

## CORRESPONDENCE.

## THE COAL MEASURES OF SCOTLAND.

SIR,—I should like to be allowed to draw attention to one of the conclusions reached by Dr. John Weir and Mr. Duncan Leitch in their most valuable paper on the non-marine Lamellibranchs of the Coal Measures of Scotland (*Trans. Roy. Soc. Edin.*, lviii, 1936, 697-752). They point out that the evidence which they have collected indicates that the strata which there lie between the Mill (Auchingane) Coal of the Central Coalfield and the base of the Coal Measures are "homotaxially equivalent to a small uppermost fraction of the Lower Coal Measures of the North of England". This confirms the view expressed by previous workers on the shells (Dix, Pringle, and Trueman, *The Naturalist*, 1930, 321-6).

This conclusion is of great importance in relation to the problem of the Lanarkian Series. As defined by Kidston this series originally included a great thickness of the Scottish Coal Measures above the Mill Coal, but in England he placed within it only the Millstone Grit and Lower Coal Measures; recently it has been suggested that the Lanarkian in Scotland should be restricted to that part of the Coal Measures which is equivalent to the Lower Coal Measures of England, that is, to the strata below the Mill Coal.

Dr. Weir and Mr. Leitch point out, however, that if this course is followed the Lanarkian is practically excluded from Lanarkshire. It would surely be undesirable to define the Lanarkian as "that part of the Coal Measures which are almost unrepresented in Lanark", but this seems to be the only basis on which the term can survive.

Is it too much to hope that with this clear evidence of its unsuitability the unfortunate term Lanarkian may now be allowed to lapse?

A. E. TRUEMAN.

25th March, 1936.

## RIVER PROFILES AND DENUDATION CHRONOLOGY.

SIR,—As a former student of Professor Baulig, I was naturally most interested to read Dr. Wooldridge's paper on the above subject published in your January number. The subject is one of extreme importance, and it was most gratifying to realize that such keen interest has been awakened in England on this matter. I should be pleased if you would allow me to make one or two suggestions with regard to points raised by Dr. Wooldridge:—

(1) With regard to the terms "profile" and "graded river". When drawn on a very small scale the profile of a main stream that has reached grade frequently appears very smooth, so much so, indeed, that attempts have been made to establish mathematical

formulae for determining such curves. Hence the supposition that a graded river shows a curve of gradually decreasing slope.

Now in the case of graded streams (i.e. ones in which the water is flowing along a continuous alluvial bed that is being neither cut into nor sensibly aggraded) it is very frequently observed that a profile drawn on a large scale is by no means a curve of gradually decreasing slope. Such a smooth curve can obtain only when the water mass increases gradually downstream, the load at the same time increasing gradually, without going beyond a certain limit, and gradually diminishing in size, i.e. in calibre. As Baulig points out, this state of affairs is but rarely realized in nature, and as a consequence profile breaks in the main stream may occur owing to the confluence of an important tributary, with slope reduction if the tributary is as laden, or less laden, than the main stream, and slope increase if the tributary is much more laden than the main stream. In other words, breaks of slope are quite to be expected in a graded stream, and may have nothing whatsoever to do with waves of retrogressive erosion.

(2) It is hazardous to attempt to determine warping or eustatic shifts from examination of rivers *ungraded* before the change took place. If down-warping took place in a, say, seaward direction, then incision would be (for graded streams) at a maximum at the seaward end, since there the increase of slope would be greatest. However, still considering streams graded before the warping, if for a part of its course the stream flows away from the coast (i.e. if it has a somewhat circuitous course) then the downwarp will decrease the slope of this part of the graded river, and the river will begin to *aggrade* its bed. Where the river flows parallel to the axis of downwarp, there will be a tendency to lateral shift in a seaward direction. It is therefore not strictly correct to say that if the whole of a stream course were tilted by differential movements, it would become simultaneously out of adjustment at all points on its course and *renewed downcutting would begin throughout*.

In conclusion, may I recall the attention of your readers to Baulig's paper, "La Notion de Profil d'Equilibre," published in the *Compte Rendu du Congrès Intern. de Géographie*, Cairo, 1925.

JOHN HANSON-LOWE.

NATIONAL RESEARCH INSTITUTE OF GEOLOGY,  
PEI-CHI-KO,  
NANKING, CHINA.  
13th February, 1936.