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anism of the present ; and the modern march of improvement will, ere long, abolish these relics of an unknown story.

Perhaps,—Who knows ?

“That old camp’s deserted round,
Sir Knight, you well might mark its bound ;
. . . . The Pictish race
The Trench long since in blood did trace ;
The moor around is brown and bare ;
The space within is green and fair ;
The spot our village children know,
For there the earliest wild-flowers grow ;
But woe betide the wandering wight
That treads its circle in the night.”

THE CULTIVABLE AREA OF THE EGYPTIAN SUDAN.

BY J. T. WILLS.

In the excellent Map of Africa just published by the firm of Justus Perthes, colours are used to distinguish cultivable and forest land from steppe, or dry, uncultivable grazing ground and waste. But the attempt to thus colour the Egyptian Sudan correctly has altogether failed.

In the well-known countries of Algeria, Tunis, and Cape Colony, the colouring is not satisfactory or consistent. In Algeria the cultivable area is made to roughly coincide with the area that has over 20 inches of annual rainfall. This is fairly correct. In the Cape the colouring includes almost all lands having more than 10 inches of rainfall, which is certainly wrong. In Tunis two-thirds of the area marked as cultivable has, according to the best authorities, a rainfall of less than 10 inches, which is absurd; and we are forced to suppose that the colouring is based on the rainfall returns of not more than two or three recent years, of which the altogether exceptional year 1884 was one. See the rainfall map in Réclus's *Géographie Universelle*, vol. ii. p. 363.

In the Sudan the uncultivable waste is made to extend everywhere to within sixty miles of the Abyssinian frontiers, and half the cultivable area is made to lie between the Red Sea and the Atbara. This is not so in fact. The evidence we have is clear, unanimous, and conclusive, and is to the following effect :—The rainfall upon the great plains, between the White Nile and the Gash (the Egyptian provinces of Taka and Senaar) is all that can be desired for the growth of maize, sorghum, cotton, tobacco, and the like, as far north as Abu-Harras on the Blue Nile, and nearly as far as Kassala on the Gash. It is considerable as far as Kawa and Kamlin, and even up to near Gosreheb and Filik ; but it there decreases in amount very rapidly, and at Khartum it is light and precarious. It is only the very “tail of the monsoon” that catches Khartum, which, in fact, lies in the desert. The rainy season lasts only 3½ months at Abu-Harras and Tomat, but it lasts four at Senaar, and over five at Rosares and Famaka, and for a month at least after the last rains the country lies “in a regular vapour bath.”

Almost coincident with the edge of the sufficient rains is an abrupt change of soil. On both sides, far into the deserts on the north and west, up to the Abyssinian foothills on the south-east, and as far as the Bahr-Gazal and Darfur on the south-west, lies a level bed of old red sandstone; but while in the desert, on the north, this is exposed on the surface, it is overlaid to the south between the Gash and the White Nile, and for five or ten miles to the west of the latter, by a thick and almost continuous deposit of lacustrine clay marls, covered with the richest alluvium. Where this alluvium came from is clear, and if one reflects on the size of the valleys that have been excavated out of the Abyssinian plateau by the present tributaries of the Nile—the Abai, Rahad, Dinder, Atbara, and Gash—and on the variety of the rocks they have cut through, one sees that this alluvium must be extensive and rich. There is every indication of the existence formerly of great lakes, or of one continuous lake, stretching from Kassala and Gosreheb, past Abu-Harras, to the centre of the Blue and White Nile doâb, and up to the Abyssinian foothills. This area is now an almost dead level of very rich alluvial soil, of apparently uniform quality, and somewhat richer than the alluvium along the White Nile. The observations of many travellers, who never saw such fine crops of dhurra anywhere else, are confirmed by Burkhardt, who found that the dhurra of Taka used to be sold in Jeddah at prices 20 per cent. above those of dhurra from Egypt. Maize, we know, does equally well—grows ten feet high, and yields many hundredfold; but as it is a very hard grain, and as there are no grist mills of any kind in the Sudan (except female slaves, who grind by laboriously rubbing two stones together by hand), it is little used. The dhurra is planted two seeds at a time in holes prodded in the earth after the first showers with a sharpened stick. It is weeded twice within a week or so after planting, and the cultivator then leaves the country, before the grass growing knee-high brings on the fatal fly and fevers, and returns five months or more afterwards to harvest it. Cotton of the best quality and tobacco were grown latterly with much success on the northern part of the fertile belt round Gosreheb, Kassala, and Abu-Harras, and on the lands flooded by the Gash.

This fertile area is commonly supposed to be barren and arid, for a simple reason. Travelling is impossible in the rains by reason of the grass, which is 10 feet high, of the fevers which it harbours, and of the tsetse-fly. Besides, the soil, which in the dry season bakes and cracks in deep fissures like a dry cheese, is reduced by the rains to the consistency of summer butter. Travellers cross it only in the dry season, and then the surface water is all gone, because it has soaked well in. There are no small streams, because the surface is so level that the rain does not drain off, and there are no hills from whose base it can issue, except certain intrusive granite knobs, which are far between. There are no wells (except on the northern edge, where 30 or 40 feet will reach water), because the miserable misgoverned people have not heart or means to make them, although in the 200 feet or so of almost undrained

alluvium that overlays the sandstone, there must be much water lying hid. Moreover, the tall dry grass is everywhere fired and burned to ashes as soon as it is dry, and this annual process has kept down the growth of woods. Consequently the country is then as bare and as dry as a desert, and the nomads that then return south with their cattle have to hug the

banks of the few large streams in order to find water. Travellers from Khartum to Kassala therefore generally go *viâ* Gedarif—a long detour.

The size of the level fertile area is not known, for neither the limits of the alluvium on the north between the Blue Nile and Atbara, nor the extent of the raised sandy tracts that lie in the centre of the tongue be-

tween the White and Blue Nile are ascertained ; but it seems that it must contain at least something like 25,000 square miles, which would equal the whole amount of unirrigated cultivated land in the Punjab. In abundance of rainfall, it would seem to be much superior to the Punjab. All along the White Nile, the Rahad, and the Dinder, about Abu-Harras, and above Gosreheb, the levels favour irrigation. Between the south edge of the plain and the north limit of Abyssinian settlements is a considerable width of well-wooded foothills and tangled mountain spurs, very little known, and inhabited by scattered fragments of native races, who, whatever they are, are not Abyssinian subjects. Those parts, of course, are better watered still than the plain. The Abyssinian nation does not descend lower than about 5000 feet, and the only acts of government by the King of Abyssinia at lower levels than this, consist in occasional forays made by a large army for the purpose of levying blackmail.

Between Kassala and the coast the cultivable areas are small and scattered. They consist either of such areas as are flooded by, or are irrigable from, the periodic streams, or else of table-lands over 5000 feet high. The deltas of the Gash at Filik, and of the Barka of Tokar, together with some small levels in the valley of the Auseba, and still smaller strips on some minor streams, chiefly east of the Barka, form the first class. The cultivable table-lands lie in three groups: *1st*, those on the watershed between the Red Sea and the Auseba, viz. Hagar, Nafka, and four or five smaller plateaux to the south of Nafka, upon the Rora Asgede ; *2nd*, those that divide the deep valley of the Auseba from the low plains of the Barka, viz. Mareaa, Debra Saleh, and Shakka ; *3rd*, those that divide the Barka from the Gash, viz. the Dembela country adjacent to Abyssinia, and the Bazen country south of Amideb, to which may be added some lands cultivated by the Beni-Amer between Daga and Kassala, that are of a lower elevation.

The plateaux in groups one and two were formerly inhabited by sedentary agricultural populations of the Abyssinian race, language, and religion ; and the feeble remnants of these tribes, and the ruins of their towns, still exist *in situ*. At present, the few and degraded inhabitants of the northern plateaux are tributary to the Beni-Amer ; the Habab, a nomad tribe that now professes Mohammedanism, occupies Nafka as a summer pasturage ; the Mareaa, the Dembelas, and the Bazen live in a fierce seclusion, cut off from all the world ; Keren has been given up to the Abyssinians ; and the rest of the plateaux are almost uninhabited.

The Tokar delta, the Gash delta, Nafka, and Keren are the chief points of strategic importance in this region. The Tokar and Gash deltas are the corn-lands of the Hadendowas, and they practically have no others. Control over them is control over the tribe. Nafka is the only known place north of Keren fit for a European sanitarium. It is 5600 feet high, cool, and breezy ; it catches both the summer rains from the south and the winter rains that are confined to the coasts of the Red Sea. In this it resembles the other parts of the ridge of the Rora Asgede. It is conse-

quently green at both seasons, and has pasturage for the greater part of the year, woods, and perennial springs. Indeed, Munzinger and Heuglin declare that it is "evergreen." It would grow vines, olives, and corn; and Munzinger's experimental crops (except cotton) succeeded well. It lies on the edge of the territory of the loyal Beni-Amer, who defended Kassala and the cause of Gordon to the last, and is close to the road by which they migrate from their summer to their winter pastures, *i.e.* from the interior to the coast.

Sinkat, the former summer retreat of Suakim, and present stronghold of Osman Digna, is only a small summer pasture, 3000 feet high, and is not comparable to Nafka, nor is it cultivable. Whether Hagar, or any place in the unexplored mountain region between it and Akik, can compare with Nafka, we do not know. Hagar probably may; if not, then Nafka, in case of a European occupation of Akik, would be indispensable as a sanitarium; and Akik is the best harbour by far on the whole coast (far better than Suakim), and commands what would be the best railway route from the sea to the fertile belt of the Sudan, the route by Tokar and Filik to Gosreheb and Kassala. It is of course useless to think of railways, or even, at present, of trade upon the Nile; but, in view of the existing occupation of Akik and Suakim by or for Great Britain, and of that of Massowah by Italy, and of the Italian proposals for planting posts on the Rora Asgede, it is not too soon now for us to study a little, first, the potential value of the land between Kassala and the Nile, and then the nature of the routes between Kassala and the sea.

A JOURNEY IN PERSIA.

ALTHOUGH so much is known in a general way of most of the older countries in the world, and although in late years even the most ancient civilisations are being forced by indefatigable explorers to yield up their historical records hidden for ages, yet in comparatively well-known parts of the earth there are districts unknown to the modern explorer, whose geography is but a matter of tradition, or even of simple guess.

That there are many such regions still open to the enterprise of the geographer no one can doubt, and it is a brief and modest account of such an enterprise that we have before us in *Notes of a Journey from Kasveen to Hamadan across the Karaghan Country*, in North-West Persia.

In June 1885, Mr. J. D. Rees, Under-Secretary to the Madras Government, and Persian Translator to Government, being on leave in Persia, formed the resolution to employ his short furlough in making a journey across the Karaghan country, as yet shown blank on the best modern maps, and not hitherto explored by any European.

For several reasons he chose the route from Kasveen, on the main road from Teheran to Europe *via* Resht, to Hamadan, the ancient Ecbatana, the traditional site of the Biblical Shushan the palace, and of