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Notes on the Construction of a General Map of Africa, 1/Two Million: Discussion

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Source: *The Geographical Journal*, Vol. 52, No. 4 (Oct., 1918), pp. 233-237

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1779890>

Accessed: 23-06-2016 03:16 UTC

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7. *Sound of English s (as in set).*

Gdk.	Njassa	Kissegesse	Kisserawe	Sakare
K.	Nyāsa	Kīsīgesī	Kiserawa	—
G/3	Njassa	Kissegesse	Kisserawe	Sakare Msassa
P.	Njassa	—	Kisserawe [U. Sakarre]	[U. Msasa]
1/2M	Nyasa	Kisegese	Kiserawe	Sakarre Msasa

8. *Sound of English z*

Gdk	Sansibar	Msimbasi	Russisi	Masinde
K.	Sansibar	—	—	—
G/3	Sansibar	—	Russisi	Masinde
P.	Sansibar	[U. Msembazi]	Russisi	[U. Mazinde]
1/2M	Zanzibar	Msimbazi	Rusizi	Mazinde

These examples show that though as a general rule

German tsch	= English ch
sch	sh
ss	s
s	z

there are many inconsistencies in the hearing or representation of sounds, and transliteration by rule is a balance of probabilities. The publication by the Government of G. E. A. of the Usambara map marked a considerable step in advance, recognizing the unsuitability of the usual German equivalents for sounds in the Bantu languages, as in the name Mtschorotschogoro ; unfortunately the principle was not extended to the rest of the country.

Such are some of the difficulties which must arise from the divergence of tongues in which African names have been written. We cannot hope to avoid mistakes, but we do look forward to the time when there shall be a Board of Geographic Names for Africa, which shall standardize them to some extent before inconsistencies have become "conventional" and therefore sacred : e.g. Khartoum and Sudan.

To all who have helped and are helping in the preparation of this map our grateful acknowledgments are due. Much unpublished material has been placed in our hands, both from official and non-official sources, which will be acknowledged as far as possible in the list of Authorities for each sheet. The ladies and gentlemen who form our special war-staff have worked enthusiastically ; we are especially indebted to those who have been able to volunteer their services, and scarcely less to those who have worked devotedly on a minimum of pay.

Before the paper the PRESIDENT said : Our Secretary has devoted much time and attention to our compilation of a new map of Africa. Nobody could be more competent than he to tell us the methods which he has followed, and I trust that, amongst other things, he will tell us with all due candour exactly what he thinks of the value of the material on which he worked.

(*Mr. Hinks then read the paper printed above, and a discussion followed.*)

The PRESIDENT: I should like to begin the discussion by saying a word on map compilation. Having been for a great many years at the head of a map-compiling office, I have, no doubt, some crystallized ideas on the subject; and it is exceedingly interesting to me to see how methods change, and in some ways improve, in the matter of compilation. The compilation of this map of Africa is very analogous to the compilation of the frontier maps of India; both have to deal with a large amount of diverse material, some of it doubtful, some absolutely bad, and some of it really based on sound survey. But there was this distinction between the work out there that I have had to deal with and this African map, that in India there was no possibility of delay. A map might be made in the course of one month, and expected to be in the hands of Government the next. Examination and correlation of all the material must be condensed into a few days, or at most a few weeks. There are three distinct classes of work: First the more or less regular survey carried out during the progress of a campaign or expedition into new country; secondly, the endless amount of work derived from the political business of settling boundaries, generally speaking based on tolerably sound foundations; and finally, the work of explorers who succeed in getting beyond the limits the professional surveyors can reach, and who bring back work of varying value which is often a very great trouble to the compilers. The difficulty arises from the fact that a traveller who goes over country which he thinks to be new, believes absolutely in his own work and will give very little credit to what has gone before. Travellers often go into the field misinformed, or only half informed, as to what has gone before them; they may entirely overlook an existing strong backbone of triangulation on which to work. And they constantly criticize the work of others where they happen to touch it, though they do not know their own position. I do not want to give you another lecture on the subject, but it would be very easy to enlarge the discussion into several hours over the matter of map-compilation. I will just call your attention to some work that has come into our compilations in India. The first is a little map of the military position at Dargai on the Afghan frontier. An action was fought there which has been very much misrepresented, and while that action was being fought a native surveyor made the map; there are about 25 or 30 square miles of it, and that was his day's work. At the end of the day he had to sit down and by the light of the camp-fire make a fair drawing of it. Next morning he had to produce a tracing which by means of some sun-printing process could be printed off. That was in the hands of the general who commanded the force by the evening of the day after the action had taken place; and after the military authorities had put on the face of the map their views—probably traced in red—as to the particular lines on which each column acted, and the details of the day's action, the map was sent in to headquarters. Such a map had to be done literally in two days. I have another fine piece of work which carries a certain lesson with it. I always regard it as a specimen of the way in which, under military exigencies in the field, work ought to be done in a hilly country. The work was done by Captain Robertson. While he got in all the information necessary for military purposes, he carefully left all details of hill drawing for subsequent elaboration. Captain Robertson was the officer who assisted me so greatly in the Andes on the boundary between the Argentine and Chile. He carried that class of survey from the north of Tierra del Fuego to Lake Buenos Aires, some 400 or 500 miles, in the course of two seasons; on that the boundary was determined.

Major WOLFF, D.S.O.: Mr. Hinks mentioned that it was proposed to make one sheet of the new map correspond to four sheets of the 1/M map. Might I ask what rule will be adopted for numbering those sheets. It seems to me that a very suitable nomenclature would be A, B, 32, 33; and so on.

Dr. J. W. EVANS: Might I ask whether Mr. Hinks has noted that a number of Portuguese and possibly Brazilian place-names have been imported into Africa. I notice in the reproduction of a table from Mr. Knox's book that there are two names evidently Brazilian, Japura and Ceara, one a well-known Brazilian river and the other a town. We do the same thing in our own colonies, and I should suggest that one would naturally retain those names as being thoroughly Portuguese.

Mr. HINKS: There are a number of purely Portuguese names on the map—for example, Pundanhar—and some of which it is difficult to say whether they are Portuguese or not. I am glad to have Dr. Evans' suggestion that some are Brazilian. Ceara did not look to me like a Bantu name; it is evidently a mistake to include it in a transliteration table.

Captain OGILVIE: I should like to say how glad I am to see this map-work being done on regions for which we have never had any reliable maps on these scales. For two reasons it gives me pleasure: first, because in providing maps for the army one is constantly feeling the lack of full small-scale strategical maps on which the relief of the country is well shown; and secondly, because in teaching geography a decent map of Africa on that scale is most useful.

Major LANGTON: I came here this afternoon to see some of the valuable work which the Royal Geographical Society is doing. I do not think we all quite appreciate how much work is done by private individuals as well as by the Government. Many are working and giving their time and knowledge to helping the various departments in this matter, and my particular department will be very much indebted to the Royal Geographical Society for this map of Africa.

Mr. A. E. YOUNG: Mr. Hinks was kind enough to refer to the projection which I calculated for this map: I am much obliged to him for giving me this work to do, because I found it very interesting, and it led me to examine the whole subject and to get some results which I think were interesting and useful. It is a technical subject and difficult to explain verbally, so I will not trouble the meeting very much with it; I hope to publish some of the results later on. But with regard to the projection for this map of Africa, the International Map projection, I found that up to a very considerable longitude from the central meridian this polyconic projection is practically the same as Cassini's projection; the longitude scale only differed by 2 per cent. But Cassini's projection is cylindrical, and only a particular case of a conical projection. It will improve a conical projection by making two parallels standard. That is similar to what M. Lallemand did. He took the error of the extreme east and west line meridians and gave half to the central meridian. You can either make the error over the whole map as small as possible, or make the maximum error as small as possible. M. Lallemand adopted Tissot's criterion, and I do not know whether he knew that he reduced the maximum error by fifty per cent. by this small correction. For myself, I think Airy's criterion the better. You get a rather larger maximum error, but a small average error.

Mr. MCCAW: I am afraid if I were to deal with all the matters that interest me I should detain you very much too long. I was greatly interested in the map dealing with the great volcanic region on the south of Lake Edward, and should like to ask whether the change to which Mr. Hinks has referred at

the south of Lake Edward has altered to any extent the previous course of the Kagera River, which we have always accepted as the extreme source of the Nile, rising from along the borders of Lake Tanganyika. The lakes on the other side of Tanganyika are remarkable. From one of the stations which I occupied I counted no less than twenty-two, all lying like punch-bowls just round about the station, with a rim of sulphurous deposit round them. All surveyors have had great trouble with place-names. It is a subject which leads to endless discussion, and I shall refer only to one small point: the *ch* which in Portuguese appears sometimes as *sh*. In moving up from Northern Rhodesia I have never found that *sh* pronounced otherwise than as the *ch* in *church*. It is so common a prefix to Bantu words that I think we may take it that is really the proper sound. It is used in a most extraordinary way, frequently meaning "sir" or "great." For example, a Bantu is not accustomed to a water-carrier as big as one of our buckets, and consequently when he is provided with a bucket he considers it a very large article which deserves a special name. Therefore, in order to honour it he puts *ch* in front of its name.

Mr. REEVES: This is a very important map, and one that was greatly needed; the old French map was altogether out of date. But apart from that there is no complete map of Africa on anything like a sufficiently large scale to be of use. The weighing of the material for a map of this sort is a most serious question. It ranges from first-rate triangulations such as we have of Algeria, Tunis, Egypt, and parts of East Africa, to stuff really not worth calling mapping at all. It is, of course, very difficult to appraise the material. I think we have done the best we can, but one feels that it is not very satisfactory in all parts. The question with regard to Mr. Last's Survey has rather shaken one's confidence in what one has always considered quite reliable traverses. Here is a man who starts off after a good long training, with good instruments, and after he has got only 120 miles he makes an error, apparently, in longitude of something like 30 miles in an astronomical position. We want some way of mapping, or some supplement to the map, to convey an idea of the value of the material in each part. It is a difficult thing to show on a map itself. You want some sort of a handbook accompanying the map, so that people who have to map later on can see what reliance has been placed on material.

Mr. HINKS: Major Wolff asked a very pertinent question. There is no doubt that we should put upon the margin of the map the numbers of the 1/M sheets which it covers. We should at the corner of the map covering sheets A 32 and 33, Bt32 and 33 write A, B, 32, 33. But I think we must give each sheet a name as well. We find we have some sixty sheets of the 1/M map of Europe. The numbering of the sheets does not provide a ready means of reference, and in the 1/M map each sheet had to be named by the principal town in it. In a much larger sheet, such as British East Africa, there is sometimes a difficulty about calling it by the name of any particular town, and we have adopted names such as Congo Forest, Limpopo, or Chad. I think it will be found that those are the names that will really be convenient for reference to the sheets, although they will have their 1/M numbers also. Mr. Young gave us a foretaste of what I hope will turn out a most interesting paper which he will some day read at one of the afternoon meetings. The result of my having asked him two years ago to compute this projection has been most happy. He got thoroughly interested in the subject, and in the course of his investigations has produced a number of perfectly new results which have thrown a great flood of light upon the whole question and will, I believe, be a contribution to the

subject of first-rate importance. It has come out very markedly in help he has more recently given me for the 1/5M map of Asia, a much more difficult question. I should like to emphasize my appreciation of the very great services Mr. Young has rendered. Mr. McCaw's question, whether volcanic change could have affected the source of the Kagera, I am unable to answer. I am not sure whether any competent geologist has been to the source of the Kagera ; it is rather east of the parts affected by the great volcanic outburst in the western rift. However, if it is true that Lake Kivu used to be in the Nile system, then clearly the volcanic outburst has affected the source of the Nile very materially, although not at the particular point Mr. McCaw mentioned. In closing, I should like to express my thanks to those who have spoken all too appreciatively of the work we have been trying to do here, and also to call attention to the fact that we are for the first time making a serious attempt to produce a layer-coloured map of Africa upon an adequate scale. We cannot expect to get contours at close intervals because the parts sufficiently well surveyed are very slight ; but we have tried to make contours at intervals of 500 metres, and when they are layer-coloured you do get a representation that is beginning to be satisfactory of what is, I think, the most interesting country in the whole world, the lake region and the two rift valleys of Central Africa.

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## GEOLOGICAL INTERPRETATIONS OF GEODETIC RESULTS: A CRITICAL EXAMINATION OF MR. R. D. OLDHAM'S RECENT TREATISE ON HIMALAYAN STRUCTURE

Sir Sidney Burrard, F.R.S., Surveyor-General of India

THE alluvial plains of the Ganges conceal from our view a deep "trough" that has been formed in the Earth's crust. The "trough" is bounded on the north by the Himalayan Mountains and on the south by an ancient tableland. This "trough" was called by Suess the Himalayan Foredeep; its origin and its relationship to the mountains are among the unsolved problems of geology and geophysics.

For many years the Trigonometrical Survey of India has been taking geodetic observations over both hills and plains : it has determined the direction and the intensity of gravity at numerous places. During its operations its chiefs have frequently had the benefit of consultation with foreign delegates at International Geodetic Conferences, and with successive directors of the Geological Survey of India. The gap between geology and geodesy is, however, difficult to bridge : the students of the two branches of science have been differently trained, and the best hope of future progress lies in personal collaboration.

Mr. R. D. Oldham, F.R.S., has lately published a memoir ('Memoirs, Geological Survey of India,' vol. 42, part 2, 1917) entitled "The Structure of the Himalayas, and of the Gangetic Plain, as elucidated by Geodetic Observations in India."

When a book on Geodesy is written by a professional geologist it