REPORT OF THE SOIL CONSERVATION COMMITTEE, SUDAN GOVERNMENT. 4to, pp. 174, with maps. McCorquodale and Co. (Sudan), Ltd., 1944.

It is one of the paradoxes of geology that the most violent type of water erosion, leading to destruction of soil, often takes place in arid regions. This is due to a combination of circumstances, one of the most important being the concentration of the rainfall into rare downpours of extreme violence. This leads to sheet erosion and gullying. But besides the climatic factor there are numerous other causes, many of them due to man's activities, also contributing to the loss of soil, such as deforestation, over-cultivation, over-grazing, fires, accidental or deliberate (grass-burning), and so on. Nearly everywhere the goat seems to come in for special blame as highly destructive to almost all kinds of vegetation. The Sudan apparently suffers from most of these troubles, and the publication under review is the Report of a Committee set up by the Government to advise on them and to suggest remedies.

As to climatic conditions, it is well known that neighbouring areas, especially Kenya and Uganda, show evidence for the occurrence since the Pliocene of alternating dry and wet periods of decreasing intensity now correlated with maxima and minima of the Glacial Period. In the Sudan, however, it seems that there has been no variation of climate for the past 4,000 years at least, except for a slightly damper period about 850 B.C. The sheet-erosion type of denudation seems to be of some importance in the Red Sea hills, but not elsewhere. In the rest of the country loss of soil is mainly due to the other controllable causes, and the Report is largely taken up by details as to these: it appears that every district has to be treated on its own merits and no general summary can be given.

CORRESPONDENCE

UPPER SILURIAN GRAPTOLITE ZONES

SIRS,—I feel it is desirable to clarify one or two further points arising from Dr. Elles' recent letter to the *Geological Magazine* on Ludlow graptolites.

(1) The prolific haul of shelly fossils which the monotonous Central Wales Ludlovian has yielded successively to Dr. Straw and myself seem to provide a basis for correlating the sequence at Builth with that in Clun Forest. The major succession of species maxima is recognizably similar in the two areas, despite the fact that the lithological variations at Builth are anything but paralleled in Clun Forest. Furthermore the graptolite sequences in the two areas have much in common. Difficulties result only when the detailed graptolite assemblages are referred to the existing zonal framework.

(2) In referring to a "spinose group of the *M. chimaera* type" I did not wish to imply any limitation of range. Doubtless it can be justifiably claimed that "strata yielding mainly spinose graptolites of the

M. chimaera type " represent the whole or parts of the zones of *M. scanicus* and *M. tumescens*. Nevertheless the delimitation of these two zones in the field is a matter of extraordinary difficulty in Central Wales, even though it is reasonably certain that the Ludlow sequence there is complete. The alternative suggestion put forward in my previous communication is essentially a simplification for field usage in that part of the country. There are, however, certain other anomalies in regard to the occurrence of several graptolites characteristic of the zones of *M. scanicus* and *M. tumescens*. At Kerry, for instance, an horizon which has yielded *M. tumescens* in abundance lies *beneath* strata which have yielded *M. colonus*, *M. uncinatus* var. *orbatus* and *M. uncinatus* var. *micropoma*, typical *nilssoni* zone species (see Dr. Elles' list of assemblages). In another instance a considerable number of fragments of *M. scanicus* were obtained in soft mudstones from one locality, which also yielded recognizable fragments of *M. crinitus*, and which lay very nearly at the same horizon as the one just mentioned yielding *M. tumescens*. It is such anomalies as these which are so puzzling in the field and so difficult to reconcile with the zonal assemblages listed by Dr. Elles.

(3) The proximal dorsal curvature of *M. clunensis* ; is this feature the result of preservation ? I have already made certain observations on this point, but perhaps the following amplification should be given.

The first specimens of *M. clunensis* came to my hand in 1935 while systematically collecting from the middle part of the Wilsonia Grits along Drefor Dingle. Closer examination in the laboratory confirmed the impression that here was a new and readily recognizable Ludlow type. Two years later, while systematically collecting from the middle part of the Wilsonia Grits in the River Lugg section, ten miles south of Drefor Dingle, another band yielding *M. clunensis* was discovered. The characteristic swing of the polypary in every specimen immediately caught the eye. Some time later Dr. Straw allowed me to run through the graptolites collected from Builth. Disregarding locality numbers I picked out two specimens which were obviously closely similar to the new type. Both specimens proved to be from the same locality, in the Pterinea Beds, a similar shelly horizon to that at which the graptolite occurs in Clun Forest. Since the discovery of *M. clunensis* in the River Lugg section other localities where it is fairly prolific have been discovered on the south side of Clun Forest. Moreover it would be possible to collect from one of the good localities just so many specimens as one had the mechanical means to unearth, *all* showing the characteristic proximal swing. Specimens may also be mounted and viewed from both sides, thereby losing none of their striking dissimilarity from *M. salweyi*.

It is less important to decide whether *M. clunensis* should be regarded as a new species, a new variety of *M. chimaera*, or a new variety of *M. chimaera* var. *salweyi*, than that its existence, characters, and horizon should be put on record. The possibility of it being a multitudinously repeated freak of preservation appears to be remote.

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