

East African Rift Valleys*

J. W. GREGORY'S classical work on the rift valley in Kenya focused attention on the rift valleys of Central Africa, and the historical retrospect given by Bailey Willis at the beginning of the recent Carnegie Institution volume on the subject provides a summary of the views of the pioneers, though there are some notable omissions both in this and in the bibliography.

The work consists of two principal parts: the first giving the 'general picture' with a hypothesis of rift valley formation, and the second detailed characters of the several areas, which include the coastal region of Tanganyika and the Tanganyika plateau, Lake Victoria and the central plateau, and also the rift valleys, Lake Albert with the Ruwenzori range at its southern end, Lake Tanganyika, the Rukwa trough, Lake Nyasa, the Ruaha trough, the classical rift valley (called Gregory Rift Valley throughout the work), and Lake Rudolf. A chapter on the volcanoes is given, and shorter chapters on earthquake conditions and on gravity tests. So little space is devoted to seismology that it might be wondered why this volume is one of the series in the studies of that science until it is realized that the work forms a very suggestive basis for a seismological study, and it is probable that the seismologist will be best qualified, when more data are available, to decide whether the general hypothesis will stand. It is likely that the physicist will object to some of the theories put forward, where conceptions such as anti-gravity or levity, downdraft and suction, are given the status of scientifically defined forces acting in the crust of the earth and capable of forming the structures under consideration.

A brief outline of the main thesis is here attempted. An area of uplift where the high plateaux of Central Africa are developed is situated over an asthenosphere consisting of "relatively incompetent but solid elastic rock". By gradual heating, probably by radioactive processes, this asthenosphere becomes a molten body, or asthenolith, which is covered by the competent shell about twenty-five miles (40 km.)

* Studies in Comparative Seismology: East African Plateaux and Rift Valleys. By Bailey Willis. (Publication No. 470.) Pp. x+358+73 plates. (Washington: Carnegie Institution, 1936.)

thick. The melting of the magma causes an expansion in volume and hence a forcing up of the central area, while various forces at the margins, which are rather convincingly described, cause the edges to sink down. The author points out that the great plateaux "exhibit a tendency to a circular form" and shows (p. 72) that "this is strikingly the fact in the case of that plateau which is most completely surrounded by rift valleys of East Africa, the Tanganyika plateau and its northern extension beyond Lake Victoria".

We are to suppose that the large central plateau is the raised cover of the asthenolith of molten magma twenty-five miles below, and that the rift valleys and troughs, and the upraised masses of Ruwenzori and Elgon(?) are round the edges, and that any escapes of magma to give volcanic eruptions also lie round the margins. This roughly fits the facts, and it must be noted that the central cover is thick enough to have prevented any eruptive or intrusive activity since Karroo times.

The details of structures which form the second part of the volume constitute a mass of information very usefully assembled together. Bailey Willis is to be congratulated on having reached the top of the rim of the great Ngorongoro hollow and found that it is not a giant crater as stated by Jaeger. He warns the reader who visits Lake Tanganyika not to be disappointed, as he was, on first seeing that mighty trough which is almost filled with water (p. 185). There is very little evidence for a central core of greenstone to the Ruwenzori range, as postulated by the author, and the basic intrusive rocks known on the mountains are far older than the uplift of the mass. There is some confusion between Mgahinga, a volcano almost as large as Muhavura and Sabinyo, and Gihinga, a small cone to the north-east.

This important and stimulating work is beautifully printed, with few misprints, while the plates (many of which appear to be from infra-red photographs and most of which are by the author) much enhance the value of the volume. It will be read by all geographers and geologists, as well as by seismologists, who are interested in rift valleys in Central Africa, and will be referred to by those who are now working in, or studying, that most impressive part of the globe.

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Breeze and Clinker Aggregates

THE Department of Scientific and Industrial Research has issued a revised edition of a bulletin published some years ago on "The Properties of Breeze and Clinker Aggregates and Methods of Testing their Soundness" (Building Research Bulletin No. 5. London: H.M. Stationery Office. 6d. net). Since the original publication, investigations carried out at the Building Research Station have established the cause of the occasional failures of these materials and have enabled tests to be devised which are suitable for application under ordinary working conditions.

'Clinker', or well-burnt furnace residue, and 'breeze'—the name applied to the smaller and less definite residues—usually contain a proportion of unburnt fuel, which has been proved to be the cause, when these materials are used as aggregates, of cracking which develops and becomes visible in the set concrete at various periods after pouring, by reason of the swelling movements which these unconsumed coals undergo in the mass. Certain types of coal are more likely to give trouble of this kind than others and, it is stated, the extent of the action can be

predicted from the physical properties of the coal from which these aggregates were originally derived. For laboratory purposes, samples of coal are distinguished by their power of removing the colour from an aqueous solution of methylene blue and by their relative moisture absorption properties, and it is suggested that the presence in the aggregate of as little as 4 per cent of a coal of the most dangerous class may be sufficient to cause failure.

Investigations made on the setting and maturing movements in breeze and clinker concretes, and on the influence of sulphur and of water content, are described, while it is also explained why these aggregates may not be used in reinforced concrete construction owing to the rapid corrosion resulting from their permeability. Of the two tests recommended, the 'pat test' is said to be reliable in the majority of cases. A standard pat is made by mixing a sample of the material under test with fine white plaster of Paris, and a normal Portland cement; if in a period of 1-4 days this exhibits certain defined symptoms of movement, the material is to be judged unsound and must be rejected.

Fossil Algæ in Boghead Deposits

BOGHEAD coal is a comparatively rare and valuable material yielding gas and paraffin on distillation. It is characterized structurally by the presence of minute 'yellow bodies', the nature of which has been a subject of discussion. An algal nature was suggested for these in 1889 by Edgeworth David, but their peculiar properties in resisting decay and compression prevented any general acceptance of this view. Since that time, reports of C. E. Bertrand and Renault, Zalessky, and Thiessen have supported the algal view, and finally P. Bertrand in 1930 came to the conclusion that the *Pila* of C. E. Bertrand and Renault was *Botryococcus* and their *Reinschia* a member of the Volvocales.

The subject has now been placed on a much surer basis by a detailed study of living *Botryococcus Braunii* and material from the muds of glacial lakes and more recent peat deposits by Dr. K. B. Blackburn, and a re-examination of the 'yellow bodies' of boghead deposits by Dr. B. N. Temperley (*Trans. Roy. Soc. Edin.*, 58, 1935-36). Dr. Blackburn has followed the alga through its many variations in form; she shows that the inner membranes of the cells are cellulose, but external to this each cell has, towards the periphery of the colony, a cellulose and pectin cap, which contributes to the general mucilage surrounding the colony, whilst towards the centre of the colony, a thick fatty thimble forms around each cell, and these constitute the general matrix of the colony. The cuticular nature of these thimbles would explain their resistance to decay. The cells are rich in oil and also contain appreciable quantities of starch.

Dr. Temperley finds that the 'yellow bodies' described as *Pila* show extremely close agreement with *Botryococcus Braunii*, the various polymorphic forms of which are recognizable in the deposits. The form *Reinschia*, formerly ascribed to the Volvocales, differs from *Pila* in the hollow form of the colonies, but the details of structure correspond so closely with those of *Botryococcus* that Dr. Temperley concludes that "there is no doubt that the various forms of *Reinschia* and *Pila* are fossil colonies of the same type of alga".

Science News a Century Ago

Medicine in Chili

"THE science of medicine has hitherto made but small advances in Chili. . . . Twenty years ago medicine was practised by men of colour and the most ignorant quacks, the hospitals were entirely under the control of the monks, and the few well informed physicians, those, namely, who had received an European education found in Lima a more lucrative field for their exertions than was offered to them anywhere in Chili. This state of things, however, no longer obtains, for the number of physicians is now even greater than necessity requires, and there is a college at Santiago at which medicine is taught, although on a somewhat compendious plan. Still there is a scarcity of educated practitioners in the country, where the healing art is chiefly exercised by matrons and old Indian women. The country people are tolerably familiar with the virtues of the rather numerous indigenous plants, but to many of them properties are attributed which the individuals in question do not really possess, and many other remedies supposed to be of great efficacy are solely indebted for the estimation in which they are held to a credulous superstition. When any particular part of the body is the seat of disease, the remedy is sought for in the corresponding part of some animal, variously prepared; thus for ophthalmic disorders the carbonized eyes of birds of prey are administered, the claws of the condor are given for gouty pains of the hands, and the flesh of the smooth-skinned lizard for scurfy affections of the skin." (*London Medical and Physical Journal*, February 18, 1837.)

The Colony of Western Australia

AT a meeting of the Statistical Society held on February 20, 1837, Lord Glenelg, then Colonial Secretary under Lord Melbourne, communicated "A Report of the Committee of Correspondence of the Colony of Western Australia". Known first as Swan River Settlement, Western Australia was formed into a province in 1829, and the towns of Perth, Freemantle and Guildford were founded the same year. The development of the colony, however, had been slow. The report consisted of nine sections written by different individuals and dealt with agriculture, live stock, shipping, commerce, population, crime, religion and other matters. The total population of the Swan River Settlements west and east of the Darling Mountains was but 1,550. Sheep farming was the principal industry, there being in the York district east of the Darling Hills about 5,000 sheep in excellent condition. The original flocks were imported from "Van Diemen's Land". The animals were a large-framed and very coarse-wooled breed, but being crossed with Merino rams, the quality of the wool was constantly improving. The merino flock consisted of about 900 pure descendants of the choice Spanish flock presented in 1791 to George III by the King of Spain. This breed had much improved since imported into the colony. The amount of wool shipped for England and the Cape of Good Hope in 1836 was 12,500 lb.

The East India Company's S.S. *Berenice*

ACCORDING to *The Times*, on February 22, 1837, the East India directors gave a dinner at the West