CORRESPONDENCE

KNICK POINTS AND PROFILES

Sir,—In his most valuable account of Wealden geography, Professor Allen uses the objectionable term nick points (*Geol. Mag.*, xci, 500). At none of these points is there any nick or nitch or notch, such as an undercut waterfall; only a flaw in the curve, like the broken back of a beast.

The term originated in the German *Knickpunkt*. It is true that knick does not appear in modern English dictionaries, though it lingers disguised in the knacker's yard. But that is surely no reason why a word with a totally different meaning should be used instead, merely because it has the same sound. It is as though an innkeeper should say he had no beer but there was a perfectly good bier available.

Another point—why do some geographers talk of the long profile and the cross profile of a valley? In common language a profile is a side view. At the Royal Academy we may see portraits in profile, half profile, or full face, smiling, smug perhaps, but never cross. What is wrong with profile and cross-section in the case of a valley?

G. M. Davies.

63 Beechwood Road,
Sanderstead, Surrey.

13th December, 1954.

HORIZONTAL STRESS AND TRANSCURRENT FAULTS

Sir,—In reply to H. W. Wellman's letter (*Geol. Mag.*, xci, 1954, 407–8) on the angles between principal horizontal stresses and transcurrent faults, I would like to make the following comments.

The writer refers in the first place to Leedal and Walker's investigation, and map (p. 118) of the Lough Belshade and Barnes Lough Faults in Northern Ireland. He says that, in virtue of a principle which I have advocated, " and without confirmatory evidence," Leedal and Walker have concluded that the two faults must be of different ages. On pp. 119 and 120 of their paper the two authors do, however, give some confirmatory evidence, although they do not claim that it is conclusive.

The writer next cites the work of J. B. Auden in Gujarat (India), and the map presented by him on p. 94 of the same volume. Auden, however, in referring to the supposed transcurrent faults involved, says that " in Gujarat the fracturing is mainly vertical ", and this leaves one very much in doubt whether he may not be dealing with two non-contemporaneous systems of normal faulting.

There is further reference to " two suitable pairs of active transcurrent faults " in New Zealand, investigated by the writer himself. In the map which accompanies the cited paper it is easy to trace the " Alpine Fault ", and identify the " Moonlight Fault ", but no indication appears to be given, either in the map or the list of dislocations, with regard to the other pair. Unless Mr. Wellman has published elsewhere, the information available appears to be far too fragmentary for the formation of any conclusions.

The last case cited is that of the San Andreas Fault, along with the supposed complementary Big Pine and Garlock Faults. These intersect at an angle much greater than 90°, as may be gathered from the writer's statements. Both the San Andreas Fault, with its parallels, and the other two mentioned are active at present: I have long known and been puzzled about this discrepancy, but perhaps the explanation is as follows:—

As is well known, when there are three principal stresses in any medium, of different magnitudes, any fracture which may result must be parallel, or nearly so, to the one which is intermediate in value. The inclination of the

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fracture to the other two is, however, less determinate. Experiment, as well as field observation show, nevertheless, that it seldom exceeds 45°, and is usually a good deal smaller than this figure. I have named this result the Navier principle.

The principle applies, however, only to the initiation of a fault-line. When stresses are changing, earthquake motion may continue along a fault earlier than that which would be produced *de novo* by the forces actually in existence, so long as a certain amount of relief to the contemporaneous stress is produced in each case.

Two very convincing examples of the principle occur in Great Britain. The first, which is evident, for instance, in the Central Coalfield of Scotland, consists in the inclination of the east–west faults, which are all of the same age, and which I have named Borcovician. These form two series, dipping respectively north and south, at angles not far from 22½°, or a quarter of a right angle, from the vertical. The angle between the sets is thus roughly 45°, and there are dozens, if not scores, in each series.

The second example consists in the dextral and sinistral faults, connected with the nearly north–south Armorican pressure, in Pembrokeshire (*The Dynamics of Faulting*, fig. 19). The angle between the series is, in this case, more nearly 50°.

On the whole I think that the Navier principle will survive a few even harder " knocks " than those which Mr. Wellman has given it. In conclusion I must point out that *The Dynamics of Faulting* was not, as in Mr. Wellman's reference, written by Professor J. G. C. Anderson—whose actual work I greatly admire—but by the present writer.

E. M. ANDERSON.

62 GREENBANK CRESCENT, EDINBURGH.

XENOLITHIC MONCHIQUITE

SIR,—I have read with interest the paper by Messrs. Walker and Ross on a xenolithic monchiquite dyke near Glenfinnan, published in your last issue (*Geol. Mag.*, xci, 1954, pp. 463–472). Optical data for minerals of the dyke rock and of its xenoliths are more detailed than any previously published in relation to similar Scottish minor intrusions, and constitute a welcome addition to our knowledge of such rocks.

The authors account of similar minor intrusions already known in Scotland, and of published opinion regarding the genesis of such intrusions and of their xenoliths is, however, incomplete. Scottish volcanic vents known to contain blocks of carbonated peridotite are also more numerous than the authors indicate.

A number of comparable monchiquitic minor intrusions and volcanic necks have been mapped by the Geological Survey in Ayrshire, and are briefly described in a memoir (" The Geology of Central Ayrshire," *Mem. Geol. Surv.*, 1949). The occurrences are as follows: (1) a monchiquite intrusion (probably a small plug) in the River Doon contains xenoliths of altered peridotite. This monchiquite is cut by a N.W. Tertiary tholeiite dyke (op. cit., p. 106); (2) the basal portion of a 4 ft. monchiquite sill in Meikleholm Glen is crowded with fragments of coarsely crystalline carbonated olivine-pyroxene rock and of pyroxene-hornblende rock. The position of the fragments is ascribed to gravitational settling (op. cit., p. 116); (3) an obscured intrusion of monchiquite (apparently a narrow dyke) near Carskeoch Farm is crowded with fragments of carbonated peridotite (up to about one inch across) composed of altered olivine associated with some pyroxene and brown spinel (op. cit., p. 118); (4) near the head of Meikleholm Glen, a dyke of ocellar monchiquite locally passes into agglomerate that contains " nodules " of altered peridotite (op. cit., p. 119); (5) three Central Ayrshire Permian volcanic vents (Patna Hill; Carnochan; Kirklafinn)

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