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Notes on the Geography and Meteorology of Mashonaland.

By ROBERT M. W. SWAN, Esq.*

(Read at the same Meeting).

As requested, I have put together a few notes on the nature of the country we traversed. Central Mashonaland consists of elevated granite plateaux, varying in height between 3000 and 5000 feet. Through the surface of these plains rise groups of isolated little granite hills which are most remarkable and varied in form, and which sometimes attain an elevation of 1000 feet above their base, but more frequently they are about 400 feet high. Generally, they are composed of enormous broken blocks of granite, but often they are dome-shaped and of one unbroken mass of rock, and suggest the idea of huge bubbles on the surface of a molten mass. The summits of the latter kind of hills are of course quite inaccessible. They are not hills left in relief by the denudation of the surrounding country, but judging from exposed sections of some that I have seen they have been elevated by a force acting at a comparatively small distance below the present surface, and they are older than the stratified rocks of the country.

On the granite plateaux one meets with patches of stratified rock—of quartzites and schists, and rarely some crystalline limestone. Magnesia too is sometimes present, notably at 'Mtali, and in the steatite which occurs near the Great Zimbabwe, of which many of the objects found in the excavations were made. The strike of the strata is generally east and west, and the various patches arrange themselves in several fairly continuous lines running across the country in the same direction as the strike. These semi-continuous deposits or belts of stratified rock are generally two or three miles wide, and in them occur the gold-bearing quartz reefs. The most southerly belt that I know of in Mashonaland proper passes by Fort Victoria, and probably crosses the Sabi river about latitude 20°. The next large one passes by 'Mtali and the 'Mfuli river, where it crosses the waggon-road, and so on to Hartley Hill. This belt includes Mount Wedsa, the highest mountain in Mashonaland. Next in order comes the Mazoe deposit, which perhaps also includes the Kaiser Wilhelm gold-field. These deposits are all fairly similar in nature, and probably represent a continuous sheet of stratified rock, all of which has been denuded away except the above mentioned belts. They generally present a rugged surface, elevated in mountain ranges, which often rise 1500 and 2000 feet above their base, and, although they are nearly always steep, they are rarely precipitous. These mountains are regular and beautiful in outline, and refresh the eye after it has grown wearied of the grotesque forms of the granite hills. The soil on the stratified rocks is more fertile than it is on the granite, and the vegetation is more charming; the very coarse grasses of the granite soils being replaced by many flowering plants.

The ruins which have just been described are all built on granite, but are generally within a short distance of the quartz formation, and the ruins at Zimbabwe are within four miles of the southern edge of the quartz belt. At Zimbabwe we found little clay crucibles in which gold had been melted, and an accumulation of quartzite rock which had been obtained from the casing of a quartz reef. I carefully tested this rock for gold, but could only find a very minute trace, so I conclude that it had been rejected as too poor for treatment. While at Zimbabwe, whenever I could spare time from the excavations, I made excursions to the quartz belt, and searched for old workings and gold reefs. I found one reef carrying a small quantity of gold, but no old workings. Since then, however, rich gold reefs have been discovered about 20 miles to the north-west of Zimbabwe, and from these probably the ancients obtained their quartz. The quartz formation near the little ruin at

* Mr. Swan is responsible only for the cartography of the map along his route.

the Mazoe river has been much worked for gold, and the Manica belt seems to have been even more exploited. Where the high plateau breaks down at Massi-Kessi an enormous amount of alluvial has been worked. The old people must have obtained, from both the alluvial and the reefs, a great quantity of gold to repay them for the work that they did, and there is no reason to suppose that they have exhausted the reefs; indeed I have seen at the bottom of old workings the reef continuing and carrying visible gold.

Besides gold reefs, these quartz belts contain much iron ore, and some manganese. In two isolated patches of the quartzite formation at the Doroba Mountains near the Sabi river, I found great masses of rich magnetite and hematite, and on the top of Mount 'Nyaguzwe, near Fort Victoria, there is also a mass of magnetite—in fact, so very abundant is iron ore, that compass bearings can rarely be taken with safety from hills in the quartz formation. Along the right bank of the Sabi river, near Mount Wedsa, are many native villages, whose one industry is iron smelting. They obtain the ore from Mount Wedsa, which is renowned far and wide in Kaffirland as an iron-producing mountain. The mineral they select is not very rich, and is consequently more easily smelted, and it contains some manganese. The iron they produce is very pure, and is consequently soft and easily fashioned into weapons and tools. Their anvils are simple blocks of hard diorite, on which they hammer with another smaller block.

Regarding the maps, I would mention that I checked my chronometer at Kimberley and Mafeking, and also at Palapye on April the 18th, by telegraph from the Cape Observatory, and I rated it at every place where we stopped for any length of time. I also checked our motion in longitude as far as possible by compass bearings on prominent mountains along our route. This I was able to do pretty effectually from Zimbabwe to 'Mtali, but from Palapye to Zimbabwe, owing to the nature of the country and the direction of our route, it was more difficult to get useful compass bearings. I fixed about 120 points by astronomical observation, and at nearly all these points I took three sets of observations. I also ascended the nearest mountain or eminence to the point thus fixed, and fixed a number of minor points by cross-compass bearing from this and other fixed points. In drawing the maps I have avoided drawing in any mountains or other features of the country of which I have not fixed the position; and where I have seen mountainous country, but have been unable to fix the direction and distance of the ranges or the position of the peaks, I have not attempted to draw them in, but have merely written the word "mountains" on the map in the approximate position. The map, therefore, seems very much of a road map, but I have thought it better to sacrifice its appearance than to puzzle future travellers with mountains whose positions have not been carefully fixed. In ascertaining the courses of the rivers, I ascended many hills, and from these hill-tops I was able to fix the direction of their flow for some distance on each side of the road. Where I have not been able to make such observations I have merely dotted in their probable courses. I have always been careful to ascertain from the natives what river each tributary fell into, and as nearly as I could the distance of the confluence from the point where we crossed the stream. They could always, at once, tell me what river the tributary joined, but their information regarding the distance was less definite.

The tributaries of the Sabi river flowing near Zimbabwe have been ill-defined on previous maps. The 'Mpopotekwe joins the 'Mtelekwe and the 'Mshagashe flows into the united stream a short distance south of Zimbabwe. This river, under the name of the 'Mtelekwe, then flows into the Lunde, and not to the Sabi direct. The Tokwe joins the Lunde farther north. The most interesting geographical work that we did was on our expedition to the Sabi river, and on that from Fort Salisbury to 'Mtoko's, and down by Mangwendi's and Makoni's country to 'Mtali. On our journey to the Sabi we crossed a great many of its western tributaries, and as the

same streams rose near the waggon road, and we crossed them pretty far down their courses, we were able to lay down their direction for a considerable distance with certainty. The Sabi river itself, in latitude $19^{\circ} 15'$, we found was placed 20 miles too far west in former maps, and from the information which I gathered from the natives, in the latitude of Zimbabwe, it must be about 50 miles further east than it is placed in these maps. This river, where we struck it, was a considerable stream flowing rapidly over a rocky bed. It had fallen about 1800 feet from its source near Fort Charter, and had 2700 feet more to fall before it reached the sea. When it has received all the tributaries we crossed it must be a very big river.

Going from Fort Salisbury to 'Mtoko's we crossed many tributaries of the Mazoe river, which were either not shown at all in former maps, or were most inaccurately placed. We recrossed these streams again further up returning from 'Mtoko's to Mangwendi's. I also got excellent views of them from the various mountains which I ascended, so that I am able to lay them down in the map with certainty. To the eastward of 'Mtoko's we could see the high veldt breaking into mountain ranges as it descended towards Gouveia's country.

Approaching Mangwendi's and also going between Mangwendi's and Chipunza's, our way lay along a very high watershed, on the western side of which rose some of the eastern tributaries of the Sabi river, the most important of which was the M'sheke. At Makoni's we reached the highest part of the plateau, and this is, with the exception of some villages on Mount Yenya, the highest inhabited part of Mashonaland. From Makoni's to Mount Yenya the country is broken, and the descent is very rapid, but on the east of our route the descent was still more rapid and the mountains more imposing. On the north side of Mount Yenya flows the Odzi river, which is there a very considerable stream. Mount Yenya is a most imposing mountain and the highest in Mashonaland, with the exception of Mount Wedsa. It rises to a height of 5800 feet above sea-level, and within 300 feet of its summit are several villages which own a considerable number of cattle. It probably represents the Mount Doe which the Portuguese place on their maps about this part, and which they say is 7900 feet high, for certainly there is no mountain near Mount Yenya of equal height. Between 'Mtali and Massi-Kessi the country is extremely mountainous, and the scenery is the grandest that we saw in Mashonaland. We lost 1400 feet in height between these two places. A short distance after leaving Massi-Kessi we crossed the Revwe river, and our way lay along a watershed about 2000 feet high. This watershed is thickly wooded, and is traversed sometimes by deep ravines. On the left hand the streams flowed to the Pungwe river, and on the right to the Revwe and the Muda and Mutuchiri rivers. Approaching Sarmento, the country falls rapidly to nearly sea-level, and thence to the coast we traversed a flat alluvial country through which the Pungwe river sluggishly flows. This swampy level country swarms with game, especially towards the end of the dry season, but the vegetation is not nearly so luxuriant as one would expect, and some parts of this country are quite bare.

I have been careful to spell the native names on the map in accordance with the rules laid down by this Society. The sound of the Bushman clicks which occurs so often in the names of places and in the names of tribes derived from the names of places, but most frequently of all in the names of rivers, is slurred over by the present tribes, and represented by a combination of letters. As I know of no rule for the spelling of these sounds, I have represented them by an inverted comma and the consonant nearest in sound.

A point of interest in the remote history of the country and of the ruins which we examined—for the old people doubtless entered the country by this coast—is the growth of the land at the mouth of the Pungwe river and around Sofala. From about Sarmento down to Beira one passes over a low alluvial country which has been

slowly encroaching on the sea for ages. I am sorry that in the rush to the coast I did not have time to collect data to enable me to form any idea of the quantity of mud deposited from the waters of the Pungwe in a given time, but its waters hold in suspension a great quantity of fine clay derived from the decomposition of the granite in its basin, and this is deposited where the river enters the sea. The distance from Sarmento to Beira as the crow flies is 65 miles, so that at some period the road to the interior must have been shortened by this amount, and even in early historical times some part of the journey across the low fever belt would have been saved. The site of ancient seaports will now be far inland, so it need not surprise us that remains of these ports have not yet been found.

Owing to frequent absence from camp, I was unable to read the thermometer and barometer as continuously and regularly as I could have wished, but the readings which I did take give us some idea of what the climate at Zimbabwe was in June and July last year. We arrived there on the 6th of June, after a week of south-east winds, high barometer, and rain and mist. The wind then gradually fell and the barometer with it, and we had three weeks of fine calm weather. The barometer reached its minimum on June 27th, and at the same time the difference of the readings of the wet and dry bulb thermometers was at its maximum. The air was then very dry and the sky clear, with light north winds which were evidently local in origin, and the temperature at night fell below freezing-point so that in the morning we saw a light deposit of hoar frost. Immediately after this the barometer began to rise, there were light south-east winds, the atmosphere became moister, and on the 4th of July the south-east wind had increased considerably in strength, and some rain fell. From this time until the end of our stay at Zimbabwe on the 2nd of August the barometer slowly rose and fell, its range being limited to about three-tenths of an inch, and whenever the south-east winds blew at all strongly the barometer rose and we had mist and rain. We had during this period generally about a half-day of rain each week.

At first sight it seems surprising that we should have windy wet weather with a high barometer, but we must remember that the only winds which can bring rain to Zimbabwe, at least in winter, are the south-easterly winds, and these, like all other winds blowing towards the equator, increase the atmospheric pressure. Zimbabwe is situated on the edge of a plateau about 3400 feet above sea-level. The country breaks down gradually towards the south and east, and more rapidly towards the west, while towards the north it rises gently until after about 100 miles it attains an altitude of nearly 5000 feet. The west winds, if they do blow, have to traverse the continent and the high country about the sources of the Limpopo before they reach Zimbabwe, and the northerly winds would tend to increase in temperature after falling from the high country towards the north. The predominant winds in this latitude are the south-east trades, and they, carrying their moisture from the Indian Ocean, are forced to rise as they pass over this country, and they consequently expand and are lowered in temperature and so deposit much of their moisture on this edge of the high plateau. A similar winter climate seems to prevail in most parts of Mashonaland, the edges of the plateaux receiving most of the moisture. Manica is situated much nearer the sea than Zimbabwe, and the country there falls much more rapidly towards the east (it falls 1400 feet in ten miles at 'Mtali) and consequently the rainfall there is heavier. Fort Salisbury is better situated for a dry winter for it is in the middle of a high plateau and the south-east winds will have parted with most of their surplus moisture for that altitude before they reach it. The driest time of the year in Mashonaland is from August to November. I may observe that the greatest difference I observed in the readings of the wet and dry bulb thermometers was 24° F. at the 'Mshabetsi river, at an altitude of 2140 feet, on May 13th, at 2 p.m.; the readings being 64° and 88° respectively.