# Encephalartos Natalensis.

*By*

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**Encephalartos natalensis** *Dyer* and *Verdoorn*, sp. nov., ab *E. altensteinii* Lehm. inter alia foliolis majoribus infimis spinosis reductis ab *E. woodii* Sander foliis haud valde arcuatis truncis minus robustis differt.

*Planta* e base ramosa truncis usque ad 6·5 m. cylindricis plus minusve 40 cm. diam. *Folia* stricta vel apicem versus aliquot recurva, 1·3–3·2 m. longa, usque 37 cm. lata, foliolis infimis spinosis reductis; pulvinus bruneo-lanatus, 3 cm. crassus, 4 cm. latus et 5 cm. longus; pedunculus glaber usque ad 26 cm. longus; foliola rigida, late lanceolata vel basin versus asymmetrica, 16–23 cm. longa, 2·5–4·5 cm. lata, marginibus integris vel utrinque 1–5 spinosis. *Strobilus masculinus* circiter 45 cm. longus, 9·5 cm. diam.; squamae circiter 4 cm. longae. *Strobilus femineus* 48 cm. longus, 24 cm. diam.: facies squamarum 3 cm. prominentes, rugosi, apices versus constricti et umbilicos truncatos producti, apicibus plus minusve rhomboideis 1·4 cm. latis concavis dense lanatis. *Semina* scarlatina, 5 cm. longa, 2 cm. diam.

NATAL.—Valley of Thousand Hills, in kloof, old female plant, *Dyer* 4475 (type); *Verdoorn* and *Christian* 713, 713a; *Dyer* and *Verdoorn* 2367; 2368; 2370; 2371 (all from same plant as type specimen); young plant; *Dyer* 4476; *Verdoorn* and *Christian*, 713b; *Dyer* and *Verdoorn* 2369; plant on ledge of krantz, *Dyer* 4477; near Inchanga, *Ducasse* (male cone); Railway Nursery on lawn, *Verdoorn* and *Christian* 713c.

Plates I, II and III.

The following specimens are probably conspecific but further research is required in the native habitats. Common in Karkloof River Valley below Howick Falls; *Bayer* S. 7; *Dyer* and *Codd* 4785; Krantzkop, overlooking Tugela River Valley, *Verdoorn* and *Christian* 714; *Crundall*.

Plant branched from the base to form a clump of several stems of unequal length; stems eventually attaining a height of about 6·5 m. (20–22 ft.) and 40 cm. (15 in.) diameter, more or less cylindrical, covered with compact leaf bases, the scars of which are about 6·5 × 5 cm. (2½ × 2 in.). *Leaves* in a moderately dense crown, erect-spreading, sometimes slightly twisted and recurved towards the apex, 1·3–3·2 m. long, up to about 40 cm. broad; pulvinus woolly-tomentose about 3 × 4 cm. thick and 5 cm. long; peduncle tomentose at first, glabrescent, 10–26 cm. long up to the lowest prickle; leaflets spreading or forming a broad V at the base and an acute V towards the apex, dark grass-green, shining on surface, paler and not glossy below, with veins not apparent on face but visible on back, glabrous, hard and rigid, the medial broadly lanceolate, 16–23 cm. long, 2·5–4·5 cm. broad, tapering to the hard pungent or subpungent sometimes decurved apex, very obtuse symmetrical or asymmetrical above the base, narrowed to 1–1·2 cm. and with line of attachment 1·4–1·8 cm. long; the leaflets towards the apex reduced in size to about 10 cm. long, 1·5 cm. broad, with the basal ones reduced in length, but little in breadth until they become reduced to prickles; margin a hard rim entire or with 1–5 sharp teeth on one or both margins, more often on lower leaflets where the teeth may be slightly to distinctly lobate. *Male cone* (from plant in veld) about 45 cm. long, 9·5 cm. diam.; scales (dry) from middle section of cone about 4 cm. long with the sporangial surface narrowly obovate-oblong about 2·7 cm. long, 1·8 cm. broad at top and 1 cm. broad at base, terminating in a flat or slightly excavate rhomboid beak; shoulders of scale acutely ridged, entire, rarely bluntly toothed; beak with grey or foxy pubescence with the rhomboid top 8 × 7 mm., the lower edge of which protrudes slightly (though more markedly so in scales towards apex of cone) the upper edge rounded with a small hump about the middle; the basal scales shorter and broader and much smaller near the top of the peduncle. *Female cone* (from type specimen)

up to about 50 cm. long, 25 cm. diam.; scale faces (as seen on fresh cone) prominent, rough with an elevated brown woolly rhomboid apical beak; scales from middle section of cone (removed from cone) with a stripe about 4 cm. long, yellowish, side arms from shoulders about 2 cm. long, with the shoulders 3-cornered, toothed on margins; scale face 5 cm. broad at base and 4 cm. high, rough with prominent blunt rugosities, lateral angles obtuse, lower and upper angles rounded or humped, constricted near apex and produced into a short truncate slightly concave umbilicus covered with brown wool. *Seed* scarlet, 5 cm. long, 2 cm. diam.

The description under a new name of such a well-known plant as the giant cycad in the Valley of the Thousand Hills, near Inchanga, Natal, requires explanation. Until now it has been classified under the species *Encephalartos altensteinii*, which has its headquarters in the coastal area of the eastern Cape Province from the banks of the Bushmans River to Kei River. Hutchinson and Rattray [in Fl. Cap. 5; 2:40 (1933)] took a broad view of the limits of *E. altensteinii* to include the arborescent forms in Natal, and some in the Transvaal separated earlier by Stapf and Burtt Davy under the name *E. transvenosus*. Hutchinson's protected himself, however, by pointing out that they had not seen specimens from either Natal or the Transvaal. It follows from our present action that we do not hold with Hutchinson's and Rattray's view, although admitting that the differences relied on for specific separation may not be very convincing to others. In a footnote to *E. altensteinii* in Flora Capensis attention is drawn specially to the fact that the lower leaflets are not reduced to prickles in *E. altensteinii*. One of the features of the plant in the Valley of a Thousand Hills, near Inchanga, is the almost invariable reduction of the lower leaflets to prickles. The leaflets of *E. natalensis* on the average are appreciably broader, especially the lower ones, than in *E. altensteinii* and the texture is more rigid and the colour a darker green. In addition the plants may become somewhat larger and branching from the base is more of a feature in the Natal species than of those in the Eastern Cape Province.

One further consideration which favours the separation of *E. natalensis* is in the apparent break in the distribution range between *E. altensteinii* and *E. natalensis*, neither being recorded, so far, from the Transkei area.

*E. natalensis* is readily distinguished from *E. transvenosus* in that the leaflets of the latter are lighter green, more curved-spreading and have an indumentum on the surface which persists for some considerable time. *E. woodii*, only known from one or two male clumps in the wild state, differs in its more robust trunk (which broadens somewhat at the base) and the long, regularly curving and later drooping leaves with larger and generally more leathery leaflets.

Henderson in the Journal of South African Botany, 1945, accepts the Inchanga plant as part of his *E. altensteinii*, but like Hutchinson had not seen material from the wild in Natal. He separated, however, *E. transvenosus* from synonymy in Flora Capensis and also maintained *E. woodii* as a distinct species.

Only three specimens, all female, of *E. natalensis* have been examined by the authors in the Valley of the Thousand Hills. Part of an old male cone, brought by a Native to the gardener of the Railway Nursery, and a male plant, on the lawn of the Railway Nursery cottage, said to have come from the neighbourhood, were used for the description of the male plant. Although there were probably more specimens in the wild formerly it could not have been common in the immediate vicinity within living memory. The three female plants studied in the wild near Inchanga are: (*a*) a large old specimen with several stems in a steep, densely wooded kloof; (*b*) a young unbranched plant about 3 ft. high nearby; and (*c*) a medium-sized plant, branched from the base (tallest trunk 9 ft.) situated on the mountainside below a krantz about half a mile distant from the other two. It will be seen from the specimens cited that plants at Howick Falls are regarded as probably conspecific and others in the Krantzkop area have been placed with them, but all require further close study for several seasons in the field, which it has not been possible to do as yet.

To give further details of (*a*) there were in November, 1949, not less than 11 well-developed trunks in the clump and several suckers which had not risen above ground. The tallest trunk was about 20–21 ft. above ground level and the diameter was near a mean of 15 in., the other trunks being all fairly uniform in diameter. Viewing the clump from the side with the upper aspect of the kloof on the left: on the upper side there are 3 erect trunks varying from 10–14 ft. in height and two broken trunks, one being 3 ft. long, hollow at the top and the other 5 ft. long with a branch about 6 ft. long from its top spreading horizontally with upturned crown. On the lower side of the main trunk were 5 subsidiary trunks, the longest 15 ft., spreading nearly horizontally from near the base and with upturned crown, one trunk about 8 ft. tall and three shorter.

The stem of the young plant (*b*) nearby was about 3 ft. tall, up to about 18 in. diam., with larger leaves and leaf bases and showing obvious signs of far more rapid growth than the old plant.

Speculation on the age of living cycads, often referred to as living fossils, has been indulged in by many people interested in botany. Estimates have varied very widely but almost invariably, we feel, on the generous, even excessive side. So far no scientific method of calculation has been devised, since the trunks are fibrous and exhibit no such character as annual rings.

Some idea of the age of cycads might be judged from the number of leaf scars on the stem, but so far it has not been determined with what regularity whorls of leaves are produced. The available information shows that new whorls of leaves are not necessarily produced annually, in fact this is likely to prove exceptional in adult plants. One cannot judge the average rate of growth from observations made during a short period. There is a comparatively wide gap at the apex of the stem between two successive whorls of leaves, but the gap between the leaf bases of the whorls decreases as further growth extends them to the maximum circumference of the trunk. Thus leaf bases of two adjacent whorls may be 6 in. apart at the apex of the trunk but later in the life of the trunk the same whorls may almost merge into each other.

Meagre records allow of an early growth rate in arborescent species, such as *E. natalensis* of 2–3 ft. in the first 30–50 years, but this rate would not be maintained even in unbranched specimens.

In the case of the old plant (*a*) the estimation of age becomes a guess at a minimum because of the fact that it is branched from the base and a succession of suckers down to embryonic size is present to continue growth when the older branches die of senile decay or accident. The present tallest stem of about 20 ft. in height may well have been a sucker far removed in succession from the original parent but we have no means of telling. In addition to the normal retardation of growth rate with age, the rate of growth of each of a group of stems from one root is almost certainly slower than a single stemmed plant, and so to hazard a guess the age of the largest branch of the matriarch is something upwards of 250 years and of the rootstock itself possibly more than 1,000 years (in keeping with the name of the valley in which it grows). If this old plant and the young plant (now 30–50 years old) and our botanical records persist for another 1,000 years, posterity will have some factual evidence to fall back on.

In this connection it is most gratifying to record that Dr. Seele, the owner of the ground surrounding the old and young female plants, has very generously and wisely set it aside as a park in his newly surveyed township of Monteseel. In addition the matriach type specimen of *E. natalensis* is to be declared a national monument.

It stands in a boulder strewn clearing surrounded by low forest. The vegetation has regained some of its former luxuriance since its comparatively recent protection from grazing animals.

## APPENDIX.

After the above account had gone to press it was possible to make a further visit to the three plants (*a*), (*b*) and (*c*) mentioned above. With the assistance of Professor A. W. Bayer and Dr. C. R. C. Heard of the Natal University, measurements were taken on 19/2/51. The height of the tallest stem of the old plant (*a*) was 19 ft. 9 in., which shows that previous estimates were too high. Even now one cannot say from how far underground the tallest stem arises, but a spot was selected at the base of the plant for the present measurements and from which to take all future measurements.

Photographs were taken to fix the position of all existing branches—eleven in all, excluding the basal suckers which have not risen above the leaf-mould. The total circumference round the base of the clump is 26 ft. 11 ins.

*PLANT (a) (11 STEMS).*

| | *Height.* | *Circumference.* (breast high). |
|---|---|---|
| (1) | 9 ft. 10 ins. | 3 ft. 10¼ ins. |
| (2) | 9 ft. 11½ ins. | 4 ft. 0 ins. |
| (3) | 7 ft. 1½ ins. | 3 ft. 5– ins. |
| (4) | 19 ft. 9 ins. | 3 ft. 9 ins. |
| (5) | 15 ft. 4 ins. | 3 ft. 9 ins. |
| (6) | 8 ft. 2½ ins. | 3 ft. 9¼ ins. |
| (7) | 10 ft. 0 ins. | 4 ft. 4 ins. |
| (8) | 8 ft. 5 ins. | 3 ft. 7 ins. |
| (9) | 7 ft. 8½ ins. | 4 ft. 0½ ins. |
| (10) | 5 ft. 6 ins. | 4 ft. 0½ ins. |
| (11) | 4 ft. 4 ins. (base) | 3 ft. 10½ ins. |
| | 6 ft. 0 ins. (branch) | 3 ft. 6 ins. |

*PLANT (b) (YOUNG UNBRANCHED FEMALE).*

| *Height.* | *Circumference.* |
|---|---|
| 3 ft. 7 ins. (above firm humus) | 4 ft. 6 ins. |
| 3 ft. 10 ins. (to corner of adjacent rock) | — |

This young plant is obviously making rapid growth by comparison with the branches of the old female (*a*).

*PLANT (c) (SEVERAL STEMS).*

| *Height (Tallest stem on north side).* | *Circumference.* |
|---|---|
| 11 ft. 5 ins. total: | |
| 8 ft. 3 ins. (above rock ledge) | 3 ft. 11½ ins. |
| 3 ft. 2 ins. (below rock ledge). | |

The circumference of the whole plant at base was 22 ft.

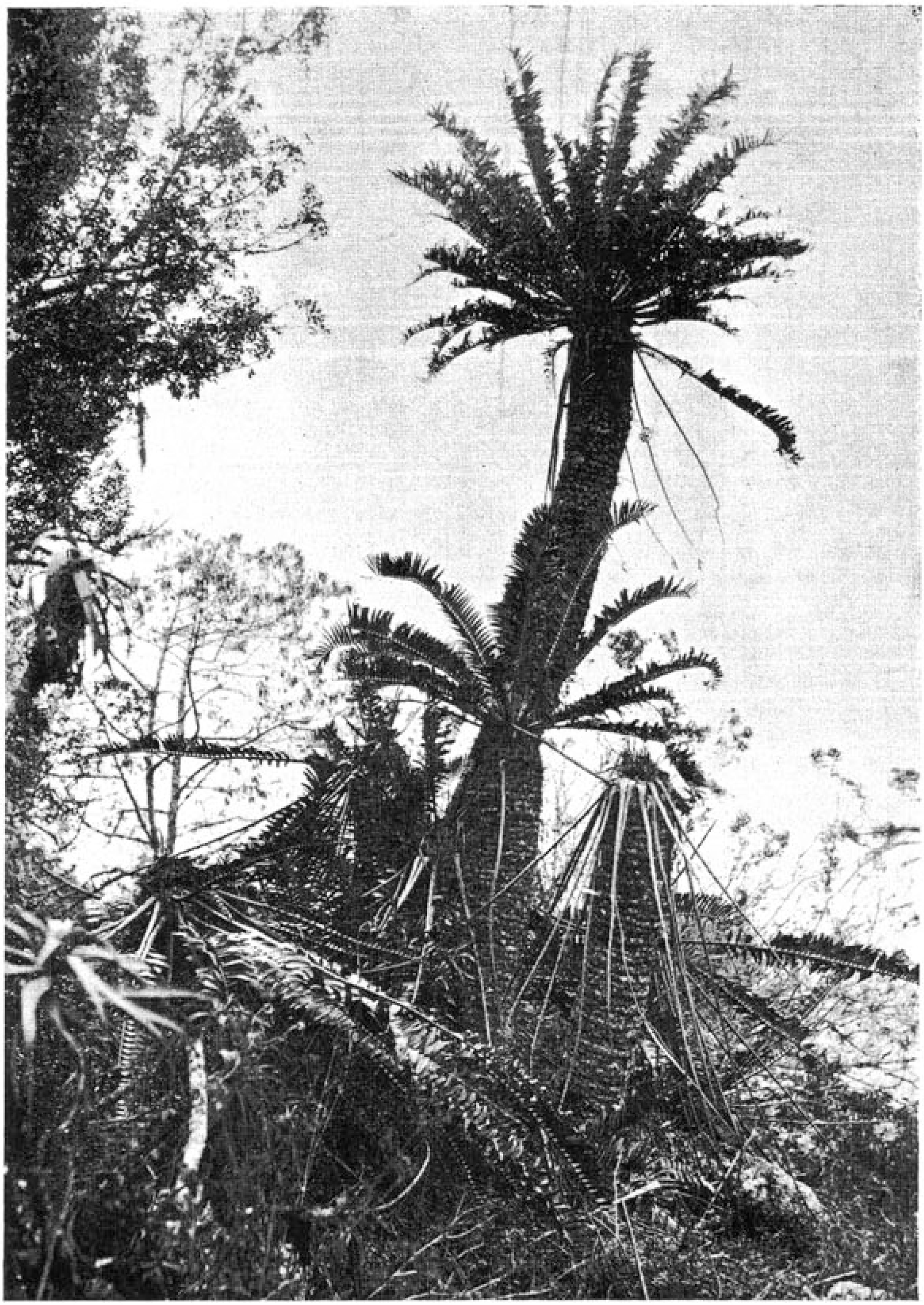

Plate I.—*Encephalartos natalensis*. Old female plant (*a*) in text, showing the group of erect stems and the large one on the right spreading down hill (1945).