Colonization and Irrigation in the East Africa Protectorate: Discussion

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APPENDIX II.

RAINFALL. EAST AFRICA.

										Approx. average rainfall in inches.		
Coast—												
Kismayu	...	...	...	...	...	...	...	...	...	14.9	Average say 36	
Malindi	...	...	...	...	...	...	...	...	...	38.3		
Lamu	...	...	...	...	...	...	...	...	...	28.9		
Takaungu	...	...	...	...	...	...	...	...	...	40.4		
Mombasa	...	...	...	...	...	...	...	...	...	44.0		
Chuyu	(Wanga)				...	...	...	...	...	50.0		
Inland—												
Kibwezi	...	...	...	...	...	...	...	...	...	25.7	say 36	
Machako's	...	...	...	...	...	...	...	...	...	34.0		
Fort Smith (Kikuyu)	...	...	...	...	...	...	...	...	...	41.6		
Munia's (Kavirondo)	...	...	...	...	...	...	...	...	...	67.8		
Nairobi	...	...	...	...	...	...	...	...	...	say 40.0	say 60	
Uganda—												
Entebbe	...	...	...	...	...	...	...	...	...	(?) say 50.0		

For details see "Annual Rainfall in British Africa in Inches" (p. 395 of *Report of the British Association*, 1901).

Before the reading of the paper, the CHAIRMAN (Colonel G. E. CHURCH) said : I now have pleasure in presenting Mr. Buckley, who will favour us with his paper on "Colonization and Irrigation in the East Africa Protectorate."

After the reading of the paper, the following discussion took place :—

SIR FRANCIS O'CALLAGHAN : I was fortunate in being in East Africa at the time the author of the paper just read was on his tour, and still more fortunate in having had the advantage of his company on the journey between Nairobi and Uganda proper, including the visit to the Ripon falls and the return across the lake to Port Florence. The author has touched but lightly on the question of colonization, but this question is of supreme importance to the future of East Africa. He mentions that the country might be peopled with surplus population from India. In this opinion I fully concur, and, moreover, that it is the only feasible plan for ensuring an industrious population, and for the supply of labourers for such portions of the country as may be suitable for white settlers. No matter how good the climate, white men will not do manual labour where they are surrounded by inferior black races. The difficulties now encountered in South Africa exemplify this fact. Until the vast regions still available in Canada, South Africa, and Australia have been filled, it seems unlikely that tropical Africa will attract white settlers except as planters or traders. The importation of Indians will, to begin with, be costly, as whole families must be brought over at the expense of the State, and supplied with food and shelter until they have time to clear and cultivate sufficient land for their own maintenance. The natives of East Africa, so far as the experience of the railway constructors go, are essentially lazy and incapable of sustained labour. So long as they can grow sufficient food to support life, they will not work continuously. When they find a dead animal they eat it raw, tearing off the flesh like wild beasts.

The soil for the most part in the districts traversed by the railway is rich, but very porous, hence rain falling on it rapidly disappears. The rainfall of one year compared with another seems very irregular, some being very dry, and others wet. The year previous to the author's visit was, as regards the district between the Great Rift valley and the lake, an exceptionally dry one, while since that visit in

April last there have not been three consecutive dry weeks, and [only on two occasions have two weeks in succession been without rain. Shortly before the visit of the Secretary of State for the Colonies there was a downpour extending over a considerable area in this district, which exceeded an average of 1 inch per hour for four hours, doing much damage to the railway works. Had it not been for this damage it might have been possible to have taken Mr. Chamberlain's party right up to the lake, but his time being limited, no risk of detention could be taken.

The potato trade mentioned is making fair progress, the exports to Zanzibar and to South African ports being steady, and as much as 60 tons has been exported in a month. An export trade in beans, which promises well, has also arisen.

Regarding the author's remarks on the prospects of irrigation, it would be an impertinence for any one not himself an expert in this branch of engineering to criticize even favourably the opinions of one of the leading irrigation experts of India.

Sir HARRY JOHNSTON : I have not anything of very great importance to add to the interesting and instructive paper to which we have listened; in fact, I came here more to be informed than to offer any information. But I may perhaps add a few words about the subject of the gauges and the attempts to ascertain the varying levels of the Victoria Nyanza, and perhaps a few additional words about the Nandi plateau. I think one reason why there is such a remarkable divergence in the records of the levels of the lake is, that perhaps those of us who in the earlier days fixed the places where these levels were to be ascertained chose unwisely. Of course we thought, to begin with, of places which were safe and where we had European agents established; but Lubwa's, I should think, is not a good spot at which to get accurate levels of the Victoria Nyanza, for already there is a discernible current trending away to the Ripon falls and the discharge of the Nile, and this possibly may influence to a slight extent the level of the lake at Lubwa's compared with the level at Entebbe and some other points. I should be disposed to suggest, if we wished to get the general level of the Victoria Nyanza, the best way would be to obtain those records from some of the islands that fringe the northern shore, where the level of the water would be more generally distributed, and not so much driven up into narrow gulfs or affected by the outfall of the Nile at the Ripon falls. There is no doubt the effect of the wind on the Victoria Nyanza is very remarkable. At some seasons of the year it seems to establish—for the wind is not uniform—it seems to establish something like a regular tide, with an average foot rise and fall at the head of the narrow gulfs. Mr. Fowler, who is at the head of the Uganda Marine, and who has known the Victoria Nyanza now for several years, is of opinion that the effect of the wind is to establish a certain rocking of the lake, a certain uniform rise and fall, especially in the gulfs and estuaries, which are the places up to the present where most of these stations for recording the rise and fall have been established. Then another point that is interesting as regards the Victoria Nyanza is the discernible current right across the lake from the mouth of the Kagera (the most important affluent to the Victoria Nyanza), right across into Napoleon gulf, and so out at the Nile. It really looks as if the Kagera was the ultimate source of the Victoria Nile. Another interesting point for investigation, as our knowledge of Africa increases, is that the Victoria Nyanza seems to be a basin with a narrow rim all round. Perhaps it may be found that the structure of the rocks along the northern coast is such that it is possible for the waters to filter away through the rocks. Although there is only one ostensible outlet, yet you will find many streams rise within a few miles of Victoria Nyanza—rise from the rim and flow northwards to feed the Nile. When Captain Speke first traversed those regions, he actually believed and recorded on

his map that the Victoria Nyanza had four outlets. But, as a matter of fact, there is only one actual outlet; yet within a few miles of the waters of the Victoria Nyanza, from the slope of those hills or downs which rise to a height of about 1000 feet above the level of the lake, from their northern slope, pour away those marshy streams. Then again, on the south shore, it has been remarked how very near to the waters of the Victoria Nyanza rise the streams which flow into Lake Tanganyika. Again, all this considerable tract of country to the south of the lake is much below the level of the Victoria Nyanza. Here, again, we seem to have a very narrow rim of land that is but a little higher than the level of the Victoria Nyanza, and not very much higher than the lower country beyond the lake's basin; but it is quite conceivable that, by some slight change in the surface of the land here, the waters of the Victoria Nyanza might flood all Unyamwezi and drain away through the Congo basin to Tanganyika. Mr. Fowler, who has studied the Victoria Nyanza more perhaps than any other European, is of opinion that it is a remarkably shallow lake compared with Tanganyika. He went to the middle of the lake, and the deepest soundings were only 240 feet, which is comparatively trivial compared with Tanganyika. I might say a word of the very important province Kisumu (the Nandi plateau), which was not alluded to directly by Sir Francis O'Callaghan. If the Uganda Railway needed any justification as apart from a means of reaching Uganda, it would receive that justification in this tract of country, which is the most valuable part of the whole East Africa Protectorate. Here there are abundant streams of water; here you have in many parts no inhabitants at all, in any case fewer inhabitants than in the sparsely populated country round Nairobi. The land is more elevated, covered with rich grasses, and is entirely free from the tsetse fly, and I think is most obviously suited for the settlement of white people. No doubt, between the Rift valley and the coast there are many tracts which could be colonized by Indians.

Mr. T. E. FULLER (Agent-General for Cape Colony): I did not at all expect to be called upon this evening, and I have certainly no information whatever to add to the very interesting address which we have heard to-night, particularly from Mr. Buckley. I have been extremely interested in what I have heard, and been reminded of this fact: that the problems we have had discussed to-night are really the problems of all South Africa—I mean the irrigation problem; the great problem how to turn comparative desert, in which there may be various elevations, various descriptions of climate and population, into habitable country; and it has been my pleasure to talk to Mr. Buckley about our own problems in Cape Colony, and now in the Free State, and in the Transvaal, and they are very similar indeed to these problems which we have had described to-night. It may not be known, perhaps, to all that really there is no certain cultivation—I was going to say, south of the Zambezi—except just on the fringe of the coast, without irrigation. In the Transvaal, it is true, there are parts of the country where you may, to a considerable extent, reckon on rainfall; but taking it generally, apart from the fringe of the coast, you need the engineer to store your water, and bring the various tributary streams from the mountains. At the foot of the mountains the Dutch build their homesteads, so as to be near the watershed. I have been extremely interested in irrigation. Let me say there was no one more warmly interested in the whole of South Africa, more profoundly interested, than Mr. Cecil Rhodes. I had the pleasure of being a neighbour, a friend, a political and social friend, of Mr. Rhodes' for many years, and if we got a little dull over politics—for we frequently met—we used to lead him to the map of Africa; for he knew every part from north to south, and his table was one of the most interesting meeting-places, people from the interior constantly coming in with their little quota of information. There

are other problems, political problems, but we have all to learn that for the real advancement of the country, the material and physical problems are of far greater importance.

Captain R. CRAWSHAY: I do not know that I can add anything to the weighty paper now under discussion, unless it be a few words on Kikuyu, a district to which Mr. Buckley has made passing allusion. What he has said in its praise I can more than endorse, after a three years' residence there off and on. It is indeed a beautiful country, with a climate as healthy and pleasant as any man's heart can desire. It is primæval forest highlands lying at altitudes varying between 4500 feet and the regions of perpetual snow on Mount Kenya—or Kilinyatha, to give its native name—18,600 feet. As far as my experience goes, no malaria is present above 7000 feet. There are everywhere plenty of clear, cold perennial streams, also two rainy seasons, producing a regular rainfall similar to that of the west of Ireland. There is, therefore, no need of that irrigation which would be necessary to develop the Ikamba plains. Anything will grow—except such fruits and vegetables as thrive only in the extreme heat of the low enervating coast. But having said this, the practical question has to be considered, "Where will be the market for produce so raised?" If this problem can be satisfactorily solved, Kikuyu offers a promising and delightfully novel field for colonization by whites, with three advantages at least over South Africa. There is timber in abundance, giant timber, fit not only for local use, but probably destined in the future, like the forests of Western Australia, to supply the wants of other countries across the seas. There is everywhere ample water. There is a good supply of native labour in the Akikuyu—fine, strong, healthy men, whom I have always found willing to work provided they are considerably treated and not too heavily tasked at the commencement.

Colonel CHURCH: Mr. Buckley's paper is of immense practical importance. We discover countries, we explore them, we make our maps, we give a lecture, and we tell the world what we have found; but Mr. Buckley comes here this evening and tells us what we can do with what we have found, and how it may be adapted to the wants of civilization. But there is one thing, I think, that has not quite been told us, and that is, how are we going to get the white man to work alongside the negro? That is the great problem which the world has been trying to solve for very many centuries unsuccessfully. Whether it can be done in East Africa or not may depend upon the genius which is brought to bear upon the administration of the Protectorate. We are told here by Sir Francis O'Callaghan that the negro "will not work." Well, in that respect he is a great deal like the white man—he won't work unless he is obliged to. With reference to the Victoria Nyanza, we have heard much of value. If the evaporation is as great as Mr. Buckley indicates, but with reservations, it is a matter to be taken into consideration; but if, on the contrary, as Sir Harry Johnston says, the water may possibly be drawn off towards Tanganyika, or may water the country to the east of Tanganyika, then the ideas which have been expounded regarding this evaporation have to be somewhat changed. In fact, here is a problem of interest, not only to Africa, but to any country containing large lakes where the evaporation is so great as it is in the equatorial regions. The railway work we have heard described is not only a credit to engineering science, but a proof that English energy leads civilization by the hand. Mr. Buckley touches upon the great problem of irrigation. The turning of many rivulets upon a thirsty soil has made powerful nations; the irrigated *vegas* of Spain were the true sources of the glory of its Moorish kingdom for 750 years; the vast belt of arid country extending from the eastern Mediterranean sea across Anatolia, Syria, ancient

Persia, and into north-eastern India, has witnessed the rise and decay of many an empire, the grandeur of which has been due to the little threads of water which have trickled over its lands guided by the hands of the husbandman. The human race appears to seek such arid districts by preference, and this has been so from the earliest times, as is attested by the ruined cities of Central Asia. The Peruvian neglected the fertile lands of the Amazon valley slope for the arid lofty plateaux of the Andes. Similarly, the Mexicans shunned the tropical districts for the dry tablelands, which, by irrigation, they made the basis of a state which reached the highest status of barbarism found in any country of the New World by the Spanish conquerors. To-day the United States has adopted a plan for irrigating its arid lands on a vast scale, and is applying a fund of several millions of dollars yearly to the work with immense beneficial results. In California, from 10 to 20 acres of irrigated land are now considered as the equivalent of 160 not thus treated.

Would it not be wise to give the native population of East Africa a few object-lessons in irrigation? Perhaps the judicious application of £100,000 would do this with great resultant benefit to the railway and to all concerned. I think it only remains for me to thank Mr. Buckley for his extremely interesting paper, knowing that in doing so I only express your wishes.

GEOGRAPHICAL DISTRIBUTION OF VEGETATION IN YORKSHIRE.

By Dr. WILLIAM G. SMITH, Yorkshire College, Leeds, and C. E. MOSS, B.Sc.

INTRODUCTION.

THE two maps * and accompanying text, here submitted, are the results of a survey of the vegetation in the West Riding of Yorkshire, conducted on principles which have not previously been employed in England. The work was begun in 1898, in order to test in Yorkshire the method of botanical survey which the late Robert Smith was at that time developing in Scotland. On the completion in 1900 of the first maps of the Scottish Botanical Survey—Edinburgh and North Perthshire (1900) †—it became evident that the method gave good results; and the survey of the West Riding was then systematically undertaken as opportunity offered. The first results of the experiment, maps covering over 1700 square miles and a summary of observations, are now submitted. It is considered most convenient to publish these in two parts, the first including the south-western district of the West Riding, the second including the north-east part of the Riding. In the first part Mr. Moss's work is incorporated, Mr. Rankin's in the

* The second paper and map will probably be published in June.

† The numbers in brackets after an author's name indicate the year in which a book or paper was published. The titles of the works referred to will be found in the List of References at the end of this paper. The authors' names are arranged alphabetically, and the papers of each author in chronological order, with the year-number in brackets. In the case of a periodical, the number in brackets is the year of publication of the paper referred to.