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Notes on Journeys Taken in the Kalahari Desert

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between the two Commissions had always been of the most cordial nature. The courtesy and experience of the Brazilian commissioner, Admiral Guillobel, and his able staff need no testimony from me. Their work is written on forty years of boundary delimitation. In the valley of the Paraguay 1909 was an exceptionally dry year, hampering the navigation of the river. On September 20 we left Corumba in a small tug for Assuncion, were captured by revolutionaries, and ultimately reached Buenos Aires on October 11, and La Paz on November 9.

At the request of the Government, I have undertaken to explore and delimit the new frontier with Peru, which in the region of the river Heath is still unknown, and to complete the delimitation of the frontier in the Acre, which I explored in 1906 and 1907.

The exploration of the Heath promises to be interesting. It is the happy hunting-ground of the Guarayo Indians, the most hostile and warlike tribe in South America, for which reason it has remained unexplored from a short distance up from its confluence with the Madre de Dios. The Government has considerably agreed to the employment of six ex-soldiers of the British army, in order to minimize the risks and avoid the danger of abandonment by locally contracted peons and Indians in tight places. There will be lucrative employment for them in Bolivia after the work. The Government, moreover, have been so appreciative of the work done as to have commissioned me to arrange for the temporary services of two more British officers for geographical exploration.

I sincerely trust that this little wedge of amity will be followed up. The march of development in Bolivia has been very rapid in recent years. The days of revolutions are past, and no credence must be placed in mischievous exaggerations, such as were cabled from La Paz over the Argentine arbitration award. The country is interesting from any point of view, its officials are broad-minded, and its people most hospitable. I do not hesitate to assert that the country is entering upon an era of most remarkable prosperity.

NOTES ON JOURNEYS TAKEN IN THE KALAHARI DESERT.

By ARNOLD W. HODSON.

THE two chief places from which expeditions, as a rule, start into the Kalahari desert are Molepolole and Kanya. The former is the capital of the Bakwena reserve, and the latter of the Bangwaketse. There are two well-beaten roads from these two places to Lehututu, a place lying about 300 miles west, far into the Kalahari. The country between Lehututu and the German border is practically unknown, and when I first went into it it was shown as a blank on the map. I intend, therefore, to give a short account of the roads from Molepolole and

Kanya to Lehututu, and a more detailed account of the country lying to the west of it, with a rough sketch showing the places I touched in my wanderings.

On the Kanya road there is water in pits at Sevrelela, Kooi, Sekgoma, and Kakia. From Kakia there is a very long thirst (or dry stretch) to Lehututu, the distance being about 110 miles. These long thirsts are accomplished with a bullock waggon in the following manner. It is difficult to lay down a hard-and-fast rule, as so much depends on the condition of the bullocks, the time of the year, etc. I have always found it the best plan to trek out about 20 miles, outspan, and send the bullocks back to water, letting them rest there a couple of days. The bullocks would then be driven out to the waggon again and inspanned. We would then travel for two nights, when we should be about 20 miles from Lehututu. The bullocks would then be sent on to get a drink and a rest, and after that would be driven back to draw the waggon in. All travelling in the desert is done at night, and the water for one's consumption is carried in barrels under the waggon.

There are a great many pans all along this road, and in the rainy season most of them hold water, so that then travelling is quite an easy matter. These pans are very peculiar. They are all open and quite flat, and perfectly white. I noticed that most of them had a slight rise at their southern extremities. Very often on approaching them you would think they were full of water, the result of the mirage. On the Molepolole road there is water at Metsematluk, Lutli, and brack water at Kang. This road is not so good as the Kanye one, the distances between the wells being greater, to say nothing of the brack water at Kang. The country between Kanye and Kakong consists chiefly of large open plains, on which beautiful grasses flourish, but from Kakong to Lehututu it is thickly wooded, and these woods continue due west right to the German border. The border is the 20th degree of longitude, and is marked at intervals by iron beacons which are numbered, and have the German emblem on one side and the British on the other. The country lying between Lehututu and Damaraland is quite waterless, except, of course, in the rainy season, and one has therefore to depend entirely on melons as a substitute. There are two kinds of melons: one is cultivated, and is called mekatan, and the other grows wild, and is known as kganwe; and of the latter there are two varieties, exactly alike in appearance, but one tasteless and the other bitter like quinine. Animals can eat both, but human beings only the former. There is no way to tell which is which except by tasting. The best way to prepare them is to cut them into slices and boil them in a pot. When they are boiled in this way they give forth a certain amount of liquid, with which you can make coffee or tea. If there is no pot, you cut off their tops and stamp the inside into a pulp, which can then be eaten, and to which the addition of a little sugar is a great improvement.

KAKIA PAN.

KALAHARIS WITH MELONS.

As one travels south-west of Lehututu the country alters completely. It is composed of row after row of sand-dunes, which extend right to the Nosop river. This river, at the point I touched, was just a dry bed with trees growing in the middle of it. These sand-dunes rather give one the impression of the sea on a rough day. This part of the Kalahari is chiefly occupied by the Hottentots, who, accompanied by their cattle and goats, follow the wild melon about from patch to patch. I rode through from Kaun to Choutsa, crossing the Oken river *en route*; this, again, is only a river in name, being quite dry. This was a long and difficult thirst, as we found no melons or water till we reached Choutsa. From Choutsa to Lake Ngami the road offers no difficulties, as there is water in wells at frequent intervals. The principal natives living on the Kalahari are the Mokalahari and the Masarwa. There are also a few Baralong, etc., living at Lehututu, and a certain number of refugee Damaras. The Mokalaharis are, as a rule, servants to the different Bechuana tribes. They are finely built, but stupid, and seem to have no cares in life so long as they can get milk and an occasional taste of meat. They live in small villages close to the wells, or else out on the melon patches. They look after the Bechuanas' cattle and collect skins, ostrich feathers, etc., for them.

The Masarwas (bushmen) are again subject to the Mokalaharis. They have no fixed habitations, but roam about after the large game, on which they practically live. They are wonderfully clever at trapping the smaller animals, the skins of which they hand over to their masters, the Mokalaharis. They have many strange customs and cures, one of the most peculiar of the latter being, I think, the snake-bite cure. It is made from a small lizard, which they kill and dry. If any one is bitten, they grind a little of this reptile up into powder. They then make two incisions above and below the wound and rub the powder in. The patient also drinks a very little of the powder mixed up in water, and the cure is complete. I have known two bushmen bitten by deadly snakes who used this cure, and on each occasion recovered. Some of them cut open the snake that has bitten them and swallow certain parts of its inside, which they also say acts as a cure. The Masarwa are in appearance slightly built, and have very small hands and feet. Their abdomens, however, are very large, doubtless a provision of nature to enable them to eat at one sitting enough to last them for several days.

The following varieties of large game are found in the Kalahari: eland, giraffe, hartebeeste, blue wildebeeste, kudu, gemsbok, ostrich, springbuck, and the smaller antelopes, such as steinbuck and duiker.

I also obtained specimens of the smaller kinds of animals: banded mongoose (*Crossarchus fasciatus*), sepia cat (*Genetta felina*), striped mouse (*Arvicanthis pumilio*), silver fox (*Fennecus chama*), manhaar jackal (*Proteles cristatus*), bushy tail mear cat (*Eliomys Murinus*), squirrel (*Xerus*

CART IN BED OF NOSOP RIVER.

GROUP OF BUSHMEN.

capensis), Cape jumping hare (*Pedetes caffer*), Cape long-eared fox (*Otocyon megalotes*), vaal bushcat (*Felis caffra*), slender mongoose (*Herpestes gracilis*). Besides these there are many other varieties.

To sum up, given plenty of water, the Kalaharí desert would be an ideal cattle country, and probably if water were bored for, it would be found at no great depth.

THE NORWEGIAN SEA.*

BEFORE 1876 the explorations dealt with in the Report by Dr. Helland-Hansen and Dr. Nansen had been confined almost entirely to the outskirts of the Norwegian sea, viz. the sea between Scotland and the Færoes, near the east coast of Greenland, the sea between Spitsbergen and Norway, and the sea off the Norwegian coast. The Norwegian sea itself was practically a *mare incognitum* before the Norwegian *Vöringen* Expedition (1876-1878). From this date up to 1900 many expeditions have collected observations within the basin of the Norwegian sea.

There is no doubt that it is to Dr. Hjort's researches that we are indebted for the splendid results arrived at by the explorations of MM. Helland-Hansen and Nansen. Dr. Hjort's studies in the waters along the Norwegian coast in 1893, and carried on in the succeeding years under his supervision, had been extended to the Norwegian sea. The results obtained were of so much importance that they led to the building of a ship, the *Michael Sars*, to study the problems of the Norwegian sea and bearing more or less on the Norwegian fisheries.

In Chapter II. we find a short account of the cruises during the years 1900 to 1904. Most of the observations discussed have been collected during the cruises of the Norwegian Fishery Research steamer *Michael Sars* during the years 1900 to 1904, and during May, 1901, and May, 1902, between Norway and Iceland, on board the *Heimdal*, of the Royal Norwegian Navy. Special attention has been paid to the work at each station, in order to get the best possible series of observations to show the vertical distribution of salinity and temperature at certain selected points. The distance between the stations was 20 miles, or even less. Since 1902 Danish and Scottish oceanographers have made investigations between the North sea and Iceland, and the authors have made use of these observations in connection with their own for the discussion of the special problems of the Norwegian sea.

The third chapter on instruments and methods is very important. In the case of the central part of the Norwegian sea the salinities are between 34·85 per mille and 35·20 per mille. With such a slight total range in the salinity of the various waters, the seasonal and annual variations are still smaller, and to be detected the most accurate methods must be employed. The accuracy required by the International Council for the Study of the Sea is 0·05 per mille of the salinity. It is, in some cases, not sufficient for the variations of the Norwegian sea. If we take the deep strata of the Norwegian sea below 300 fathoms, I quite agree with

* 'The Norwegian Sea: its physical oceanography based upon the Norwegian Researches, 1900-1904.' By Björn Helland-Hansen and Fridtjof Nansen. Report on Norwegian Fishery and Marine Investigations. Vol. 2, 1909, No. 2. With 28 Plates. Bogtry K. Reri. Kristiania: Het Mallingske. 1909.