

those of Sutherlandshire and Assynt. If this were the case the nomenclature of the Geological Survey would have to be altered, and the rocks of Pistyl and Holyhead no longer termed metamorphosed Cambrian rocks, but Laurentian.

Mr. HICKS, in reply, stated that the quartziferous breccias forming the central ridge contained so many rolled pebbles, and were, moreover, in places so distinctly bedded, that there could be no doubt of their being sedimentary. Other beds, described as Greenstone in the maps of the Geological Survey, were also distinctly laminated. The non-occurrence of fossils in the more sandy beds he attributed to their having been deposited in very shallow water. The fossils occurred principally in fine-grained beds of a flaggy nature.

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2. *On the AGE of the NUBIAN SANDSTONE.* By RALPH TATE, Esq.,  
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MR. BAUERMAN, in a recent number of the *Quarterly Journal of this Society* (vol. xxv. p. 27), has discussed at some length the opinions advanced respecting the age of the sandstone strata underlying the Cretaceous limestones, and resting upon the granitic and schistose rocks, in Sinai. These rocks belong to the same series of sandstones described by Russegger as occurring in Egypt, Nubia, and Arabia Petræa, under the name of "Nubian Sandstone."

Though the facts that I have the honour to submit to the Society may be stated in a few words, yet it seems desirable to recapitulate briefly the views that have been advanced as to the period of deposition of the strata in question, the better to explain away those inferences which are so much at variance with my own.

In the first place, it appears, from the circumstance of the Nubian Sandstone being overlain conformably by approximately horizontal strata of Cretaceous age, that this formation has been regarded, in the absence of palæontological evidence to the contrary, as forming part of the Mesozoic group of rocks. Thus Russegger colours and describes it as Lower Cretaceous in his maps; and Bauerman, guided by the lithological similarity of its strata to the Lower New Red Sandstone about Chester, has placed it on the horizon of the Trias; whilst Figari Bey seems to have regarded the tripartite arrangement and lithological features of the series as sufficient tests by which to assign the whole to the Trias, "taking the limestone as representing the Muschelkalk, although the evidence for this determination (other than lithological character) is not very clear"\*.

In the second place, the fossils which have been obtained from the limestone separating the sandstone into two great masses are, for the most part, fragmentary, in bad condition, or otherwise undeterminable. Hence the palæontological evidence is of a most con-

\* Bauerman, *loc. cit.* p. 27.

tradietory nature ; indeed the generic names assigned to the fossils seem to have been given in accordance with their presumed age as determined by the lithological characters and physical conditions presented by the containing rocks, rather than as interpretations of zoological affinities.

Thus the Encrinites which occur in the Nasb-valley limestone are represented by fragments of cylindrical stems, and do not admit of generic determination. The Ammonite, the only fossil mentioned by Figari Bey, is not named specifically ; and I have reason to doubt the correctness of its identification, and suspect that it may have been either a *Nautilus* or a *Goniatite*. Mr. Etheridge and Figari Bey have referred the fossils brought under their notice to Secondary genera, *Encrinus* and *Ammonites* ; whilst Mr. Salter assigned the Encrinite stems to the Carboniferous genera *Rhodoecrinus* and *Poteriocrinus*, and adds to the list the Gasteropod genera *Murchisonia* and *Eulima* (?), which latter are Triassic as well as Carboniferous.

So that really it has hitherto been difficult to express any very decided opinion on the age of the Nubian Sandstone, owing to the great want of palæontological evidence. Conclusive evidence of the Carboniferous age of the series, however, has been recently brought to light. Captain Wilson and the Rev. F. W. Holland, of the Sinai Ordnance Survey, have placed in my hands a block of limestone from the Nasb-valley section (*vide* Bauerman, *loc. cit.* p. 26) in the hope that it would yield evidence of its age, and so of the associated sandstones.

One fossil only, in a good state of preservation, was contained in the mass ; this I at once named *Orthis Michelini*, a well-known fossil of the Carboniferous Limestone ; but that the specific determination might be indorsed by the greatest authority on the fossils of the class to which it belongs, and so acceptable as indisputable evidence, I submitted the specimen to Mr. Thomas Davidson, who obligingly writes, that the "inclosed fossil is certainly *Orthis Michelini*, as you correctly identify it." With this valuable index to the age of the limestone, the obscure forms associated therewith may be approximately assigned to the genera indicated by Mr. Salter, who thereupon referred these beds to the Carboniferous epoch.

Mr. Salter\* has moreover described a *Lepidodendron* from Sinai as a new species, under the name of *L. Mosaicum* ; and though neither the locality nor the stratigraphical position of the fossil was known to him, yet, as it is preserved in sandstone, we cannot hesitate in referring it to one or the other of the arenaceous members of the Nubian Sandstone ; and the Rev. F. W. Holland was fortunate in obtaining a portion of a Sigillarian stem from the Wady Mokatteb, which, though not collected *in situ*, bears unmistakable evidence of having been enclosed in the sandstone forming its cliffs. The sandstone in this valley is overlain by Cretaceous limestone, and is presumably referable to the Upper Sandstone of the Carboniferous series of this region.

\* Quart. Journ. Geol. Soc, vol. xxiv. p. 509.

I append a list of the organic remains from the "Nubian Sandstone" series:—

! Orthis Michelini . . . . .	Wady-Nasb Limestone.
! Streptorhynchus crenistria . . . . .	" "
! Spirifera (fragments of) . . . . .	" "
* Murchisonia . . . . .	" "
* Eulima? . . . . .	" "
* Rhodocrinus . . . . .	" "
!* Poteriocrinus . . . . .	" "
* Lepidodendron Mosaicum . . . . .	Wady-Nasb Sandstone.
! Sigillaria, sp. . . . .	" "

[The sign ! prefixed to the names of the fossils indicates that the specimens were collected by the Sinai Survey; and the sign \* indicates the determination of Mr. Salter.]

In conclusion I venture to suggest that the Adigrat Sandstone in Abyssinia, described and so named by Mr. W. T. Blanford†, is of the same age as the Nubian Sandstone. It appears to have escaped the notice of that author that the Sandstone of Adigrat is similar in character and general appearance to the Nubian Sandstone, and that it, moreover, overlies the schistose rocks in the same manner, and contains iron-ore and psilomelane, as in Sinai. Mr. Blanford surmises, however, that "both the coal-bearing beds of Chelga and the Adigrat Sandstone may belong to a portion of the great series associated with [Triassic] coal in India" (*loc. cit.* p. 175); but the Talcheer and other coals are referred by Messrs. Blanford and Theobald to a Permian age (*Mem. Geol. Surv. India*, vol. i.).

NOTE.—My attention has been called since the reading of this paper to Prof. Unger's observations on the Fossil Wood from Assuan and Um-Ombos, in the Nile valley (*Quart. Journ. Geol. Soc.* vol. xv. Misc. p. 13, 1859). The wood belongs to a coniferous tree of the Araucarian division, and is named *Dadoxylon ægyptiacum*; its habitat is assumed "to be the sandstone, which occurs extensively in Upper Egypt and Nubia, between the granite and Cretaceous beds," in which case *Dadoxylon ægyptiacum* was contemporaneous with *Lepidodendron mosaicum* and *Sigillaria*. Prof. Unger argues, from the presence of this genus, that the sandstone, "hitherto of doubtful rank in the geological series, as no organic remains have been found in it," should be ranked in the Permian, rather than in the Keuper or the Cretaceous formation; but from the palæontological evidence alone he might have argued equally in favour of its Carboniferous age.

### 3. On the DISCOVERY of the GLUTTON (*GULO LUSCUS*) in BRITAIN.

By W. BOYD DAWKINS, Esq., M.A., F.R.S., F.G.S.

THE caves in the Mountain Limestone which forms the magnificent gorge of the Elwy, near Cefn, St. Asaph, have furnished from time

† *Geology and Zool. of Abyssinia*, p. 170.