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Review: Plant-Dispersal in the Pacific

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most closely concerned we miss the firm grasp which might have brought the data into a completer shape than they at present show.

With reference to the great advance now being made in our knowledge of the upper regions of the atmosphere, attention may be called to a series of small maps showing the pressure of the atmosphere at 10,000 feet elevation above India.

H. R. M.

## AFRICA.

### RAINFALL IN NORTH-EAST AFRICA.

'The Rains of the Nile Basin in 1905.' By Captain H. G. Lyons, Director-General, Survey Department, Egypt. Cairo, 1906.

In 1905 several new rain-gauge stations were established in the Nile basin (making seventy-five stations in all), and returns showing the number of rainy days were also received from forty-four posts scattered over the Sudan plains. It is hoped that by collecting information from so wide an area, it may be possible to deduce the probable development of the East African monsoon in its northern extension, though, as Captain Lyons says, "much study is still necessary before it can be said precisely what information is more useful, and what weight should be given to such evidence as excess or deficiency of rain in different areas."

The meteorological information given in this report is interesting and important, including a set of maps of the mean monthly rainfall over the region which show well the advance of the rains northward in early summer, and their return in the autumn across the equator. The northern edge of the equatorial rainbelt just reaches Khartum, which has its one short rainy season. The precipitation over the Nile basin in 1905 was deficient everywhere, with the exception of the Delta, which had a heavier winter rainfall than in 1904, owing to the passage of the Mediterranean cyclonic depressions nearer the African coast, and the Nile flood was only 0.65 of the average volume. This makes the tenth successive year of low floods, only two since 1895 having risen, very slightly, above the average, while the others were well below. Captain Lyons emphasizes the fact that the Nile water-supply is but little affected by the rainfall of the equatorial lake plateau, the evaporation in the marshy regions of the Bahr-el-Jebel and Bahr-el-Ghazal basins being so great that the run-off is only 0.95 per cent. of the precipitation.

## AUSTRALASIA AND PACIFIC ISLANDS.

### PLANT-DISPERSAL IN THE PACIFIC.

'Observations of a Naturalist in the Pacific between 1896 and 1899.' Vol. 2, Plant-dispersal. By H. B. Guppy, M.B., F.R.S.E. *Illustrations and Maps*. Large 8vo, pp. 627. London: Macmillan & Co. 1906. Price 21s. net.

This book figures as vol. 2 of Mr. Guppy's book on the Pacific, but it would perhaps have been as well had the two volumes appeared under distinct and differing titles. The first, it may be remembered, dealt with Vanua Levu, and was a comprehensive and most careful study of that island from a geological and physical point of view. It was, indeed, the trained geologist to whom it mainly appealed. The volume under consideration is for the botanist and the student of distribution, and though it may be as little intended for the layman as its predecessor, it has, it must be admitted, but faint connection with the latter. The place of "Vol. 2" on the back of the book is, however, taken by the customary two stars, so that the purchaser who wishes to confine himself to this latest record of Mr. Guppy's

investigations can do so without fear of any appearance of incompleteness in regard to his bookshelves.

All who have made any study of the Pacific are familiar with Mr. Guppy's work. He is a trained and careful observer, with wide experience and a good knowledge of his ground. For the writing of the volume before us he has qualified himself by a course of observation which is truly Darwinian in its patience and method. His interest in the dispersal of plants having been first aroused in his earlier cruises in the Solomons, he afterwards followed up his investigations while on Keeling island and in Java; continued them for some years in the British Isles, in the Mediterranean, and in Fiji; examined the west coast of South America from Southern Chile to Ecuador; and finally visited Panama in order to study the differences between the shore plants on either side of the isthmus. Even were Mr. Guppy not the competent naturalist that he is, so wide a course of study would alone be sufficient to compel our attention.

The book, as we have already said, is mainly for the botanist, and without a certain amount of acquaintance with the littoral flora of the Pacific islands, the reader will not find it very easy to follow the author in his arguments. He takes the floating seed as his text, and the plants on the sea-shore as his main study, and the years of investigation he has devoted to them have enabled him to build up a superstructure of facts which will serve for a long time to come as a perfect storehouse of information for future investigators to draw upon, whether they choose to accept his deductions or not. Although he is modest enough to describe himself as a plotter of detail rather than a delineator of great designs, and to lament that much of what seems new in his work has already been foreseen by the generaliser, there is no doubt that Mr. Guppy here gives us one of the most valuable studies on plant-dispersal hitherto published.

After recording numerous experiments on the buoyancy of seeds, their fertility after long immersion, and so forth, the British littoral flora is discussed at some length. The Fijian, Tahitian, and Hawaiian plants of similar situation are then treated of, before passing to the currents of the Pacific and their action, the rôle of birds, vivipary, the relation between shore and inland plants, and the eras in the floral history of the Pacific—a subject which extends over several chapters. There are also special chapters on beach and river drift, and on the economic plants of the Polynesian, and, lastly, a very interesting section on the Rhizophores—the different genera and species of mangrove having been a special study of the author. Some plants and trees of special peculiarity, such as *Afzelia bijuga*, *Entada scandens*, and some of the Cæsalpinias, are also dealt with separately. A final chapter gives a summary of Mr. Guppy's arguments and conclusions, and there is a long appendix of notes on the text.

Much of this, as may be supposed, is of technical interest only, but there is also much which bears directly on geography. Such, for example, are the pages on the west coast of South America, which form one of the most instructive portions of the book. Going northwards from Valdivia, Mr. Guppy distinguishes four well-marked shore-belts: (1) the *Convolvulus soldanella* belt, with cool moist beaches (South Chile); (2) the desert, plantless belt, where the temperature of the sand near the surface ranges from 120°–130° Fahr. (North Chile); (3) the *Sesuvium* belt, ranging from Africa to near Tumbes in lat. 3° 30' S., which has a beach quite as hot as that of the desert belt, but shows a scanty flora in which one or two species of *Sesuvium* are generally to be found; and lastly, (4) the mangrove belt of Ecuador and Colombia, where, near Tumbes, there is an abrupt transition from drought and semi-sterility to humidity and rank tropical vegetation. A very remarkable feature, however, is to be noticed in this belt, for it is interrupted from Puna island to the

equator, a distance of some 200 miles, by a stretch of perfectly arid coast, which resembles the sterile sea-coast of Peru and has similar climatic conditions. These striking variations, noticeable even by the most unobservant traveller passing along the coast, have been remarked upon by many naturalists, especially by Ball and Eggers, though not many have dealt with the subject so fully as the author. His explanation of them deserves to be recorded here, as it differs in many respects from that given by previous writers. He regards the aridity of the tropical coasts of Northern Chile and Peru, and the complete absence of the mangrove, as caused by the prevailing wind having to cross the cold waters of the Humboldt current before striking the land. Over the current mists are of frequent occurrence, and on attaining the land the air does not part with any more moisture till it has climbed the mountains and reached a cool temperature many thousands of feet above the sea. The Humboldt current is thus the condenser—the umbrella, so to speak, of this western coast, and that this is so, Mr. Guppy considers, is proved by the fact that when the Humboldt current leaves the coast below Tumbez mangroves thrive, but when it strikes it again beyond Puna island, and courses along it to the equator, we find the remarkable arid stretch of sea-coast above alluded to.

We should like, if space permitted, to follow Mr. Guppy in his discussion of the former sea connection across Central America, and other questions of a geographical nature upon which light is thrown by study of the strand flora. Here, as elsewhere, the author supplies abundant and suggestive material. Perhaps, indeed, the material is a little too abundant, or rather the presentment of it, for the volume does not sin on the side of conciseness, and its message might have been delivered still more effectively with a reduction by a century or so of pages. However, this is atoned for by the excellent plan of summarizing the arguments and conclusions of each chapter at the end of it. Mr. Guppy now and again touches upon evolution, chiefly to reiterate his assertion that the world is only a differentiating world, and that Nature nowhere enlightens us as to the mode of development of the type itself. Into this branch of the subject, however, we need not follow him.

F. H. H. G.

## THE MONTHLY RECORD.

### THE SOCIETY.

**President Roosevelt and the R.G.S.**—At the meeting of the Society on February 11, the President read the following letter from the Hon. Theodore Roosevelt, President of the United States, who a short time ago was elected an Honorary Member of the Society: "I very deeply appreciate the compliment conferred upon me by my election to honorary membership in your great and distinguished Society—a Society standing pre-eminent among all organizations of the kind throughout the world. I thank you for myself. I thank you on behalf of the great English-speaking Republic of the Western Hemisphere for this compliment conferred upon its President." It may be mentioned that, including President Roosevelt, the list of honorary members includes only ten names in all, mostly representatives of the royal families of Europe and elsewhere.