
Review: Meteorology

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Source: *The Geographical Journal*, Vol. 40, No. 4 (Oct., 1912), pp. 436-437

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1778359>

Accessed: 06-05-2016 14:53 UTC

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order of treatment: Colombia, Ecuador, Peru (growth of the Peruvian empire, government, daily life and occupations, burial, religion, sequence of cultures, arts and crafts, the southern provinces), the Southern Andes and Plains, East and Central South America, and a brief Appendix which points out gaps in our knowledge and gives a short descriptive bibliography. Colombia, with a diversity of geographical conditions, possessed, when the Spaniards arrived, a large number of tribes representing various stages of cultural development; of these the Chibcha were the most civilized, and a feature of their "mythological history is one common to all cultured peoples of Central and South America, namely, the arrival of a white culture hero who gave the people laws and instructed them in arts and industries." Although their empire was almost contiguous in the south with that of the Inca, their civilization was quite distinct from that of the Quichua, and they retained their independence until the arrival of the Conquistadores. Though the respective cultures of the Colombian tribes differed in detail, yet underlying was a strong similarity which extended also to the culture of the Peruvian highlands. "If the Chibcha may be regarded as illustrating in broad outline the condition of the Peruvian tribe before the people of Cuzco had established their hegemony, the small empire of Quito [in Ecuador] may equally be taken to represent the Inca empire in its infancy." The greater part of the book is naturally taken up by the account of Peru, and it forms a most admirable summary of our knowledge; the reader should at the same time consult Sir Clements Markham's 'The Incas of Peru,' and Payne's suggestive 'History of the New World called America' should not be neglected. In the southern provinces Inca influence was weak and disappeared in the southern section of Chile and of the Argentine; agriculture was less practised to the south. "The social system of the peoples of this region affords a remarkable contrast to that of the almost over-regulated country over which the Inca ruled. Though in the main patriarchal, as is usual among nomadic peoples, its leading features were individual freedom and equality." Although the area of East and Central South America is vast and relatively speaking very little is known of its archæology, "yet the researches made seem to point to a culture which is fairly homogeneous, belonging to a low evolutionary stage and of no great antiquity." In discussing the various ancient cultures, Mr. Joyce, as far as his space permitted, has taken varied evidence into account, and has not neglected the data afforded by craniology, but he has naturally given a good deal of prominence to the pottery finds, and his descriptions of the technique and decoration of the pottery give an especial value to the book. The volume is well illustrated with 26 half-tone plates, 1 plate in colours, 37 figures in the text, and 2 maps.

A. C. H.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

METEOROLOGY.

'Our Weather.' By J. S. Fowler and William Marriott. *Maps, Photographs, and Illustrations.* London: J. M. Dent & Sons. 1911. 1s. net.

This useful and well-illustrated little volume is one of the "Temple Primers," and familiar as is its elementary subject-matter a great deal of information is placed before the reader in a new and attractive way. The authors, moreover, have apparently realized that the best way of whetting the appetite of the unscientific public for a scientific study is to introduce judiciously the popular aspect of the subject here and there. They have, in fact, been good enough to give their readers a pleasant little introduction in a lively comparison of the

effects of the weather on the temper of your friend as he meets you on the road in the morning. On p. 54 one finds a table of the average monthly rainfall at the Royal Observatory, Greenwich, which is interesting to compare with one of the average monthly evaporation at the same place. The average annual rainfall is 24·32 inches, ranging from 2·71 inches in October to 1·52 inches in March, whilst the yearly evaporation amounts to 15·65 inches, being greatest (3·16 inches) in the warm month of July, when it exceeds the rainfall by 1·71 inches, and least (0·09) in December, when it is in defect of the rainfall to the amount of 1·86 inches.

Owing apparently to the fact that evaporation is an invisible process and less striking in its immediate effects than precipitation, comparatively little attention has as yet been paid to its scientific measurement. Systematic observations upon evaporation, on a scale analogous to that on which rainfall measurements are made, are needed to give the latter their true practical signification, and it is obvious how important such results would be to engineers and others. The photographs reproduced in this little book are excellent, such as those of forked lightning and one showing sheep killed beneath an oak. The last chapter on weather lore discusses the value of various common proverbs.

L. C. W. B.

ATMOSPHERIC CIRCULATION.

‘Contribution à l’Étude des Relations existant entre les Circulations Atmosphériques, l’Électricité Atmosphérique et le Magnétisme Terrestre.’ Par Alfred Vialay. *Maps and Illustrations.* Paris: H. Dunod et E. Pinat. 1911.

This treatise goes somewhat fully into the details of the general summer and winter circulation of the atmosphere over the globe, and in it are drawn conclusions not always in accordance with more usual or generally accepted notions. It thus deserves the careful consideration of all students of the subject, but to us this work, like so many French discussions of a like character, seems somewhat barren owing to the merely verbal reasoning employed, which can seldom get very far without the more rigorous methods of mathematics. The author disagrees with Sir John Eliot’s view of the source of the south-west monsoon of India. The latter considers the monsoon to be supplied by the south-east trade wind, which is on this supposition drawn across the equator. M. Vialay concludes, on the contrary, that the winds which bring the all-important summer rain to India are currents deflected northwards from the main body of the north-east trade wind, which in part lies a little south of the equator at this season. He affords some negative evidence against Eliot’s theory together with positive evidence in support of his own. According to M. Vialay’s scheme, drought and famine in India should synchronize with a poor flood of the Nile, and abundant rains with a high flood, and such a relationship has in fact been discovered by Sir W. Willcocks and Sir John Eliot himself. The author is further of opinion that an extension of the north polar ice area farther south in summer than usual will weaken the summer system of circulation over the Asiatic and American continents, and thus indirectly the strength of the south-west monsoon. In a discussion in Chapter VII. upon the effect of pressure distribution on the weather in France, M. Vialay shows that the same general conditions which in December 1879 brought to France winter of extreme rigour, in April 1893 were associated with heat and drought, the difference being, of course, entirely due to the change of season from the shortest days in the year to a period when the days are already long and warm.

L. C. W. B.