of stratification in æolian deposits can be divided into 'barkhans',[1] ripple-mark, diagonal with opposed dips, discordant parallelism with great differences in the dips, horizontal and vertical. These types occur both in sandy and dusty accumulations. One can observe in purely æolian deposits, strata due to insulation (limy, saline, or irony), to vegetation (earthy, clayey), or to wind; and these can be further subdivided. One can trace certain characteristics as one passes from the desert type of deposits to that of the edge of the desert and from that to the steppe. The loess of Turkestan is purely æolian, while that of Kiev is aquatic. Similarly, one can judge how different beds of other geological ages were formed; thus the red grits of Tartarian age were æolian, while the sands bordering the Dnieper were aquatic. It is necessary to distinguish the dusts of deserts formed from the denudation of local rocks from that formed from the denudation of the soils in depressions. In addition to ordinary winds the action of whirlwinds can often be distinguished by the spiral or circular arrangement of the dust particles. Whirlwinds, too, have a certain influence in the formation of desert depressions. Gentle breezes blowing towards ridges do not seem to have much influence in elevating dust unless the escarpment is below 30. Erosion and denudation of accumulations of dust upon low slopes seem to be localized and do not have a general influence. The dimensions of particles of desert dust transported by the wind diminish from the centre towards the margins of the desert: the dimensions of the dust of the soil, which are less mobile and less carried, diminish from the margins to the centre. The grains of sand have special characters in æolian and in aquatic deposits; in the former they are characteristically triangular. The vertical separation of accumulations of dust or sand can, up to a certain point, be attributed to the existence of vertical stratification. Similar beds due to the resistance of wind pressure may be in part the result of pressure of the upper beds on the lower beds of such deposits. The first (due to resistance to the pressure of the wind) form the surface of the accumulation, and the second (due to compression) form the interior.

III.—Brief Notices.

1. "Les Cavernes et les Rivières souterraines de la Belgique" is the title of a sumptuously illustrated work by E. van den Broeck, E. A. Martel, and E. Rahir, which has been published at Brussels in two volumes, 1910, illustrated by 26 plates and 435 text-figures. There is a total of 1857 pages, arranged in an extraordinary manner, as there are sundry interpolations independently paged in successive places in each volume, so that precise reference is rendered difficult.

The subject is dealt with in special relation to the hydrology of the Devonian and Carboniferous Limestones, and the question of potable waters.

The great purity of the Givetian Limestone in the Devonian and of the Upper Visean Limestone in the Carboniferous has facilitated the corrosive action of water and led to the production of some of the more

[1] Semicircular continental dunes.

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important caverns and subterranean watercourses. These features are to some extent naturally dependent on tectonic structure, but all points are duly discussed—the folds and fractures, the mineral composition of the limestones and dolomites, the organic remains, notably of coral and crinoid, and the various kinds of weathering. The different forms of caverns and grottoes, the stalactites and stalagmites, tufa, swallow-holes, and underground channels are fully described; and the whole subject is illustrated by pictorial views and many charming vignettes, by diagrams, plans, geological maps, and geological sections. The living fauna and flora as well as Pleistocene and later organic remains receive attention, and there are abundant references to the literature.

2. The "Cenozoic Mammal Horizons of Western North America" are dealt with by Professor H. F. Osborn (Bulletin 361, U.S. Geol. Survey), and Mr. W. D. Matthew contributes an appendix comprising faunal lists of the Tertiary mammalia of the West. Various mammalian zones are recognized, from the *Polymastodon* zone of the basal Eocene to the *Equus* zone of the Pleistocene; and Professor Osborn concludes "that North America promises to give us a nearly complete and unbroken history of the Tertiary in certain ancient regions, which are, after all, comparatively restricted".

3. A "Description of New Carnivores from the Miocene of Western Nebraska" has been contributed by Mr. O. A. Peters to the Memoirs of the Carnegie Museum, Pittsburg, vol. iv, No. 5 (undated). The forms include species of *Daphænodon*, *Borocyon*, *Cynodesmus*, and *Tephrocyon*, belonging to the Canidæ; and *Paroligobunis*, belonging to the Mustelidæ.

4. We have received the first part of a work entitled "Geologische Charakterbilder", edited by Dr. H. Stille, and comprising six beautiful illustrations, with descriptions, by E. Philippi, of "Eisberge und Inlandeis in der Antarcktis" (Berlin, 1910).

5. "Geology in relation to Civil Engineering," by Mr. Robert Boyle, Assoc. M. Inst. C.E., President of the Glasgow University Geological Society, has been published by John Smith & Co., Glasgow, price 1*s*. It is a small work of 19 quarto pages, and contains brief practical suggestions on the relation between geology and constructive works such as roads, railways, bridges, docks, etc., as well as on water-supply. As the author remarks, "Success or failure in an engineering scheme depends largely on geological conditions." General remarks are also given on geology, field-work, and the use of maps and sections; but it may be observed that it is not often that the geologist has to work out the true dip of strata by trigonometrical methods. The author devotes more space than appears necessary to igneous rocks and petrology, illustrating the subjects of road-metal, building-stone, etc., by microscopic sections. These are matters that few engineers can deal with personally, and the advice of a specialist should be sought when necessary.

6. Liverpool Geological Society.—In commemoration of the Jubilee of this Society, a small but interesting volume, *A Retrospect of*

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Fifty Years' Existence and Work, has been prepared by a former President, Mr. W. Hewitt, B.Sc. (Liverpool, C. Tinling & Co., 1910, pp. 117). The Society was founded on December 13, 1859, at a meeting held at the residence of G. H. Morton. An excellent portrait of him is given, and there are portraits also of C. Ricketts, T. Mellard Reade, and Joseph Lomas, as well as illustrations of the footprints of *Cheirotherium* and of the gypsum boulder of Great Crosby. An account of the work accomplished by the Society, a list of papers published in the Proceedings, and biographical notices of some past members are included in the volume.

7. Cotteswold Naturalists' Field Club.—The first part of vol. xvii of the Proceedings of this Club is sumptuously illustrated with twenty-one plates and a number of text-figures. Geological articles dominate. Among these is a sketch of "Some Glacial Features in Wales and probably in the Cotteswold Hills", by Mr. L. Richardson, who gives an account of the prominent glacial phenomena in the region of Snowdon, and draws attention to glacial features in the Brecon Beacons and in the amphitheatral hollows of the Cotteswolds. The Rev. H. H. Winwood records a section of the White Lias (Upper Rhætic) at Saltford, near Bath. Mr. Richardson further contributes a detailed account of "The Inferior Oolite and Contiguous Deposits of the South Cotteswolds".

8. "The Volcanic Rocks of Victoria" formed the subject of the presidential address delivered by Professor E. W. Skeats in 1909 to Section C (Geology and Mineralogy) of the Australian Association for the Advancement of Science.

9. Geological Survey of the Transvaal.—"The Geology of the Country round Zeerust and Mafeking," by Mr. A. L. Hall and Dr. W. A. Humphrey, 1910, is the title of an explanation of Sheets 5 and 6 of the Survey Map of the Transvaal. The geological formations belong to the Dolomite and Pretoria Series, with intrusive and contemporaneous igneous rocks. The structure of the region, the drainage and water-supply, the Malmani goldfield, and the lead and zinc deposits of the Marico are described.

10. A Wealden *Anodonta*.—In 1856 Beckles referred to "*Anodon*(?)" in his paper "On the Lowest Strata of the Cliffs at Hastings" (Q.J.G.S., vol. xii, 1856, pp. 291, 292), a mixture of shells some of which are obviously Unios. Mr. R. B. Newton (Proc. Malac. Soc., vol. ix, June, 1910, pt. ii, p. 114) has now gone carefully into the subject and finds that an undoubted *Anodonta* does occur in the Wealden beds along with the various Unios so often met with. He figures and describes a beautiful specimen of the fossil, which he calls *A. Becklesi*, from the Fairlight Clays of Hastings. This forms part of the Rufford Collection now in the British Museum, and seems to be the oldest known true *Anodonta* yet described.

11. Geological Survey of Egypt.—A Report on "The Building Stones of Cairo Neighbourhood and Upper Egypt", by Dr. W. F. Hume, Director, is issued as *Survey Department Paper*, No. 16, 1910. It comprises full particulars of the white and yellow nummulitic

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limestones that are quarried at Gebel Moqattam to the south-east of Cairo and elsewhere; some detailed quarry records are given on the authority of the late T. Barron, and a report on the chalky nummulitic limestones used as building stone in Upper Egypt is contributed by Mr. H. J. L. Beadnell. There are also notes on sand-lime bricks, portland cement, etc.

CORRESPONDENCE.

ORIGIN OF THE BRITISH TRIAS.

Sir,—In the October number of this Magazine Mr. A. R. Horwood has given us a summary of the conclusions he has come to as a result of his researches into the origin of the British Trias. The paper as printed, being only an abstract of a longer paper read at the British Association, has no doubt suffered much in clearness as a result of condensation. In its present form, however, it is unsatisfactory, being composed in part of facts long known and now put forward none too clearly and by no means for the first time, and in part of more or less new statements requiring substantiation. I feel, and I daresay I voice the feelings of other readers too, that I should now like to hear the evidence on which some of these last-mentioned statements are based. I do not wish for the present to be understood as criticizing the conclusions, but merely as asking for a more explicit statement of the facts. I will take the points under Mr. Horwood's own numbers.

(3) If there is a general absence of delta bedding in the Bunter [see (9)], what then is the evidence that it is a delta? Is it its dactyloid form (6), and, if so, is this capable of being demonstrated on a map?

(9) Apart from the fact that beds which should theoretically have lain at 40° now lie horizontal, is there any other evidence of tilting through an angle of 45° in any part of the Trias?

(16) I am not very clear as to the author's meaning here, but I presume it is that the signs of wind erosion are confined to one level on the syenites and other older rocks. I would now ask how many cases of this wind erosion are known and to what extent they can be demonstrated to occur only at one horizon in the marls; also whether the opportunities for their observation are not very exceptional?

(20) What is the evidence that the supposed Bunter river came from North-West Scotland? I am aware that I may be displaying great ignorance of the literature of the subject in asking this question, but in that case a reference will set me right.

(21) What are the points of petrographical correspondence between the Bunter, Keuper, and modern delta formations? What bearing on this question has the immediately following statement that "the Leicestershire Trias shows signs of chemical action, the Nile delta of mechanical"?

W. B. Wright.

Dublin.

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