

out. In the interior of this cave is a pit which is visited by natives who brave the fleas, as the earth in this pit is saline and salt is extracted.

In these notes in many names both the English and native article has been used for the sake of clearness, i.e. 'the' El-geborit, 'the' El-kabeywa. It would probably be more correct to say 'The Geborit,' 'The Kabeywa.'

THE MELON OF THE KALAHARI DESERT

By R. B. WOOSNAM, F.Z.S.

It was suggested to me that it might be of interest to some of the members of this Society to hear something of the results of an attempt which I have made to acclimatise the wild melon of the Kalahari Desert (*Cucumis caffer*) in the Southern Game Reserve of this protectorate. There is always an element of doubt in the introduction of any new plants into a country strange to them. But although the first seeds of this melon, which were planted last year, practically came to nothing I am glad to say that the second attempt during the present year has met with quite encouraging results.

Before I tell you of the progress of the experiment I ought perhaps to give you some idea of the kind of country and general conditions under which this melon flourishes in its native wilds.

The Kalahari desert, which forms the stronghold of this wild melon, may roughly be said to be comprised by the north-western part of South Africa and extends from Lake Ngami, down past Kuruman and Prieska and Kenkart to the Orange River. This wild melon is, I believe, only found in any quantity in the northern parts of the Kalahari in N.W. Bechuanaland and the Bechuanaland Protectorate, and it is here that I have met with it. It is called by the Bechuanas *kengwe* and by the Dutch and English *sama*. In size it varies from an orange up to a man's head or larger, and is of a dark green colour banded with lighter green stripes, and when fully ripe

it turns to an almost uniform bright yellow. It is of the taste and consistency of a cucumber, but some are intensely bitter, and it is full of small, very hard, brown seeds.

The word 'desert' usually calls to the mind of most people a vast expanse of perfectly flat, bare, yellow sand, with here and there a gaunt isolated palm tree and perhaps a missionary on the sky line, and of course no water.

The Kalahari is not a desert of this kind, in fact it is doubtful whether it is not an injustice to call it a desert at all. It consists of a vast extent of comparatively flat or gently undulating country of soft deep red or grey sand, and is not open but is covered all over with kamel thorn forest, in parts very dense, or with low scrub and thorn bush, beneath which there is an ample supply of grass. There is no permanent water other than native wells long distances apart. The Kalahari undergoes much the same seasonal changes as the Athi Plains, except that the rains only come once a year, from December to April, and during these months and for the month or six weeks following numerous 'salt-pans' or shallow, brackish pools of rain-water are to be found widely distributed over the whole desert. After this period there is no water to be had except at very few places, great distances apart; and against this long drought, until the next rains, Nature has made a most wonderful provision in the form of this wild melon. During the rains the Kalahari produces a luxuriant crop of grass and herbs, and at the same time the melons grow. They do not grow uniformly all over the desert but in patches. Sometimes ten, twenty, or thirty miles or more will be passed without a single melon being seen, and then suddenly, for no apparent reason (although of course there must be one), the traveller comes upon a patch of melons, sometimes only a few hundred yards in extent, sometimes reaching for many miles. In places I have seen the *sama* lying so thickly on the ground that it is difficult to believe they have not been collected there by natives, and it is a curious fact that in these patches sweet and bitter melons are to be found all growing together, but I was never able to decide definitely whether they grow upon the same plants, although the bushmen assured me that they do.

During the long dry season, the *sama* forms the mainspring of life in the Kalahari. Upon it not only the game but the bushmen and the herds of cattle of the Bechuanas subsist to a great extent and in some places entirely, for it supplies both water and food. The species of game which I know to rely entirely upon *sama* are Oryx and Eland, for I have seen them in places where there was no water obtainable within a hundred miles in any direction, and I have found the stomachs of Oryx entirely filled with *sama*. Greater Kudu eat it readily, but I believe are generally, not entirely, out of reach of water. Hartebeeste and Wildebeeste I have also seen at great distances from water in places where there was plenty of *sama*. It is eaten by cheetahs and jackals and numerous small birds. The bushmen burn the grass and then collect great numbers of the melons which are thus exposed to view. They eat them in several ways. Generally they cut them up into strips and dry them on the bushes and afterwards boil them up into a paste. They eat them raw and they also collect the seeds and roast them and then grind them up into a porridge. It is a diet upon which human beings cannot exist without some training, for, being of a very low order of nutriment, it is necessary to consume enormous quantities, and the figures of the bushmen during the time they are feeding upon *sama* bear very evident witness to this fact in their abnormally protruding stomachs. The melons, I have been told, remain intact on the ground for as long as two years, but I think they must be useless as a water-supply after about ten months, for they have by then become woolly and lost much of their moisture.

I have been fortunate enough to make two expeditions into the Kalahari and had ample opportunity of observing the phenomenon of this wonderful provision of Nature.

On the second occasion I took a wagon and eighteen oxen and two horses across to the German border and up through the desert to Lake Ngami. The oxen, although not accustomed like those which live in the desert to eating *sama*, were able to thrive for long periods without water, living entirely on the *sama*. After very little difficulty the horses were taught to eat it, and on one occasion on arrival at water, after a long trek of ten days through waterless country in which *sama* had

been particularly plentiful, neither horses nor oxen would drink the water, which happened to be, for an exception, particularly good and fresh.

I myself and a friend who accompanied me used the *sama* on many occasions. By cutting it up into lumps and boiling it in a pot it appears to melt; the fibrous and more solid parts can then be strained out and the syrupy liquid which remains can be used for making tea, porridge, and boiling meat—to which it gives rather a pleasant sweetish flavour.

Sama tea I cannot honestly recommend—it gives one the sensation of being what the Dutch call 'dik,' and one has no inclination for either food or drink for about twenty-four hours afterwards, as well as other less pleasant sensations. When necessary I always eat it raw, and in this way a white man, provided he does not walk about too much in the hot sun, can sustain life on *sama*, but it is not a pleasant experience, and one is conscious of a continual desire for a good long drink. But the Bushmen can live for months with no water other than *sama*.

With regard to the acclimatisation experiments which I have rather neglected so far, it occurred to me that it would be of great value and interest if this wild melon could be introduced into the Southern Game Reserve in British East Africa, for, as all of you probably know, during the dry season the greater part of the Athi Plains across to the German border is extremely waterless, in fact in bad drought years the Southern Game Reserve becomes a veritable Kalahari desert, and I thought that if this wild melon would grow there it would help very considerably to solve the problem of water and food for the game and also for the Masai cattle—for it is both. I therefore, after considerable difficulty, obtained from a friend in Bechuanaland about 10 lb. of *sama* seed from the Kalahari. It arrived in good condition and was planted over a considerable area of the Reserve in October 1911, but the rains, although fairly plentiful in some parts of the Protectorate, were almost a failure over this area of the Game Reserve, and no sign was to be found of the *sama*.

At the same time I gave some seed to Mr. C. A. Hill of Machakos, who planted it on his farm. At first he told me that

this also had been a failure, but later he found some small striped melons among the grass which I have no doubt were *sama*. This was most encouraging, for I was very much afraid that the seed must have been taken from unripe melons and was useless. Some of the melons on Mr. Hill's farm have been left on the ground, and it will be interesting to see whether they will grow again of their own accord.

This year in April I planted another lot of the same seed in the Reserve from Athi River down to Simba Station, and as the rains were abnormally heavy I was in great hopes that successful results would follow, and I am glad to say that in some places the melons have grown and produced fruit. On the Athi and Kapiti no signs of the *sama* could be found, but farther down the line, at Sultan Hamud, and particularly at Simba, there was quite a good crop and the game had apparently been eating them, but the melons were much smaller than in South Africa. It is rather curious why they should do so much better at Simba than at Athi River; possibly there is some difference in the soil, or the altitude and temperature may have been more suitable at Simba, or, again, there may be some insects on the Athi Plains which destroyed the young plants. I am rather inclined to think that insects have played a more important part in preventing the *sama* from growing than altitude or climatic conditions, for the following reasons:

This year I also planted about fifty seeds in my garden in Nairobi, and after nearly two months and a half of heavy rain fourteen of the seeds germinated and young plants appeared. They grew well until—as I suppose was only to be expected—the resident insect life discovered the strangers and set upon them. First something began to eat the leaves, then suddenly, without any visible cause, five of the plants shrivelled up and died. They had so obviously the appearance of having been cut through just below the surface of the ground that I dug them up and found that such was indeed the case. I took one of the dead plants to Mr. Anderson who at once diagnosed the case as 'cut-worm,' and I am strongly of the opinion that it is this or some other insect pest which has destroyed the *sama* on the Athi Plains. Mr. Anderson advised me to mix a little poison (Paris green) with bran and a little sugar and sprinkle

it among the plants: this I did with most successful results, for no more plants died and a fair number of melons came to maturity, but the effects upon the local chickens who frequented my garden, although satisfactory from my point of view, were fatal to them. Possibly I had put too much Paris green with the bran; however, I am afraid it is not practicable to sprinkle the Athi Plains all over with bran and Paris green, and unless the *sama* are able to hold their own against insect pests in the struggle for existence the acclimatisation experiments with the Kalahari melon will not be very successful.

It will be interesting after the next rains to see whether the seeds from the melons grown at Simba and Sultan Hamud will germinate naturally and grow a crop. If this takes place it may reasonably be hoped that they will form a nucleus and gradually spread over the surrounding waterless country, and from them acclimatised seeds may be obtained and planted in other parts of the Protectorate.

There is one other point of interest concerning the growth of the *sama* which I noticed from the seeds planted in my garden, and that is the very long period which elapsed between the time that the seeds were planted and the appearance of the plants. It was nearly two months and a half after the seeds were planted in my garden that the plants appeared, and nearly a month later several more plants came up. This is a very interesting point, because the natives in the Kalahari say that *all* the *sama* seeds do not grow *every* year, but that some lie on the ground for two or three years and then grow, the object of this being to prevent the extermination of the species through drought and to make the utmost use of the rains. It is possible that *sama* seed germinates only after it is two or three years old or even more, and in this case there would always be seeds in varying stages of ripeness lying on the ground, some only of which would grow when rain came, and if such rain was out of season or premature or only of short duration, and the young plants which came up were consequently unable to come to maturity, there would still be left ample seeds ready to spring up during the real rainy season, and the species would not die out as would have been the case if all the seeds had germinated at once, for the *sama* plant only grows

once. This is the explanation given by the bushmen of the Kalahari. There is only one real rainy season in the Kalahari and Bechuanaland ; but a few storms may occur at any time, and it is obvious that if the *sama* seed germinated at once after a few showers and the plants then died there would soon be none left to carry on the race. However, from my own experience of the Kalahari I am convinced that the *sama* only grow once a year during the real rainy season from November to April, and the long period of germination noticed in my garden is probably to ensure the seeds only coming up during this season ; but on the other hand the seeds may not have been old enough. I still have some seeds left from the original consignment and it will be interesting to see whether they germinate more quickly next year, but in any case the explanation of this long period of germination does not seem at all clear. I believe it is the same in the case of Black Wattle seed, which I think is usually soaked in boiling water before it is planted. As an experiment I tried soaking *sama* seed in boiling water before planting, but none of the seeds ever came up.

I do not know whether any other seeds are known which have a similar long period of germination, or whether the object of this is known. Perhaps some member will be able to give us further information on this subject.

THE EVOLUTION OF THE ARROW

BY C. W. HOBLEY

This seems at first sight a trivial subject, but big issues sometimes hang on little things, and when one considers how through untold ages the fate of nations and the livelihood of mankind often hinged on this weapon its development may be considered worthy of some attention. It is beyond my powers to trace the history of the arrow through past ages, but my attention has been turned to the subject by some prehistoric arrow-heads which lately came into my possession and the various types of arrows used by the tribes in East