

THE LIVING WELWITSCHIA.

IN the course of a botanical expedition¹ in Damaraland from Walfish Bay to Windhuk I spent some days in January and February in the littoral desert (the Namib), where in several localities *Welwitschia*



FIG. 1.—*Welwitschia*: Male Plant.

is abundant. Speaking generally, the cones seen this year on January 22 and on later dates were considerably more advanced than those examined on January 13, 1904. The plants are flowering quite as profusely as they were three years ago, and, excepting a number of immature specimens, few were without cones.

Fig. 1 shows a male plant the leaves of which are torn into broad bands. Baines might be forgiven for representing a plant not very different from this by the picture reproduced in Hooker's monograph (Plate i., Fig. 2). The tearing of the leaves into narrow strips, which on the whole seems to be more characteristic, is, I think, less common in the eastern part of the Damaraland area than in the west. The inflorescences (Fig. 2)—compound dichasia with decussating branches, occasionally reduced to solitary sessile cones—are inserted in pits on the outer ridge of the stem just within the leaf base. The ridge in the axil of the leaf remains fertile for a number of years. The lower flowers of most of the cones seen in the photograph are open, and their anthers are exerted.

The female plant shown in Fig. 3 bears an unusually large crop of cones. This is also an eastern plant, and the leaf-segments are few and broad. The bracts are deep, dull red in colour, except for a narrow margin of dark brown which extends for a short distance only on either side of the apex. The general effect is to mark out the four angles of the cone by longitudinal dark bands, which are separated by broader red bands along which the bracts over-

lap. In Fitch's picture (Hooker, Plate vii., Fig. 1) the angles of the cone are not sufficiently dark, and the colour of the remainder is too bright. The lower ovules appear to be pollinated. A drop of an intensely sweet viscous fluid was found on the summit of the projecting micropyle of each of the upper ovules during the day. It was not observed earlier than 9 a.m., but was common at 9.30 a.m. It remained there until after 3 p.m., but disappeared before sunset. Its formation was not due to a general increase in the turgidity of the plant, for it appeared before mid-day on inflorescences cut off in the early morning. Similar drops were seen under like conditions on all cones of corresponding size and colour.

I have elsewhere stated that the hemipteron *Odontopus sexpunctulatus*, which in Damaraland is always found on the inflorescences during the hotter part of the day, is not a pollinating agent, and have inferred, contrary to the opinion of Schinz, that the relation between the insect and the plant is one of parasitism only. This statement, founded as it was upon too hasty observation, is incorrect. Fourteen specimens captured in different places, some from male and others from female plants, and examined microscopically, were found in every case to bear pollen. The grains adhere singly or in masses to the smooth surface of the abdomen, or are caught up among the short hairs on the limbs. I have observed that as the insect walks over the cone the abdomen is touched by the exerted anthers in the one case and by the fluid-tipped micropyle in the other. There can therefore be no doubt that *Odontopus* is



FIG. 2.—Inflorescences of *Welwitschia*.

an important pollen-carrier, though, I believe, not the only one. The cones are also visited by a fly which is sometimes present in considerable numbers, and also by at least two species of Hymenoptera. In these cases the sweet fluid on the top of the micropyle is probably a source of attraction, but it

¹ In part assisted by a grant from the British Association.

is less likely that it exercises a similar influence on the visits of *Odontopus*. It may be suggested that pollination was once mainly effected by insects in search of nectar, and that the relations which now exist between the plant and *Odontopus* have been more recently established. This is the more probable, since this insect is so widely distributed in regions where *Welwitschia* does not occur. Possibly the coloration of the bracts at the time of pollination is also connected with the process. Certain it is that before the micropyles appear above the bracts the latter are green, and the red colour appears about the time of pollination. Further, there is no trace of a red colour in the many old specimens of seeding cones that I have examined, but I have not been able to make sure that the colour disappears while the cone is still attached to the plant, though I believe this to be the case. If this is so, the occurrence of yellow seeding cones in Hereroland specimens (as described by Pechuel-Lösche) is at once explained.¹ The native in this picture (Fig. 3) is a Herero. The shrubs in the middle distance are *Sarcocaulon* sp.

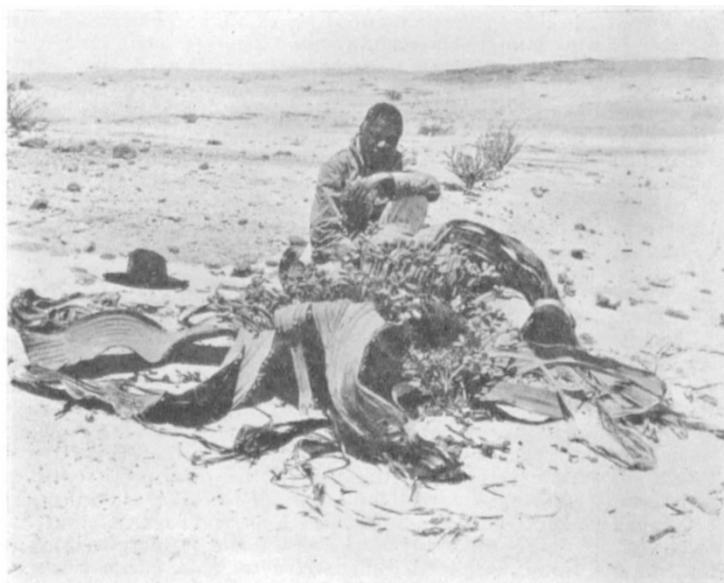


FIG. 3.—*Welwitschia*: Female Plant.

Through the kindness of Mr. K. Dinter, whose name is well known in connection with the botany of Damaraland, I was able to examine a bed of seedlings in the nursery of the forest department at Okahandya. The seeds were sown in July last in a deep, well-drained, sandy soil, and germinated in about two weeks. A specimen which I was allowed to take up on February 7 had an exceedingly slender tap-root with a few short branches; the main root (the tip was left in the ground) measured 20.5 cm. below the feeder, the oldest branch being 11 cm. below the same level. The fairly stout hypocotyl was 2 cm. long, the foliage leaves 4.5 cm.; the cotyledons were dry and shrivelled, and the lateral cones represented by small, vertically placed green lamellæ. The comparatively rapid elongation of the root, altogether out of proportion, on the one hand, to its own growth in thickness, and on the other to the increase in size of the aerial parts, points to the existence of a supreme necessity that the absorbing root should reach an underground source of water and as soon as possible render the plant independent

¹ C. Eichler, in Engler and Prantl, "Pflanzfamilien," ii., 1, p. 124 (footnote).

of the very scanty and infrequent supply at the surface. In nature the conditions which would induce germination, and at the same time enable the root to penetrate the surface layers to a sufficient depth, must very rarely occur, and it is not surprising that young seedlings have been searched for in vain. This apparent failure of natural reproduction by seed in recent years, when considered in relation to the large number of plants found within a comparatively small area and their obviously slow growth, suggests that the life-conditions now prevailing in this *Welwitschia* area are more severe than formerly. There is other evidence also pointing to the same conclusion. Vegetative reproduction being entirely wanting, it is difficult to escape the conviction that, with the continuance of existing climatic conditions, the species, here, at least, is approaching extinction.

I am very deeply indebted to His Excellency Herr von Lindequist, Imperial Governor of German South-West Africa, and to Herr Regierungsrath Dr. Hintraeger, Acting Governor, through whose kindness every assistance which the Government could possibly give me in the study of *Welwitschia*, and in a subsequent journey further inland, was most generously afforded.

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THE ART OF EMBALMING IN ANCIENT EGYPT.¹

PROF. ELLIOT SMITH has applied to the study of mummification the accurate and thorough methods of observation which have won for him a foremost place among the younger generation of anatomists, the result being an authoritative memoir, which will serve both the expert and the uninitiated as an excellent introduction to the art and significance of embalming as practised in ancient Egypt. As professor of anatomy in the medical school at Cairo he has free access to the material necessary for a first-hand study of the subject. So well has he pieced his evidence together that one obtains on reading it a very complete picture of the actual process employed by the embalmers during the twenty-first dynasty. The memoir is

based on a study of forty-four mummies of priests and priestesses of Ammon, belonging to that dynasty.

Although the chief object of the author was to unravel the details of the embalmer's art, he carefully collected all evidence which might throw light on the significance of a custom which was practised for a period of at least two thousand years in Egypt—from the seventeenth dynasty until about 600 A.D. During the twenty-first dynasty, embalming culminated in an elaborate technique which aimed at preserving the integrity of the skin and restoring the living form to the body. In explanation of the elaboration of technique during this period, Elliot Smith brings forward a suggestion of Dr. Reisner (in charge of the Hearst Egyptological Expedition of the University of California), namely, that the procedure had as its object a life-like preservation of the body so that it might serve as an abode for the *Ka* or "double," in place of the statue which was usually placed in the tomb along with the dead body to

¹ "A Contribution to the Study of Mummification in Egypt." By Prof. G. Elliot Smith. Pp. 53+plates. Mémoires présentés à l'Institut Égyptien et publiés sous les auspices de S. A. Abbas II., Khédive d'Égypte, Tome v., Fasc. i. (Cairo, 1906)