The Geographical Factors That Control the Development of Australia: Discussion

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The PRESIDENT (before the lecture): It is almost superfluous to introduce Prof. Gregory to this meeting, as he has so often lectured to us before. The first occasion on which he delivered a lecture to the Geographical Society was when he described an interesting journey to Mount Kania, a journey in which he had to overcome considerable difficulties. After that, in matters geographical, we heard of him travelling with Sir Martin Conway in Spitsbergen. Then his next lecture was one on the figure of the Earth, which gave rise to a considerable amount of discussion. The last lecture which he delivered here was entitled "Economic Geography and the Development of Australia," and the lecture he is about to deliver deals with very much the same subjects. Prof. Gregory was from 1900 to 1904 Professor of Geology and Mineralogy at the University of Melbourne, and also during part of that time he was in charge of the Geological Survey. He is, therefore, eminently entitled to speak with authority on all scientific questions connected with Australia.

The PRESIDENT (after the lecture): We are honoured to-night by the presence of the Acting High Commissioner of the Commonwealth of Australia and the Agents-General of the various colonies composing it, gentlemen who may perhaps best be described as the ambassadors representing one of those great practically independent nations which, in confederation with ourselves, we call the British Empire. Their presence here to-night will, without doubt, lead to a discussion from which we shall learn much. The interesting lecture which Prof. Gregory has just delivered proves conclusively that the forces of nature are not yet brought into subjection to the will of man in Australia to nearly the same extent as in the old world, and I cannot but feel that it augurs well for the future of that great continent that, whilst yet it is in as it were a plastic condition, so many of its high officials are evidently considering the many difficult problems before them in a scientific spirit. I must also confess that I am also glad to see them interested in geographical questions for reasons not connected with to-night's lecture. Another British expedition is about to proceed to the Antarctic continent, and I lay stress on the word "British" because the material assistance and sympathy which have been so freely given to this and to former expeditions by Australia and New Zealand make it quite inappropriate to describe them as being merely English. And I want to take this opportunity of assuring our guests that the co-operation of the southern Commonwealths is highly appreciated by this Society, for without it success would be far less probable. The growing nations of the south not only ought to but certainly do take an interest in the capture of the South Pole. We see in the papers that Commander Peary is about to undertake an expedition to the antarctic, and on this point I will only say to-night that this is a form of competition at which we rejoice. The American people, if once started, are apt to do the work in hand magnificently, and it is, therefore, especially necessary that the British Empire should not be backward in helping our gallant countrymen in their bold adventure. But we are here to-night to discuss Australian problems, which are many and complex, and I will, therefore, without further words, ask Captain Muirhead Collins if he will kindly commence the discussion.

Captain MUIRHEAD COLLINS: I am afraid I must trouble you with a very few remarks, as I have not had an opportunity till I came here of reading this very interesting lecture. The lecturer, Prof. Gregory, is well known to all of us in Australia. We attach the very greatest value to his knowledge, to his experience, and to his research, and therefore, to all Australians who are (as we all are in Australia) firmly convinced of the wisdom of the white policy of Australia, therefore I say to all of us who are Australians, his remarks and the arguments in support of that policy, and the facts which he brought forward to-night, give us not only hope, but the most cheerful optimism, to the successful issue of that

certainly very important and difficult problem which we in Australia have before us. If we successfully solve that, as we all hope we shall, we then shall afford to the world that example of a single continent—a huge continent—with one race—an ideal and an object that I am sure you all must agree is worthy of a struggle for its attainment. I hope that none of you here to-night, and I am sure I do not think Prof. Gregory intended you should, will go away with the idea that huge as Australia is, it after all is a big continent with merely a margin round it where the rainfall is sufficient to secure settlement. Australia is big enough to give away a considerable area to be unclaimed as desert, and yet have plenty left over to support a very large population, and it has been said that where the rainfall is somewhere between 14 and 18 inches, it is sufficient in our present state of knowledge, and we may hope yet to go further, to give all the advantages of settlement. Taking that rainfall and that standard (I have not the figures in my mind now), I know that we have in Australia certainly four times as much land capable even of settlement as there is, say, in a great country like France, where we see a considerable population. Also another authority has said, that even with our knowledge now and with our progress in the application of science to farming in dry countries, Australia is capable of supporting a population of quite 100 million at a high level or high standard of civilization. I think that, at any rate, will afford to us a considerable margin for a very active policy of emigration. The figures which Prof. Gregory brought before us to-night with regard to the increase of population were also equally instructive. It is significant, and it is a point often lost sight of, that, I think from somewhere about 1850 to 1900, the population in Australia increased ever so much more rapidly than it did in Canada, and now although we suffer in Australia from our remoteness, and in that respect we cannot compete with Canada, yet now that the attention of everybody in Australia is directed to the necessity of increasing our population, we shall enter undoubtedly upon a more active and more progressive policy. Also, I may say too, that as far as irrigation goes, although Prof. Gregory made some remarks with regard to perhaps the difficulties of irrigation over a certain area, I think a great many experts in irrigation are convinced that Australia offers wonderful opportunities to the irrigationist; that the contour of the country is most suitable for it; that the rivers we have provide, at any rate in certain areas, sufficient water when properly conserved to carry out large irrigation schemes. We are carrying them out in certain districts now. We have in the reservoir in New South Wales, where we are impounding the waters of the Murrumbidgee, an undertaking, I think, as big as that of the great dam of Assouan in Egypt. In agriculture knowledge increases very rapidly, and no doubt we will, as time goes on, increasingly find methods, and successful methods, by which we will more and more be able to combat the drought, and the drought, like other bogies—like the bogey of the impossibility of the white man to labour in tropical countries—will tend to disappear. Prof. Gregory's remarks with regard to that question on the people working in the sugar plantations, I think were most valuable, and those present who have not read his article in the last number of the *Nineteenth Century*, I would commend it to their attention, as in that article he brings forward some most convincing facts with regard to the sugar production in Queensland. I will not detain you any longer, as I dare say there are many others here who have a more extensive knowledge of some of these facts than I have.

Prof. L. W. LYDE: I do not think that I am in a position to speak, with so many gentlemen here who know the continent at first-hand; but there are two points I would like to draw attention to, believing all the time in a white

Australia. The first is that Prof. Gregory seemed to me to pass over the two most important results of the isolation of his continent. That isolation produced two exceedingly important political results. The first was that of all the continents on Earth, that continent alone has never been touched by war; more than that, she has never been touched even by fear of war. Consequently, all her great cities are down on the coast—put down where they ought to be, without any regard to any strategical defects of the position; and therefore from the very first they were in a position where they could command the maximum of trade and commerce. That is the fundamental geographical basis of the high *per capita* returns of Australian commerce. There was another result of that isolation. It made colonization so late in time, that when it did come it was with every possible advantage compared with Canada. It sprang into full birth at once, just as Germany more or less did forty years ago in her industrial life. The success of the wheat industry that Prof. Gregory referred to was due, in the great wheat colony of South Australia, almost entirely to the advanced scientific conditions under which the colony was settled. Then as to this matter of tropical settlement, he appeals to history and physiology, and says both are in his favour. I do not think for a moment either is. In the first place, the mere fact that children are born and survive in a climate is no proof whatever that the climate is suitable to the race to which those children belong. The vital question is, Do they survive true to type? The answer of history, under apposite conditions, is absolutely No; they do not survive true to type—Hindustan and Mesopotamia, Italy and Greece, all tell you the same thing. So do the French and the Spaniards in North America, where the French went too far north, and the Spaniards went too far south. Where a race moves to a climate fundamentally alien to them, the race invariably is modified, and in about 97 or 98 per cent. of cases it deteriorates. By all means have a white Australia, but see that the whites are white in temperament and mind as well as in colour and by birth. I do not understand what Prof. Gregory means about his physiologists asserting that there is no definite factor that you can mention. We know absolutely the physiological conditions that arrest the mental development of the negro in early youth; we know with almost equal certainty that these physiological phenomena are due to climatic control acting almost entirely through the particular food appropriate to the climate. And I feel sure that the researches of Prof. Sneddon and other sociological investigators in North America will end in proving that you can trace distinctly an increase of intellectuality in the negro in North America with change of climate from south to north, accompanying a corresponding change of food, so that the maximum of intellectuality amongst them will be found north of the line where rice and sugar cease to be natural foods. I feel perfectly certain that expert physiologists will say without any question of doubt in their own minds that no nation, white or black, can colonize a tropical monsoon climate without deteriorating. If anybody must deteriorate in that part of Australia, I say, then, let it not be the white man.

Sir JOHN TAVERNER: I promise you that I am not going to get between Prof. Lyde and Prof. Gregory, but I should like to tell you, as a layman, from my experience of the tropics, you will be surprised to know how the conditions have changed in the mode of living since the introduction of cold storage, and I am surprised that the opinion of the authorities quoted by Profs. Gregory and Lyde have not referred in any way to the great change brought about by the introduction of refrigeration.

In 1897 I had the pleasure of travelling through the sugar country in Queensland under the guidance of Sir Horace Tozer, who was then Acting-Premier of Queensland. I came to the conclusion that if we had had that soil in Victoria it would have been used for dairy farming in connection with our butter industry.

I desire to thank Prof. Gregory for the very interesting paper he has read

to-night, and, as an Australian, it is pleasing to me to know that Prof. Gregory does not forget Australia. There are persons who are now living in this country, who, although they owe their good fortune to Australia, forget that country altogether, and, in some cases, go so far as to express unkind sentiments towards her. I feel sure that I voice the sentiments of Australia in tendering our best thanks for Prof. Gregory's paper to-night. We are living in a distant part of the empire, the isolation of which has led us to adopt a policy of keeping our country for the white races. We are determined to give white labour the fullest possible opportunity in our tropical country. So far it has been clearly demonstrated that we can produce sugar with white labour. However, we can only ask the people on this side to bear with us, and give us their sympathy in helping us to carry out the policy that we conceive to be the best for our country. We venture to hope that the people on this side of the globe will remember that there is in these great overseas states room for great expansion, which is important in connection with the solving of that great problem of the Mother Country, namely, congested population. We are anxious to co-operate in every way with the Mother Country in promoting the best interests of the Empire.

Major T. B. ROBINSON: I should like to express the extreme pleasure with which I have listened to the lecture with which we have been favoured to-night. It is good to hear a man, who knows so well what Australia is, come here and in this great city tell the citizens of the Empire of the rich and wonderful land there is on the other side of the globe, and which belongs to them. It is one of the duties of the Agents-General in this country to keep on telling the people in Great Britain that these great possessions are theirs and waiting for them to occupy. I was very gratified, indeed, to hear so many good things about Australia; but the one great want we all of us realize is that of water. I am disappointed that Prof. Gregory is among those who think that the water we now get from artesian wells is likely to decrease. Most people hold the opposite view. Prof. Gregory mentioned in connection with water on the western side of that continent, that we were dependent almost entirely upon the water got from the shallow wells. Now to-day there comes a telegram from Melbourne reading as follows: "Borings carried out by the West Australian authorities on the route of the proposed trans-continental railway have resulted in water being struck at Madura, and also at a point 340 miles from Kalgoorlie. Sir John Forrest is confident of a good artesian supply which will greatly reduce the cost of the railway being struck, and add a new pastoral and agricultural area of from 20 to 30 millions of acres to Australia." I think it is extremely gratifying that this telegram should have come through at such an opportune moment, when the impression has perhaps been left upon your minds that Australia may be in places short of water. Of the great possibilities of Australia we have as yet only a most imperfect conception, and although there may be parts where water is very scarce, granted that there are inducements of another character to attract population, I feel satisfied that means will be found to give them an ample supply of water. When we remember the enormous rainfall, it seems very regrettable that means have not yet been discovered for retaining that water upon the surface, and utilizing it for irrigation and other purposes. In the wet seasons the surface of the sea at the mouths of the great rivers, and for miles outside them, is soiled and discoloured with the muddy deposits which have been brought down the rivers by the rains. I do not quite understand the disadvantages which Prof. Gregory spoke of in connection with those two large tracks of pastoral country, the one on the west and the other on the east side of the northern territory—how they are handicapped by the fact that their outlet is through another state to the sea coast. I think now that Australia has federated any such disadvantage

has almost disappeared. I should like to thank Prof. Gregory for the comforting assurance he has given us with regard to the sugar industry. A great many people were once in considerable doubt as to whether sugar could be profitably grown by white labour, and it is very gratifying to find that 90 per cent. of the sugar is now grown entirely by white labour.

Mr. WM. DAVIDSON: I thank you very much for the privilege of being present here to-night to hear the paper by Prof. Gregory, whom I have the honour and pleasure of knowing. We were officially associated to some extent in Australia. I am in accordance with what he said with regard to the development of Australia in almost everything, except in regard to the general application of irrigation. There are very limited supplies of water in Australia, and we are in Victoria doing the best we can with our portion of them. I think the arable land of Australia is infinitesimal compared with the whole extent of the continent, and I think it is confined entirely to the south-eastern portion of the island, that is to say, Victoria and the section of New South Wales stretching west to the River Darling. Irrigation is not so much wanted on the belt east of the Dividing range, where there is an ample rainfall and rich soil capable of assimilating it. I am very sympathetic with Prof. Gregory's optimism as regards white labour in Queensland. I do wish he would come out to Australia once again, and make a trip, not into the sugar-growing country of Queensland, but into what I think, after all, will be the great asset of Australia—the north-western portion abutting on the Indian ocean from Point Darwin to the lat. 20°, and all those great tracts of country, which would produce all the artillery horses the English army and all the armies of the world would want, if they were only bred up properly. If he would take one of his lightning visits, we would obtain from the Professor a lot of information which would be valuable to us.

The PRESIDENT: As the time is getting on, I think I had better bring this discussion to a close, and call on Prof. Gregory to reply; but I am sure I may, in your name, thank him sincerely for his most interesting lecture. Both your applause and the way in which you have listened to the lecture must have convinced him that we have been all exceedingly interested in what he has said. I will merely thank him sincerely for his lecture.

Prof. GREGORY: I thank you, sir, and all the speakers for their kind remarks about my paper. One or two points have been slightly misunderstood. In regard to the area available for irrigation, I quite agree with Mr. Davidson that it is very small in proportion to the total area of Australia; but along the Murray and the Darling, and the rivers of the eastern coast and those of the northern territory, there are extensive areas which are extremely well adapted for irrigation, as Captain Collins has pointed out. I quite agree with Major Robinson that the real solution of Australian water difficulties is the storage of water. The amount of water which runs wasted to the sea in the winter is enormous. Australia has undertaken the construction of storage reservoirs on a larger scale than any other continent. Major Robinson asked in what respect the pastoral areas in the southern part of the northern territory would be handicapped by not having an outlet to the sea in the same state. It is quite true that since the Federation there are no interstate Customs, and the areas would get their products to the coast without any customs dues; but they would be under different administration as regards railway development, agricultural and mining regulations, education, and the many other departments still left to the State Governments. Hence there would be an artificial divide between these districts and their natural outlets, and I think it would be much better if they could be kept under the same local administration.

In regard to the white labour on the sugar-plantations, I may say that when

the Act was passed in 1901, I was very doubtful as to the chances of the experiment. I remember asking two distinguished Australian politicians whether they did not think it was rather a reckless step to take. The view has been expressed in this country that the policy was forced upon Queensland by the Labour Party in the Southern States; but this was not so: it was forced on the Government by the overwhelming demand of the members from Queensland itself.

I was extremely glad to hear of the discovery of artesian water in the area along the proposed trans-continental railway east of Kalgoorlie. It has been known for a long time that there is artesian water under that country, but all that has been obtained is so salt that it is of no use. It has been confidently hoped that fresh water would be found in that area, and thus remove the great difficulty in the way of the trans-continental railway. On the assumption that the newly-found water is fresh, we can congratulate Australia on this valuable discovery.* With regard to Prof. Lyde's remarks, I have been carefully into the physiological arguments, and have come to a different conclusion. His remarks show how great a change has taken place in the position of those who object to the possibility of tropical colonization by the white races. Until recently the point advanced was that no white men could work in the tropics. That position has been abandoned, and the difficulty with tropical climate is not its immediate but its ultimate effect, by injury to the type. That is much more difficult to check, because it is a prediction for the future. The evidence from the Spaniards in South America I do not think is worth much, because so many other effects than climate have contributed to their change of type. The statement that whites degenerate in India, if they live there generation after generation, was contradicted in 1873 by Sir Joseph Farrer. He refers to his examination of white people of the third generation born in Calcutta, and he tells us that "neither in physical nor mental properties was there anything to suggest marked degeneration." The opinion of such a distinguished medical authority shows that degeneration from type when people are living under suitable conditions is unnecessary. I quite agree with Prof. Lyde that if people live on unsuitable foods, they will degenerate; but food is not climate. The improvement in the negroes in the northern states of America has been due to improved conditions of life and food, and not due to climate. So many of the factors which have been claimed as causing degeneration are not climatic, and can be eliminated, and I am sure that when the white people settle in tropical Australia, they will be protected from these known causes of degeneration.

THE RIVER UAUPÉS.†

By HAMILTON RICE, B.A., M.D., F.R.G.S.

THE Uaupés or Caiary is one of the great tributaries of the Rio Negro entering that stream from the west, and is of salient interest geographically, ethnologically, and perhaps for its commercial possibilities.

In 1854 Wallace ascended the river to its Cuduary affluent, and about this time Spruce journeyed up the stream for a short distance. Stradelli, in 1891, reached the Jurupary Caxoeira, 71° 9' W. long., and in 1904 Koch-Grünberg ascended to El Dorado, a point ten days'

* Information since received from Australia describes this water as "stock water." so it is apparently brackish.

† Map, p. 744.