

writer suggested, but afterwards withdrew, "Padarnian." The fourth thought there might be confusion between "Arvonian" and "Avonian".

In June, 1930, I concluded my letter by saying that "if serious disapproval be not manifested, then I will adopt 'Arvonian'". In view of these four letters, and of the silence of everybody else, it is clear that there is no serious disapproval. I feel therefore free to adopt the term.

EDWARD GREENLY.

THE PLEISTOCENE SUCCESSION IN ENGLAND.

SIR,—In his paper on the Pleistocene Succession in the January number of the *GEOLOGICAL MAGAZINE*, Dr. K. S. Sandford has made a notable contribution towards the solution of our difficulties in the correlation of glacial and interglacial episodes with the industrial phases of Early Man.

I agree with the broad outlines of his correlation—indeed, I had independently been led to practically the same conclusions, though our approach to the problems was rather different. By reversing the "apparent" order (in his *Q.J.G.S.* paper) of the Summertown-Radley Terraces and Wolvercote Channel, by correlating the Plateau Drift with the Norwich Brickearth (containing Scandinavian erratics) and abandoning any correlation with the Cromer Forest-bed, Dr. Sandford has cleared up most of the difficulties I foresaw.

As I shall be attempting a general conspectus of the problems a little later in the year, I will only point out at this stage a slip in Dr. Sandford's summary table on p. 15, which may confuse readers, because it involves an apparent contradiction with other parts of the paper. The Brown Boulder Clay of Hunstanton finds its equivalent in Yorkshire in the Hessle Boulder Clay, and in the Thames Valley in the Ponder's End stage. The Upper Chalky Drift of East Anglia and the Coombe Rock appear to be represented in Yorkshire by the Upper Purple Boulder Clay, which it appears must be attributed to an ice-advance separate from that of the Lower Purple Boulder Clay. The view of a four-fold glaciation of Yorkshire has the support of Drs. Raistrick, Trotter and Hollingworth, to whom I offer my thanks for their trouble in furnishing me with their detailed correlations.

P. G. H. BOSWELL.

DISTURBED GLACIAL BEDS IN DENMARK.

SIR,—In a recent publication of the Geological Survey of Denmark, the famous sections of disturbed glacial beds at Lønstrup have been described and admirably illustrated by Mr. Axel Jessen. British geologists will welcome this detailed description of a classic area,

and will note with some interest that the disturbances, formerly regarded by our Danish colleagues as the result of post-glacial earth-movements, are now attributed to the work of ice. Certain references to my own investigations at Lønstrup in 1925 (published in the *Trans. Roy. Soc. Edinburgh*, lv, 1927) involve, however, mis-statements which should be corrected. That I have no wish to indulge in profitless controversy will, I think, have been evident from the fact that I refrained from replying to the attack launched upon me by Mr. Hintze in the *Medd. Dansk. Geol. Foren.* in 1928. As nearly the whole of Mr. Hintze's paper was devoted to personalities, and as he reasserted his opinion that the Moen disturbances were not of glacial origin, I was content to let the scientific world judge between us.

In the recently-published memoir, however, are statements which impugn my good faith. Mr. Jessen says of me "he has taken advantage of my readiness to help and my trust in him to hastily publish the above paper on Lønstrup Klint". I would here repeat the acknowledgements I have previously made of Mr. Jessen's kindness to me during my visit to Denmark. But instead of desiring to take advantage of him by hastily publishing my work, I would say that I took much trouble to consult my Danish colleagues. Far from objecting to the publication of my views, Dr. Madsen, as Director of the Survey, wrote in April, 1926, to say that he had read the MS. of my paper with the greatest interest, and that he had tried unsuccessfully to secure funds for its publication in Denmark, but intended to make another attempt. Again, in May, 1926, Dr. Madsen stated that he could not get the paper printed in Denmark, but that I ought to publish it in England. No objection was raised by Dr. Madsen on the grounds that I should be anticipating Danish work.

Mr. Jessen further says: "Mr. Slater seems to have been content to walk down to the beach and draw a sketch of the cliff; but as he has obviously not taken a single measurement, neither of height nor lengths nor of the dip or direction of the strata or the overthrust planes . . ." Far from this being the case, after parting with Mr. Jessen I spent a fortnight in systematically measuring the section as detailed in my paper, and plotting the section to a scale of 1 in 1,200. A comparison of Plate I of my paper with Mr. Jessen's section (1931) at once shows that I have reproduced much more measured detail than he has done.

I leave the matter there, for I am now well satisfied that the Danish Geological Survey agrees so far with me that the disturbances are of *glacial* origin, and not tectonic as they formerly thought, even although we may differ as to the exact *modus operandi*.

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