

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