

Why Aeroplanes Fly

By Arthur Elton and Robert Fairthorne. (The March of Time Series: Mechanics, 1.) Pp. xii+82. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1936.) 2s. 6d. net.

THIS readable book discusses the subject more broadly than the title suggests, giving a chapter upon the uses of aircraft, even going into the question of its military values. The text follows faithfully the ideal laid down in the preface of giving "the reading public a detached, simple and untechnical explanation" of the subject matter; so much so that the reviewer feels inclined to suggest that the authors underestimate the ability of the said reading public to understand the simple ideas of natural physics and mechanics. Nevertheless, it is almost entirely free from those loose and often inaccurate statements that are usually the inevitable accompaniment of the simplification of scientific matters.

It is easy to find faults of omission in any book which has obviously been kept down in size, but there are some cases in which the authors, having embarked upon an explanation, should not have left it unfinished. For example, when discussing high wing loading as a means of increasing carrying capacity, the attendant dangers of high landing speed are mentioned, but there is nothing about the many thoroughly tried and proved methods of increasing the speed range and reducing the landing speed. One would have been inclined to have accused the authors of being out of date but for the fact that in the next paragraph they mention retractable undercarriages as a means of reducing drag, a much more modern development.

Mention of a possible "new kind of engine made like a rocket" is a case of loose terminology. This surely means that the whole aircraft would be functioning on a rocket principle.

In general, a good book for the lay reader who has been so out of touch with the modern world that he is quite ignorant of the technical aspects of flight. The illustrations are particularly good, well chosen and well produced.

The Geology of South-Western Ecuador

By Dr. George Sheppard. With a Chapter on the Tertiary Larger Foraminifera of Ecuador, by Dr. Thomas Wayland Vaughan. Pp. xiv + 275 + 13 plates. (London: Thomas Murby and Co., 1937.) 25s. net.

DURING the past twelve years Dr. George Sheppard has published a series of papers on various aspects of the geology of Ecuador. In this volume, which is probably the first published in English on the geology of Ecuador, he puts on record his collected data and his conclusions. The present climate and physiography are described together with the effects produced by this type of climate. The origin of the Tertiary Clay Pebble Bed of the Santa Elena region is a matter of controversy. It has been suggested that it is a crush breccia on a regional scale, but Dr. Sheppard takes the view that it was originally of the

nature of a series of extensive mud streams similar to those which have been observed at the times of the heavy rains. He puts considerable emphasis on the results which may arise from these rather exceptional climatic conditions.

Some have regarded the Guayaquil Limestone as Cretaceous, but examination of the contained Foraminifera places the age as Eocene, and probably in the upper part of the series. In consequence of this and other evidence, Dr. Sheppard makes the tentative suggestion that the Guayaquil Limestone and the Seca Shales are of the same age.

Dr. Wayland Vaughan has contributed the chapter on the Tertiary Larger Foraminifera, and other chapters describe the geological structure, the igneous rocks and cherts, at some length. The final chapter deals briefly with the occurrences of petroleum.

An abundance of material is presented which provides food for thought on many points, but in giving his conclusions the author does not expect to go unchallenged on all the issues. G. D. H.

Plant Life Forms

By C. Raunkiaer. Translated by H. Gilbert-Carter. Pp. vii+104. (Oxford: Clarendon Press; London: Oxford University Press, 1937.) 5s. net.

THIS type of botanical text will not be familiar to many British botanists, and therefore, although the original was written in Danish by Prof. Raunkiaer so far back as 1907, the point of view will be fresh and, indeed, invigorating.

Plants can be classified vegetatively into trees, shrubs and herbs, but this does not take the botanist very far. Most plants have to pass through a period of much-curtailed activity—winter in temperate countries and dry season in the tropics—and during this period, their growing parts, namely, the buds, must be afforded some means of protection. The degrees of protection vary according to the requirements of the different species. Prof. Raunkiaer describes the various means of protection, and these are illustrated by examples and drawings.

From this point of view, the plants are divided into the following main groups: (1) Phanerophytes, plants whose buds and apical shoots project into the air during the unfavourable season; (2) Chamæphytes, with buds and apices on shoots at or near the soil surface; (3) Hemicryptophytes, whose shoots die back just before the unfavourable period, so that surviving buds, etc., are protected by withered leaves and the soil; (4) Cryptophytes, whose surviving buds, etc., are either beneath the soil or at the bottom of water; (5) Therophytes, plants which pass their complete generation from seed to seed, that is, survive the unfavourable period as seeds. These groups are still further subdivided.

The value of plant life-forms to the study of plant geography can be well imagined, and a brief account of this is given at the end of the book.

Botanists will welcome this attractive book, and should be grateful to Mr. H. Gilbert-Carter for his excellent translation from Prof. Raunkiaer's original.