The Physiographic Control of Australian Exploration: Discussion

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the future of Australia than the experience of the "man on the spot," which experience may have been limited to a series of unusually good seasons.

Let us therefore profit by the example of our most successful explorers, especially in two directions. They made careful study of such data as were available—in effect, they had an un-British belief in the value of "taking thought for the morrow." Furthermore, they did not fear grave difficulties, but faced them boldly. Our national future in Australia is fraught with great difficulties, though many would have us deny or conceal them. Little is gained by shutting our eyes to the disabilities of our arid interior and northern tropical lands. It is as much to the national interest to study the controls governing the less-favoured areas, as it is to invite attention to our prosperous centres of close settlement.

Before the paper the CHAIRMAN (Dr. AUBREY STRAHAN) said: The paper this afternoon is on the Pysiographic Control of Australian Exploration by Dr. Griffith Taylor, who is in Australia and therefore unable to read his paper. Captain Sir Douglas Mawson has, however, been kind enough to undertake to give us the paper in Dr. Taylor's absence.

In giving an account of the paper printed above Captain Sir Douglas Mawson added the following remarks, and a discussion followed.

Captain Sir DOUGLAS MAWSON: Many areas in Australia suffer long drought, in some six months or more, and this is one of the most awkward factors of the country. Near the coast the rainfall is fairly uniform throughout the year; that is to say, one can have a good fall of rain in any month; but in the central part there is always a long period of drought. In the north drought occurs in the winter; in the south during the summer; the rains in the north being monsoon rains. The word "Abrolhos" is supposed to mean "keep your eyes skinned"; it is probably a word of Portuguese origin, not Dutch; but it may be that the Dutch have copied it as a sailors' term from the Portuguese navigators of the time. The fine region in the south-west has been divided by Dr. Taylor into zones typified by various types of gum trees, and it is a good method of trying to ascertain the probable rainfall in Australia, to keep careful note of the vegetation, for different trees live in different conditions of rainfall.

The coast in the Sydney region is a comparatively low plain leading up to a steep rise and a high plateau of mountains that were a barrier to the spread of settlement, for the crossing of these mountains was not so easy as the crossing of ordinary mountains of anything like the altitude of 3500 to 5000 feet, because the valleys, which are the natural roadway into new country, are here of a peculiar type: bottle-necked, steep-walled valleys, almost unique. Standing on the brink of these valleys one looks down into something like the Grand Cañon of Colorado, with falls of over 3000 feet sheer, so that any one entering those valleys might get to the head, but not be able to get out at the top. The Kanimbla Valley is large, but when it comes down to join the Wollondilly it narrows to a gorge filled entirely with water, and it is difficult to get through. All the other valleys are the same, so that the early explorers attempting to go

inland were repulsed. Prof. David of Sydney has done most towards finding an explanation. Although this is a plateau region, there is a main throw-down, mostly as a monocline. The rocks incline until they are almost vertical. Overlying the softer coal-bearing and other shales there is a series of sandstone. This sandstone is very hard, and the rivers find it difficult to cut their way through, but when once they are through they eat away the softer rocks below. That factor produces the bottle-necks.

During the last twenty years there have been many small expeditions for mine prospecting in the little-known interior. Two or three men with a few camels have gone out and done wonderful work, being away two or three years, very little having been heard of them, as it does not get into print. There is not much of that area that is likely to have anything very exciting in it, or these prospectors would have discovered it. Forrest and others showed what a desolate country most of it is, and, in the larger part of the area in the north where there is no sand, there is what Carnegie called a territory of spinifex, a clumpy sort of grass rather spear-like and not much use for anything.

One of the biggest factors in the occupation of the country is not so much the average annual rainfall as the possibility of getting no rain at all, and making up the average a few years later ; but if all the stock has died in the mean time it does not much matter whether you get rain later to make up the average.

With regard to vegetation, the mallee is a very common feature over a large area of Australia. It is a small eucalypt with an enormous bole and a root which seems to store a good deal of water. The savannah area extends around the east and south coast ; then there is the spinifex region, of which there is not a great extent ; for the rest it is country useful for sparse population. Stock do excellently, if they are few to the square mile, and the merino sheep do better in this country than elsewhere. Dr. Taylor certainly draws attention to the disabilities of Australia in those arid regions, and shows how this aridity in the west led to Great Britain now owning Australia and not the Dutch. But although only 1 per cent. of Australian stock is being run on one-third of Australia, yet there are minerals in this area. The richest iron ore in the world occurs in patches, which are unfortunately a long way from the coast. If Great Britain wishes to push the steel industry, I think she could just as profitably push it in Australia as in Spitsbergen. Australia is British ; it is a good climate, especially in the south. Moreover, there is a movement on foot at the present moment towards making Australia a great iron-smelting country, and a tendency for Australia to supply steel not only to Australasia, but to the Dutch East Indies, to Japan, to South Africa, so that there are reasons why British capital should be spent in steel development there, even in preference to importing steel ores into Great Britain and smelting them. I think some of the companies in this country would do well to consider Australia from this point of view.

The CHAIRMAN : I think Sir Douglas Mawson has given an admirable account of an exceedingly complicated subject. The paper is full of information of all sorts, and deals with an enormous tract of country. I admire the patriotism with which Captain Mawson stands up for his country ; but I can assure him that he need not be jealous of Spitsbergen's iron resources. Unfortunately, the disabilities of Australia to which he refers are such that it is beyond the power of man, even modern man, to remedy. We cannot change the trade winds or the physiography of a continent, and we cannot change the geological constitution of a tract of ground like that. All such things appear to have their effect upon the physiographic conditions of

Australia. In one case we notice that the extent of limestone covering a large tract of ground had an important influence on the climate or, at any rate, on the water conditions of that tract. I was greatly interested in the description of that mountain range near Sydney, which appeared to me to be rather like our own little area of the Weald. There you once had the chalk forming a ledge over it, so that in the formation and excavation of the Weald the valleys must have been gradually opening themselves out in the way we see in the mountains of Australia, the rivers flowing through narrow gorges in the chalk on each side. It is the old story—a river in soft strata makes a valley, in hard a gorge. That region near Sydney seemed to me to represent a stage through which our own little Wealden area must once have passed. It suggests that these mountains near Sydney are of quite recent geological formation. Blockfaulting is a very delicate question. It is very easy indeed to say what was once said of our Wealden area, that all the gaps by which the rivers escape are due to faults. There was only one failing in the theory: when the ground was carefully examined and mapped there were no faults there. I am not going to say for a moment that these block faults do not exist, and it would be very dangerous to speak dogmatically about country I have never seen and know nothing about. I do, however, venture to say that a theory of that kind should be subjected to very careful criticism before it is accepted as an axiom.

A FELLOW: There has been something in the newspapers during the last few days with regard to an expedition of motor-cycles and aeroplanes right across Australia. What is the object of that expedition? Is it to facilitate the opening up of the country? Is there any idea of building a line from Port Augusta right up north to Port Darwin?

Captain Sir DOUGLAS MAWSON: I do not know anything of that expedition, except that I have seen in the papers it is proposed to start a company to run aeroplanes to London, and I expect they are proposing to send some scouts ahead to map out a good route across the continent. I do not think they would go north from Adelaide, but straight from Sydney to Port Darwin. That is probably the line of the next railway, not from Adelaide to Port Augusta. Many years ago when that railway was started the South Australian Government were most anxious to run to Port Darwin; but the other States have been keen to put money in it, and consequently when that line does come it is to go through Perth. The dry country is pastoral, and within a few weeks of a good heavy rain what was almost bare ground, with an occasional tuft of spinifex or salt bush, becomes waving grass as high as a horse's thigh. When there is a good season in one part you put the maximum stock on the pastures for the time being, and then get your stock away when the drought is coming. You have to know the region, and to move the stock quickly when necessary. In the old days when there were no railways, when the drought came after a series of good years, the squatter thought he could go on with the same stock, but he was suddenly faced with drought. Perhaps he thought it would be better the next year and kept the same number of stock on, and they probably ate the place out, and then when the drought arrived there was nothing to give them. You can cut down the limbs of trees and feed the stock on the leaves, but that will not last for two or three years. With the spread of railways, as the seasons change you can shift your stock away to another part, where there is a good season, leaving only a small amount of stock behind. Many squatters have property down near the coast and far inland; they can keep half the stock inland until the drought approaches, and then

they rush it down to the coast. Railways will improve possibilities for stock-keeping in Australia.

The CHAIRMAN: It remains for me only to express on your behalf to Dr. Taylor thanks for his paper, which I think has been of great interest, and especially I will ask you to record your gratitude to Sir Douglas Mawson for his exceedingly able exposition of the subject.

REVIEWS

ASIA

Asia Minor.— **Walter A. Hawley.** London: John Lane. 1918. *Map and Illustrations.* 12s. 6d. net.

A STUDENT of Asia Minor glancing through this volume for the first time is likely to do so with curiosity. He will be anxious to learn just how, within the compass of three hundred pages of bold type and ample margin, the author has contrived to cover the gigantic subject propounded by his title. One hopes to find, maybe, a broadly handled sketch, in which a long and involved but fascinating story shall have been reduced to a clear and orderly outline; one finds, instead, little more than a loose collection of travel impressions, by railway and steamer, along some of what may be called the chief tourist routes of Asia Minor. With disappointment one realizes that here is a book quite over-weighted by its title.

The opening chapter sketches briefly the physiography and history of Asia Minor, and is well enough, considering the complexity of both subjects and the true nature of the book. Thereafter the author goes upon his travels, and sees something of the country, its cities, peoples, and strange sights, including performances by howling dervishes and whirling dervishes; he gives, also, some general information upon certain districts that he did not visit. He journeyed first from Constantinople to Brussa, capital of the early Ottoman conquerors; then by steamer, from Constantinople again, through the Ægean to Smyrna. From Smyrna he visited the four great classic valleys of Western Asia Minor—the valleys of the Mæander, Hermus, Cayster, and Caicus; wandered over the sites of the ancient cities of “The Seven Churches which are in Asia;” and examined ruins laid bare by the excavations of archæologists. He went to Konia (St. Paul’s Iconium) and to Karaman, both with interesting remains of Seljuk art, and also to Angora, far in the interior. And then, as final journey, he took steamer from Constantinople along the southern coast of the Black Sea, calling at various places on the way, and so came at last to Trebizond.

It makes a long itinerary, through a varied and always attractive country, rich in every sort of historical association. The author, further, is obviously in love with his subject. But he is over-anxious to give full details to his readers; his descriptions of scenery architecture, and archæological discoveries are generally too precise and much too long; they produce confused pictures. He tells us what he saw and felt, but too often fails to get beneath the surface; and, in spite of his sympathy and good purpose, the subtle charm of the country escapes him. Something of this failure may have been due to shortness of time and the exigencies of travel; but more, one suspects, to the disturbing influence of the author’s Greek friends and travelling companions. As *cicerone* in Asia Minor, your well-to-do Greek is an intolerable distraction; for him the East of romance and colour and old survival does not exist; he sees only a