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Review: River Surveys in Southern Brazil

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## AMERICA.

## PERU AND ECUADOR.

'Reise in Peru und Ecuador.' Ausgeführt 1909, von Wilhelm Sievers. München und Leipzig: Verlag von Duncker und Humblot. 1914. *Numerous Illustrations, Maps, Figures, and Sections.* Pp 411.

The author, who is well known as an explorer of Venezuela and Colombia, undertook this journey with the primary object of ascertaining whether the cordilleras of northern Peru and Ecuador, like the sierras of Venezuela and Colombia, had been more extensively glaciated during the Quaternary age than at present. At the same time he investigated the geology and structure of the Andes in these countries, took meteorological observations, and collected plants. Dr. Albert Pepler, Th. Reil, and Prof. N. Bergt have furnished reports on his meteorological and botanical material and his barometric readings for the determination of heights.

The Andes within the sphere of Dr. Sievers' work consist almost everywhere of two cordilleras—the western, built up of sedimentary rocks with intrusive porphyritic material; the eastern, of crystalline schists, old eruptive rocks, Palæozoic, and, in parts, Mesozoic formations. Recent, still active, volcanoes are confined to the western cordillera, except in Ecuador and southern Colombia. These mountains are described with considerable detail under twelve subdivisions. He found valley terraces, lakes, and trough valleys of undoubted glacial origin, and concludes that there were two periods of glaciation, during the first of which the ice descended to about 11,000 feet (3400 metres), and during the second to 12,800 feet (3900 metres), figures which agree very well with those of Hans Meyer for Ecuador and Hauthal for southern Peru and Bolivia. The present limit of glaciation is about 15,200 feet on an average. Whether precipitation or temperature has the greater influence on glaciation in this region is a question which has yet to be investigated. Special chapters are devoted to the climate, the distribution of vegetation, useful plants, their cultivation and distribution, and commercial regions and means of communication.

## RIVER SURVEYS IN SOUTHERN BRAZIL.

'Exploração do Rio Grande e de seus Afluentes.' Comissão Geographica e Geologica do Estado de S. Paulo. São Paulo: Typ. Brazil. de Rothschild & Cia.: 1913. Pp. 44. *Numerous Maps and Illustrations.*

This is the official report of the survey of the Rio Grande in the northern part of the province of S. Paulo, Brazil. The river is formed by two headwaters, the Rio das Mortes and the Rio Sapucahy, rising in the Serra da Mantiqueira, Minas Geraes. One of the parties sent out surveyed the river from the tributary Canôas down to the mouth of the Prado, a distance of 143 miles; another the lower section to the confluence with the Paranahyba where the two rivers form the Paraná. Other parties explored the large tributaries Pardo and Turvo, and the Rio S. José dos Dourados, which enters the Paraná farther south. The course of the Rio Grande is obstructed by numerous falls and rapids, so that navigation is possible only in small sections. Its value lies in the immense hydraulic power due to the large difference of level. In the lower section, assuming the discharge to be about 44,000 cubic feet per second, the total energy is 3,680,000 horse-power, of which 1,620,000 at the three falls and three rapids is practically available. The geology of the neighbourhood of the river was investigated. Trap occurs along most of its course; other rocks are sandstones and crystalline schists, the

latter occurring in the upper part. The gravels are auriferous, but no rich deposits were found. Meteorological observations were taken and collections of the fauna, both living and fossil. The discovery of a species of *Pleiodon* in the lacustrine deposits is of great interest in relation to a former connection of South America with Africa.

The volume contains a large number of maps—a general map and sectional maps on the scale of 1 : 50,000, plans of the chief falls and rapids, and a geological map—besides photographs of scenes on the river.

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'Ecuador.' By C. Reginald Enock. (London : T. Fisher Unwin. 1914. Pp. 375. *Maps and Illustrations*. 10s. 6d. net.) Among the earliest volumes in Mr. T. Fisher Unwin's South American Series were 'Peru' and 'Mexico,' by Mr. C. Reginald Enock. One of the latest, 'Ecuador,' is by the same author. Like other volumes in the series it is a fairly comprehensive monograph, and certainly brings together a fuller collection of the main facts about the country described than is to be found within the covers of any other single book published in this country. It may be noted that Mr. Enock, while admitting considerable grounds for Guayaquil's unenviable reputation in matters of health and comfort, says that conditions have improved of late years, partly owing to the advent of the Americans engaged on the railway. An account of the Galapagos islands is sandwiched between chapters on the natural history and the antiquities of Ecuador. There is a bare outline map of the islands in the text. A more elaborate double-page map of Ecuador at the end is commendable for its clearness.

## GENERAL.

### OLD-TIME TRAVEL.

'English Travellers of the Renaissance.' By Clare Howard. London : John Lane. 1914. Pp. xvii., 233. *Illustrations*. 7s. 6d. net.

This book was written in 1908-10 while the authoress was staying at Oxford as Fellow of the Society of American Women in London. It is not merely a collection of incidents and anecdotes from the writings of Elizabethan and Jacobean travellers, but a survey of the essays which were addressed to the gentlefolk of those days, enlarging on the advantages of travel and residence abroad, both for purposes of study and for the general increase of knowledge and culture. The number of such 'Instructions for Forreine Travell,' with their rules for conduct and their warnings against the temptations of foreign cities, is in itself a proof of the wide extent of the custom advocated. The subject was touched upon by E. S. Bates in 'Touring in 1600,' published three years ago, a work to which the authoress of the present book makes no reference. As she says, however, few writers have interested themselves in this branch of literature. Most of the essays are rare and have never been reprinted. She herself has not attempted anything in the nature of reprints, her plan being to comment on whatever in each essay was new or showed the evolution of travel for study's sake. The range is from "The Beginnings of Travel for Culture" to "The Decadence of the Grand Tour." It is a scholarly work, replete with bibliography and index, and, being lightened with stories from biography and history designed to show the sort of traveller to whom the essays were addressed, it provides entertaining as well as instructive reading. There are reproductions of a dozen old prints.