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the State would do much to settle these questions, while an exploration of the caves in the east and the photographing of all the petroglyphs of which we heard in the west so that a comparative study could be made of them, would give us a more detailed understanding than can be had from a mere reconnaissance. One of the problems of most interest to ethnologists is whether the plains have been inhabited for any considerable number of years, say before the introduction of the modern horse. An exploration of the caves may throw light on this problem, but in all this work of determining the location, character and age of cultures there must be co-operation between archæologists, geologists, linguists, ethnologists and students of mythology and tradition.

KORDOFAN

Kordofan is the large Province of the Anglo-Egyptian Sudan between the Nile and Darfur. Knowledge of this large region was quite imperfect until the British ended the régime of the Mahdi in 1899. Since that time the British have traversed the country in all directions and have made a map of a large part of the province on a scale of 1:250,000 which gives a very good idea of it, though the map is not based on triangulation.

Captain Watkiss Lloyd, recently governor of Kordofan, has an article on this large region in the *Geographical Journal* (March, 1910, pp. 249-267, map and illustrations), in which he contributes many new facts to our knowledge of Kordofan. The following data are taken from his paper:

The province includes about 130,000 square miles with an estimated population of about 500,000. It extends about 400 miles N. and S. and 350 miles E. and W. It is naturally divided into two parts, North and South Kordofan, the dividing line extending obliquely from lat. 12° N., on the frontier of Darfur, to lat. 13° N. on the White Nile.

North Kordofan consists of plains, generally sandy, formed by the disintegration of granite and sandstone hills and broken in the north by clusters of granite hills. North of lat. 14° 30' N., the plains are often stony and broken by many wadis, the streams losing themselves in the sand or forming small lakes that dry up after the

rains cease. The natives often work the salt that is left behind. The plains are either bare or covered by low bush that is thicker in the wadis. The real bush begins about lat 14° 30' N., where the country becomes more undulating. The rain usually sinks where it falls, there being no visible watershed. This district extends south to the dividing line between northern and southern Kordofan, and in it are most of the gum forests which are the chief wealth of the province.

Along the Nile is a belt of low ground, chiefly black soil, in places 12 miles wide, very fertile, broken by many watercourses and politically attached to the White Nile province. The country rises rapidly westward, becomes much more sandy, and, about 40 miles west of the Nile the rainless and almost treeless district of El Akaba begins, extending westward for 50 miles. This district is uninhabited except during the rains, when the population drive their flocks into it. The hills become higher and steeper to the west, till a level plain is entered near El Obeid, the chief town of Kordofan. To the north of this town is the district of El Kheiran, where the sandhills enclose a number of small basins with fertile soil, and water at depths of 4 to 10 feet, once highly cultivated, devastated by the Dervishes, but now rapidly recovering.

Around El Obeid, the soil is much less sandy, the wells are quite numerous, particularly in the town, and there are many villages. Thirty miles west of El Obeid begin the sandy, bush-covered steppes of Dar Hamar, extending to the Darfur frontier, about 170 miles.

Water is the chief topic in northern Kordofan. It is a mistake to regard the country west of Khartum as a waterless district, though there is not enough to support a large sedentary population. In the most of Dar Hamar, however, the people are dependent for water chiefly upon watermelons and the supply they store in the trunks of baobab trees. Melons are grown in enormous quantities and kept in heaps, protected from the sun, until needed. A hole is cut in the hollow trunk of the baobab tree and the cavity is filled with rainwater to be drawn upon as required.

Southern Kordofan is the home of the Baggara or cattle-owning Arabs and Nubas. This is a very different country, consisting of a plain of black soil, from the middle of which the rugged hills of Dar Nuba rise to a height of 3,000 feet. The rain does not sink where it falls, as in the north, but the country is drained by several considerable watercourses, filled during the rains, but dry a few weeks later. The country between the White Nile and Dar Nuba

is about 150 miles square, many of the hills being masses of huge granite rocks containing many caves and hiding places utilized by the Nubas in time of war. West of Dar Nuba, the plain extends to beyond the Darfur frontier and is covered with bush except where cleared for cultivation. The bush gradually changes to forest towards the south.

The drainage system of southern Kordofan is exceedingly simple. The Khor Abu Habil rises in the hills west of Dilling and flows N. E. to Sungikai, where it turns east, finally losing itself in the sandhills near Gedid. It is joined by many affluents from the south and there are good wells along its course. The climatic variations are considerable in Kordofan. The rains begin earlier, about March 15, in the south and end later in the north. The climate at El Obeid is pleasant from November to March, when the heat becomes oppressive, until the wind, turning to the south, about the end of April, brings the first rains. The wet season lasts till about the middle of October, when the wind goes around to the north. At El Obeid the rainfall seldom exceeds 25 inches. In the south, the rains are much heavier and last longer. Malaria is the chief cause of sickness, but the war on the mosquito is improving matters at the Government posts.

Arabs and Nubas form the population, the latter being confined to the hills of southern Kordofan. The Arabs are divided into camel-owners, sedentary tribes and Baggara or cattle-owners. The camel-owners live in the northern and drier part of Kordofan and also own many sheep, goats and a few horses. Most of them live in tents, do not till the soil and subsist on camels' milk and the grain they buy from settled tribes. The nomad Arabs always regard a tiller of the soil as inferior to them.

The sedentary tribes live between lat. 14° and 12° N. The Gawama tribe owns all the best gum forests and is the richest of these tribes. The sedentary tribes all live in villages which seldom contain more than sixty families. The only large towns are El Obeid, capital of the province (pop., 12,000), and Nahud, with 10,000 inhabitants, between El Obeid and Dar Fur. The chief trade of the capital is in grain, cattle, cotton cloth and gums. The trade of Nahud is mostly with Darfur, the town sending cottons and trade goods west in exchange for cattle and ivory.

Practically all the Arabs of southern Kordofan belong to Baggara or cattle owning tribes. They have a bad name on account of their cruelties under the Khalifa, but they are the most enterprising

people in the province, and many of the poorer men go to Khartum to work in the public service till they have money enough to buy some cattle and settle down in their own country.

The Nubas, all living in the southern hill country, have often been raided by the Baggara Arabs for slaves and cattle and were terribly harassed under the Dervish rule. Under the present régime, they are gradually settling down, though they raid one another, from time to time. They cultivate a great deal of land and have many cattle, sheep and goats.

The resources of Kordofan are considerable, but require time and population to develop them. All the main roads have now been cleared of bush, and a railroad is to be built from the Nile near Kosti to El Obeid, but at present all transport is by camels in the north and pack-bulls and donkeys in the south. The chief source of revenue is gum arabic, but, as yet, only a small part of the vast gum forests are being worked. The herds of camels and cattle are very important, but mineral resources are rather limited. Iron is plentiful and salt is found in considerable quantities. On the whole, Kordofan is fairly rich as countries go in Central Africa. The revenue is now about \$300,000 and the expenditures \$175,000, so that the province is paying its way and contributing its share to the central administration. It will be a generation or more before the enormous losses from battle and famine under the Mahdist despotism can be replaced, though there is now no tribe that cannot be described as fairly well off.

GEOGRAPHICAL RECORD

NORTH AMERICA

CALIFORNIA'S MINERAL OUTPUT IN 1909. Lewis E. Aubury, State Minerologist of California, informs the *Bulletin* that, subject to trifling alterations, the statistical mineral returns for the State, in 1909, exclusive of gold, silver and platinum, figures for which are being collected by the U. S. Census Bureau, will reach over \$61,324,000. The precious metals will bring the aggregate up to \$80,000,000 and probably more. The value of the total mineral production will exceed that of 1908 by about \$14,000,000. The value of the total output in 1907 was \$55,697,949; 1908, \$66,363,198; 1909, about \$80,000,000.

A large part of the advance of 1909 over 1908 was due to the increase in production and average price of petroleum. The output of petroleum in 1909 was 58,191,723 barrels valued at \$32,398,187. California, in 1908, led all the