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## DESERT LAND FORMS.

*Das Gesetz der Wüstenbildung in Gegenwart und Vorzeit.* By Prof. Johannes Walther. Zweite, neubearbeitete Auflage. Pp. xv+342; illustrated. (Leipzig: Quelle and Meyer, 1912.) Price 12 marks.

DESERT regions have received much attention during recent years, and in this volume Prof. Walther presents a very instructive geographical study of the north-eastern part of Africa. This is something more than a new edition of that which he published under the same title in 1900, for the fourteen essays on different aspects of desert conditions which there appeared have been recast and rearranged under the headings of the character of the desert, erosion in the desert, and deposition in the desert, together with a fourth chapter in which the evidence for the identification of desert areas in the past history of the earth is assembled. A visit to Egypt and the north Sudan in 1911 provided the opportunity for extending and supplementing his earlier observations, and recent railway extensions enabled him in the time at his disposal to visit the oasis of Kharga, Khartum, and to cross the Red Sea hills between the Sudan plains and Suakin. The result is a very interesting and instructive work dealing primarily with a part of the north African desert, but introducing many examples from other arid regions of the world.

In treating of precipitation in the desert the author has, we think, in following Sickenberger, gone somewhat too far in saying that dew is entirely absent in the interior of the desert. The absolute humidity is usually not very low, and on cold clear nights dew is not infrequently formed. Stress is rightly laid on the action of rainfall in areas which are fairly described in general terms as rainless, for such falls of rain are not at all uncommonly reported when a wide region is considered, though each fall may be extremely local in extent. The rock tombs on the west of the Nile at Thebes are quoted as providing evidence that the water from the Nile does not there percolate to any distance from its bed. Here the river flows in its alluvial flood plain for the most part. Grabham has shown that the varying levels of the Blue Nile are to be traced so far as 900 metres from its banks in the Sudan, and it appears from discharges which have been measured that a considerable loss from the river takes place, over and above that due to evaporation, in such long reaches as that near Dongola, where the river flows for long distances in the Nubian sandstone.

An especially interesting part of this book deals with the Sudan desert and the "half-desert" on the northern fringe of the monsoon rains, where the extreme aridity of the Nubian and Libyan deserts gives place to less inhospitable conditions and vegetation can develop to a limited extent. The Red Sea hills furnish most instructive instances of this, and of the erosion characteristic of such regions. Many interesting examples of erosion and of deposition are described, and are particularly well illustrated by characteristic and well-chosen photographs. Doubtless because the parts of the country which the author visited do not exhibit good examples of the process, there is not much reference to the filling of wide valleys and depressions with rock waste swept down from the higher levels which may be seen so finely represented further north than the Berber-Suakin route which was followed, in the valleys of the complex of crystalline ranges which form the western shore of the Red Sea. This greatly enlarged edition of a work already well known will be most acceptable to both geographers and geologists. H. G. L.

## THE PROPERTIES OF STEAM.

*The New Steam Tables: together with their Derivation and Application.* By Prof. C. A. M. Smith and A. G. Warren. With an introduction by Sir J. Alfred Ewing, K.C.B., F.R.S. Pp. xii+101. (London: Constable and Co., Ltd., 1913.) Price 4s. net.

PROF. CALLENDAR, in his Royal Society paper of 1900, suggested the use as the characteristic for steam of  $v-b=R\theta/p-C\theta^{-n}=V-c$ , say. This is suggested by the Joule-Thomson equation for gases, where  $n=2$ , and by Grindley's result for steam, in which  $n=3.8$ . Only a man of Prof. Callendar's reputation could have received attention, for he gave rather fanciful reasons for taking  $n=3.5$ , and for his values of the specific heats when  $p$  is very small. Again, it is probably quite untrue that  $c$  is a function of temperature only. Nevertheless, when steam tables are calculated by means of the above characteristic, the constants  $b$ ,  $C$ , and  $n$  (and, indeed,  $R$  also) can be given such values as make the calculations agree with what Prof. Callendar regards as the best experimental results, and he recommended in 1900 that tables calculated from his formulæ should be substituted for the usual tables as given by Regnault and modified by Griffiths and others. The numbers of the new tables are consistent with each other, and this is a great advantage, because we generally need differences