHN W. JUDD.

GLACIAL EROSION.

SIR.—In Mr. Judd's very interesting paper on Lake Balaton, there is, besides a vindication of the claims of subterranean forces to be the true originators of lakes lying in rock-basins, an attempt to show that glacial erosion can never be regarded as a *vera causa* in any case in the formation of lakes.

I am afraid that the eminent geologists who write on behalf of glacial erosion, as one of the causes producing lakes, in the current

number of the *GEOL. MAG.*, will not succeed in converting Mr. Judd to their views, as they have omitted to notice one point, if not *the* point, which prevents him from giving any recognition to that agency.

On p. 15 he states that only by those who ignore altogether the action of subterranean forces "the necessity is felt of assuming that *rivers of ice* possess a power, which is on all hands admitted does not belong to *rivers of water* (the italics are Mr. Judd's)—that of excavating great basin-shaped depressions in their course." But, surely, rivers of water do often scoop out basin-shaped depressions. As a good example may be mentioned the Atbara, so well described by Sir Samuel Baker in "The Nile Tributaries of Abyssinia," which, except in the rainy season, is simply a dry bed, with here and there, in its course, pools of considerable size abounding in fish, crocodiles, and hippopotami. So that we have only to suppose a river of ice endowed with similar excavating power, and its capability of producing lakes in its course, and the probability that it will do so, are evident.

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WIGTON, CUMBERLAND,
March 10th, 1876.

H.M. Geol. Survey Eng. and Wales.

NOTE ON AN ANNELID BED IN THE GAULT OF KENT.

SIR.—I have been much interested in reading the note on the above subject by Prof. Rupert Jones in the March Number of the *GEOLOGICAL MAGAZINE*. I take this opportunity of stating that I am well acquainted with the narrow hard band he mentions, as occurring in the Lower Gault of Folkestone, which is probably similar, if not identical, with that found at Westwell Leacon, near Charing.

Although I did not actually note the occurrence of this hard band as bored by Annelids, still, if my paper on the Gault of Folkestone (*Quart. Journ. Geol. Soc.*, 1874, vol. xxx. p. 347) be referred to, it will there be seen that in describing Bed III. I have mentioned the occurrence of tabular masses of ironstone, as being met with in this bed, being of the same light fawn colour as the clay. It might almost be said to be red externally, especially when slightly weathered. Upon breaking open a fragment of this hard seam, it was seen to be completely riddled with Annelid borings, which were filled up with blue clay. Finding that these masses were far heavier than the clay from any of the beds, I asked Mr. Hudleston to give me an analysis of it—the result being, it was found to contain as much as 30-40 of metallic iron.

Large tabular slabs of this seam may be found lying on the beach in Eastwear Bay, being washed out of Bed III. I have a fragment in my cabinet which is one inch in thickness, but I do not think the seam is ever found thicker than $1\frac{1}{2}$ inches at Folkestone. Yet, as Prof. Rupert Jones has met with this seam near Charing, about two inches in thickness, it is an additional evidence of the Gault thickening out gradually towards the north-west, as at Burham the Gault has a total thickness of about 200 feet.

With regard to the Foraminifera, I am aware that they are plentiful in the Gault, particularly in the lower beds; but as I had never