represented by a point in the directions-image. A circular plate is ruled with concentric circles at distances from the centre equal to $r \tan \theta$, where θ stands for different angles at intervals of 5° up to the full aperture of the objective and r as a constant length, say 50 mm., and with radiating lines 5° apart; it may be placed on supports which fix its position above the stage. When the microscope is adjusted for observations of the directions-image of a mineral, the point, the angular position of which is to be determined, is identified by the end of an adjustable pointer, which is placed so as to be seen in focus. The microscope is then focussed up until the objective is accurately at a distance r from the plate, which is now placed in position and is clearly seen. The angular position required is then shown by the position of the end of the pointer relatively to the scale of the plate.—L. J. Spencer: A new (seventh) List of Mineral Names.

CORRESPONDENCE.

ON GLACIER LAKE CHANNELS.

SIR,—As I have stated my case at some length in regard to the 'overflow channel' valleys, and as Professor Kendall and Mr. B. Smith in their courteous criticisms restrict themselves mainly to points of detail, most of which had been noted in my pamphlet, while omitting to discuss the fundamental difficulties to which I called special attention, I must not weary your readers with more than a few words. Each of them, I may remark, has confined himself, perhaps wisely, to the district which he has made his own. Hence they have not dealt with the Ringstead Down 'railway trench' (which is perfect from its head to its end, besides having a lateral tributary of more normal form), or with the ancient and more modified trenches near Hawes Junction and in the Dufton Pike district, or with those in the Cleveland and Black Combe districts, which are occasionally perfect or are suggestive of decapitation. Nor have they met my objection that the shape of the trenches is not such as should be the result of an overflow from an ice-dammed lake (see my pamphlet, pp. 7 and 8), for what Professor Kendall does say on this subject seems to me hardly to meet my objection. He and Mr. B. Smith lay much stress on the fact that spurs are severed by channels transverse to the valleys by which those spurs are defined, no doubt a thing not easily explained, but they apparently forget that similar and similarly situated trench valleys occur in the Dufton Pike district and in that to the south of Cader Idris, where the lake overflow hypothesis seems to me an impossible explanation. Nor, so far as I can see, does the "marginal drainage of an ice-sheet" really help us. Of course that would erode, but so far as my experience goes (and it is a fairly large one) it would find the cutting of a flat-bottomed trench very difficult and that of an 'in-and-out' impossible. Much of what Von Engeln says of marginal drainage is familiar to me, and the channels cut by it are not 'railway trenches' but nearer to gorges. Also, Mr. B. Smith forgets to mention that the granite

in which channels were quickly cut was "very much shattered by close jointing". It is no doubt a little remarkable that, supposing these trench valleys to be, geologically speaking, rather ancient, their sides are not more furrowed; but water-worn valleys in the Bunter pebble-beds, the Neocomian Sands, and the Chalk downs of Southern England often have their sides unfurrowed, and cliffs of limestone, on a comparatively small scale in England and on a gigantic one in the Alps, are frequently smooth for considerable distances, showing that atmospheric denudation has about kept pace with that from streamlets. The same sometimes holds good with sandstone and granite.

Finally, they forget that the invasion of the larger part of England by great ice-sheets is just as much an hypothesis as that of submergence, and cannot be regarded as an axiom until the difficulties to which I have repeatedly referred have been fairly met (instead of being ignored) and removed. I may add that I cannot accept as moraines (with which I ought to be familiar) several of those to which some geologists give that name. But my pamphlet will fulfil its purpose if it leads to a more careful study of the whole question, instead of such reasoning as this: "Here is a peculiar valley: how can we associate it with terrestrial ice-sheets?" To me the safer method seems this: "Here are certain physical facts: what inference do they suggest?" I do my best to keep "my mind from being set awhirl" when it arrives at a conclusion which is contrary either to a popular opinion or to what I was taught in my younger days.

T. G. Bonney.

A METHOD OF HARDENING FRIABLE FOSSIL WOOD FOR SECTION-CUTTING.

Sir,—While collecting from the Lower Gault in the neighbourhood of Farnham, Surrey, I often found fragments of what was evidently driftwood lying amongst the shells. It was extremely friable; in fact, when dry, it was, as a rule, impossible to touch it or even blow upon it without causing it to fall away in powder; and to obtain a section from such material seemed well-nigh impossible.

When treated in the usual way with silica solution the wood did not appear to be permeated, but merely to be—in the mechanic's term —'case-hardened,' that is, to have formed on the surface a very thin crust of hardened substance, rendering the specimen useless for section-cutting.

It occurred to me, however, that a better result might be obtained by *forcing* the silica solution into the wood, on the same principle as that by which railway-sleepers are impregnated with creosote under pressure. An ordinary model steam-engine boiler was, accordingly, adapted for the purpose. First the filling hole was enlarged enough to admit a piece of the wood, and a certain fitting, stocked by all model makers, added. This consists of an ordinary bicycle tyre valve threaded on the outside to screw into the boiler. This attached, sufficient silica solution (undiluted) was poured in to cover the wood, the filler-cap screwed on, and the boiler pumped up with an ordinary cycle-pump. The pressure was raised to 30 lb. per square inch,