

## NEW SPECIES AND NOTES ON TYPE SPECIMENS OF SOUTH AFRICAN ENCEPHALARTOS

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(With Plates XIX & XX)

***Encephalartos princeps*** R. A. Dyer sp. nov., *E. lehmannii* Lehm. affinis, sed truncis longioribus, petioli pulvino minore, strobilis 2—4, megasporophylli bulla irregulariter et crasse papillosa differt.

*Encephalartos lehmannii* Auct. in part, not of Lehm., Hutch. & Rattr. in F.C. 5 (Suppl.) 36 (1933) as to specimens from Queenstown etc., Henderson form "D" in Journ. S.A. Bot. 11, 1—30 (1945).

Planta saepe e base ramosa, trunci usque ad 3 m. vel rariter 4 m. alti, 20—30 cm. diametro. *Folia* 75—110 cm. longa, apicem versus recurva et nonnunquam leviter torta, glauca, petiolus 15—21 cm. longus pulvino lanato, foliola lineari-lanceolata, pungentia, usque 15 cm. longa, integra. *Strobili* 2—4, breviter pedunculati *masculus* elliptico-oblongus, 16—26 cm. longus, 8—10 cm. diametro, microsporophylla mediana plusminusve 3 cm. longa, 1.5—1.8 cm. lata, bulla 1.2—1.5 cm. prominens, vulticulo terminali 5—8 mm. × 4—6 mm. *femineus* plusminusve cylindricus, apice rotundato, usque 30 cm. longus, 20 cm. latus, megasporophylla mediana circiter 7 cm. longa, bulla 4—4.5 cm. lata, 3—3.5 cm. crassa, circiter 2 cm. prominens, irregulariter papillosa, sparse tomentosa, vulticulo terminali concavo plusminusve 1.5 cm. lato, 1 cm. crasso. *Semina* circiter 4 cm. longa, 2 cm. diametro.

### DISTRIBUTION

QUEENSTOWN DIV Among doleritic rocks on lower hill-slopes of Swart Kei Valley, with *E. friderici-quilielmi* Lehm., 2,300—2,600 ft., Galpin 8090 (PRE holotype). Cathcart Div, Henderson 1594. King William's Town Div, Peninsula Farm on Kabousie River, Comins 1661. Komga Div, Junction or Mooifontein Farm on Kabousie River, Verdoorn & Christian 708, Dyer 4525, Dyer & Wells 5792, Flanagan 1373 (SAM). Tsomo Div, near Tsomo, Sim (SAM). Butterworth, Kei River Valley below railway bridge, Verdoorn & Christian 709, Dyer 4508, Smith & Latimer 261, Dyer & Wells 5793, 5794.

In earlier literature specimens of this species have been confused with *Encephalartos lehmannii* Lehm. They differ in several characters. Firstly,

*E. princeps* is taller and the trunks relatively slender, secondly, 2—4 cones are produced on a stem as opposed to the normal one of *E. lehmannii*; further, the face of the female cone-scale is coarsely papillose or warty as opposed to the ridged yet relatively smooth surface of *E. lehmannii*; and in addition the leaves of *E. princeps* are usually denser, shorter and have a smaller pulvinus which is often hidden by the scale-bracts, whereas in *E. lehmannii* the pulvinus is large and exposed with a red-brown collar

*E. princeps* is concentrated in the eastern Cape Province within the middle and lower reaches of the Kei River catchment including the Swart Kei and Kabousie Rivers, mainly on doleritic outcrops and cliffs. It is claimed to occur in a valley further east but the record requires confirmation. Galpin records that it occurs with *E. friderici-guilielmi* Lehm. near the Swart Kei about five miles from the junction with the White Kei River

The specific epithet was chosen because it reflects the thought that *E. princeps* has had a longer history and has a more stately habit than its near allies *E. lehmannii* and *E. trispinosus* (Hook.) R. A. Dyer

**Encephalartos trispinosus** (Hook.) R. A. Dyer stat. nov

*E. horridus* var *trispinosa* Hook. in Curtis's Bot. Mag. t. 5371 (1863), Type tab. 5371, l.c., specimen preserved in 1880 in K.

*E. horridus* Schuster in part, not of Lehm., in Pflanzenr 4, 1 116 (1932).

*E. lehmannii* Auct. in part, not of Lehm., Hutch. & Rattr in Fl. Cap. 5, 2 (Suppl.) 34 (1933), Henderson in Journ. S.A. Bot. 11, 1 32 Form B1 (1945).

Plant unbranched or branched from the base with stems up to about 1 m. tall and 25—30 cm. diam. *Leaves* glaucous-green when young, becoming green with age, 0.75—1.25 m. long including petiole 15—22 cm. long, glabrous, rachis stiff, usually recurved and often twisted towards apex, with dirty white collar round tomentose pulvinus, leaflets spaced and reduced in size and mainly entire towards the base, occasionally overlapping in upper half; median leaflets linear-lanceolate, or oblong-lanceolate, often somewhat falcate, 10—18 cm. long, 1.5—2.5 cm. broad, pungent with terminal spine up to 6 mm. long, some or all with 1—2 pungent sometimes twisted lobes 1—3 cm. long from lower margin. *Cones* solitary, general colour blue-green or yellowish-green, shortly and stoutly pedunculate *male* subcylindric, narrowed to both ends, 25—35 cm. long, 6.5—7.5 cm. diam., median scales about 2.5 cm. long, 2.5—2.8 cm. broad with sharp lateral angles, bulla face projected into a beak 7 mm. long, terminal facet about 6 mm. broad and 6 mm. wide vertically *female* broadly cylindric, barrel or egg-shaped, rounded at apex, 45—50 cm. long and 16—18 cm. diam., median scales 8—9 cm. long, 6—7 cm. broad and 4 cm. thick vertically, with lateral ridges extending into the incurved lateral lobes 2—2.5 cm. long, bulla protruding 2.5—3 cm., sparsely hairy with ad-

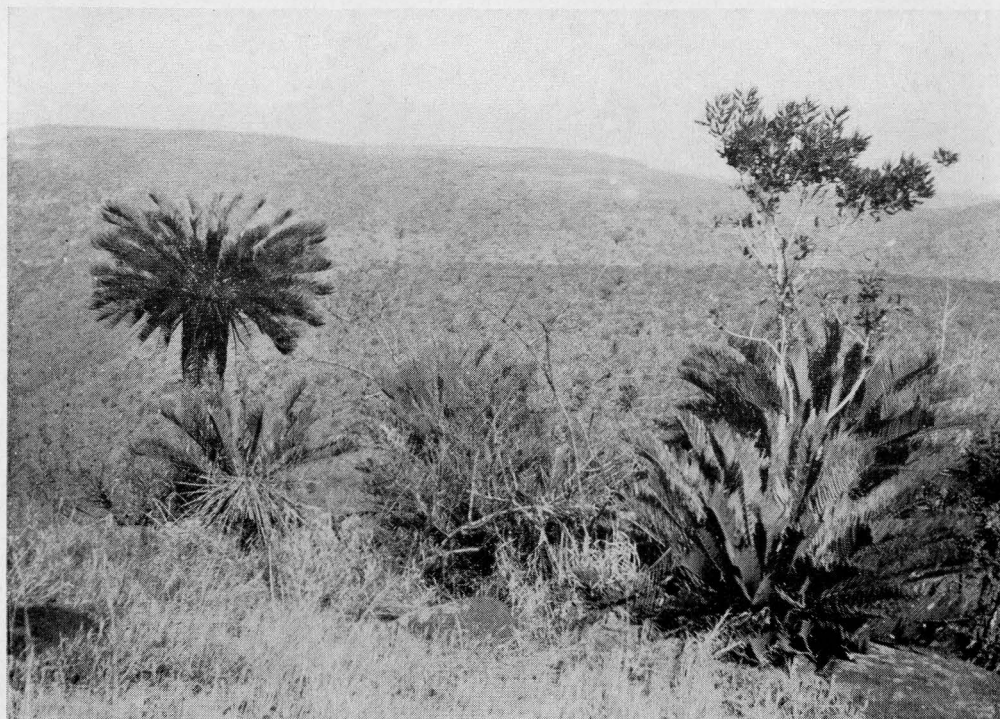
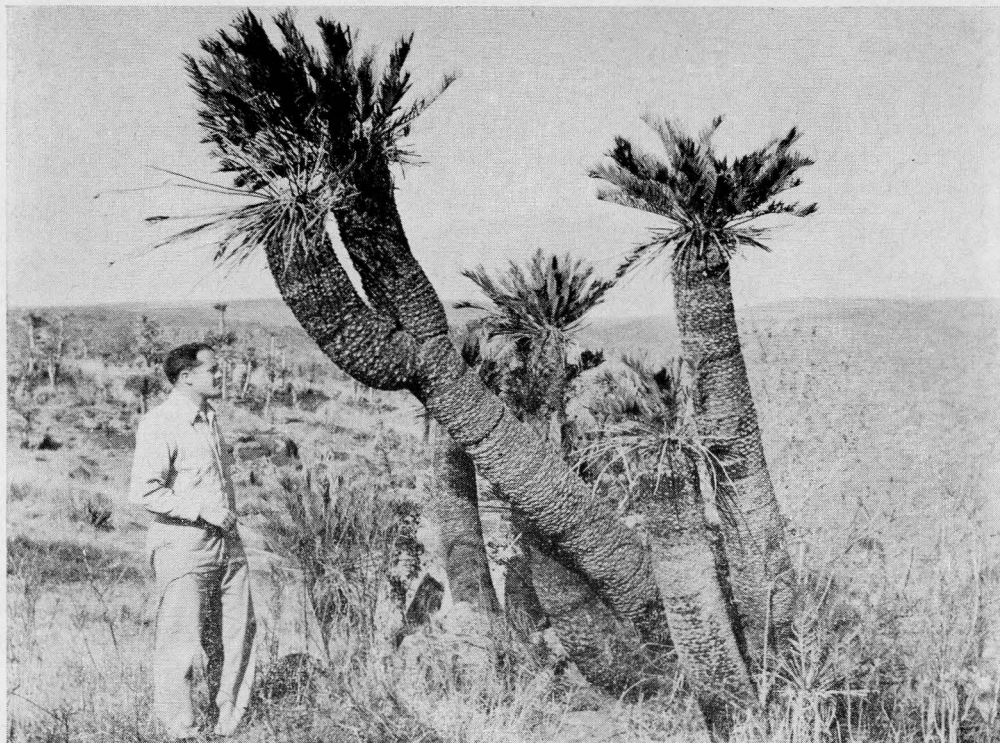


PLATE XIX

1 and 2. *Encephalartos princeps* R. A. Dyer, overlooking Kabousie River in Komga district (= *Dyer and Wells* 5792).



1 *Encephalartos trispinosus* (Hook.) R. A. Dyer Plutos Vale in Albany district (= Dyer & Wells 5801).



PLATE XX

2 *Encephalartos trispinosus* (Hook.) R. A. Dyer, cultivated at East London Museum, from 4 miles west of Hunts Drift in Bathurst district, collected by G. G. Smith.

pressed whitish hairs, upper facet with rugose ridge and with irregular pointed papillae or sometimes nearly smooth, lower facet rounded, terminal facet smooth or sparsely pitted, concave, about 1 cm. broad and 1 cm. wide vertically. *Seeds* reddish to yellowish-orange, about 5 cm. long and 2 cm. diam., with fleshy beak (there is likely to be greater variability in cone size than recorded here based on limited material).

In the eastern Cape in karroid scrub and bush of the lower reaches of the Bushmens and Fish River Valleys.

#### DISTRIBUTION

ALEXANDRIA. *Verdoorn & Christian* 697, *Compton* 19697B.

BATHURST *Dyer & Wells* 5796, 5797, *Acocks* 16152.

ALBANY *Galpin* 3083, *Verdoorn & Christian* 703, 703a, 704, *Dyer* 1184, 4842. *Dyer & Wells* 5801, *Acocks* 12769.

VICTORIA EAST *Acocks* 15979.

PEDDIE. *Dyer* 4547B, *Smith* 5815, *Verdoorn & Christian* 705, 706.

Hooker wrote in Curtis's Botanical Magazine, 1863 "After the most careful examination of our plant, I can only come to the conclusion that it is one of the many varieties of *E. horridus*, with a great tendency to have, on the inferior margin of the pinnules, two large spinescent lacinae, which, in conjunction with the terminal spines, justify the application of the term var *trispinosa*"

Schuster (l.c.) regarded the Bot. Mag. figure as representing a form of *E. horridus* (Jacq.) Lehm., while Hutchinson & Rattray and Henderson dealt with it under *E. lehmannii* Lehm. After considerable meditation, backed up by field observations, it is deemed desirable to recognise *E. horridus* var *trispinosa* as a distinct species from both *E. horridus* and *E. lehmannii*, under the name *E. trispinosus*. The affinity seems considerably stronger with *E. horridus* and the distinction is not always obvious between variants of the two. Henderson's concept of *E. lehmannii* is now classified into three groups of specific status *E. lehmannii*, *E. trispinosus* and *E. princeps*, and there is a residue of indeterminate origin including some supposed hybrids.

The figure in Bot. Mag. t. 5371 can be matched very closely by specimens in the lower reaches of the Bushmans and Fish River Valleys. These are sufficiently distinct, numerous, widely spread and tolerably uniform in habit, and often isolated from any other species, to justify specific status. While there is no means of confirming that the type specimen was collected within this environmental range, conversely, it would not be possible to deny the possibility. When Galpin collected his No. 3083 (cited above) in 1898, he identified it as *Encephalartos horridus* var *trispinosa* Hook. by comparison with the Bot.

Mag. figure and his specimen in the National Herbarium, Pretoria, including female cone material, is regarded as typical of the species. There appears to be no earlier epithet which could, with equal confidence, be applied and the only alternative would seem to be to give an entirely new one. Caution in adopting the specific epithet was necessary because of the close relationship with *E. horridus* and the presence within the distribution range of *E. trispinosus* of specimens which do not conform to a species pattern and give the impression that natural hybridization has taken place. Field observations appear to confirm the supposition.

The first botanist to generalize on the relationships of specimens in the eastern Cape Province was Charles Zeyher whose notes were read in 1852 before a scientific gathering and published in the *Phytologist*. After mentioning that any person with "tact" should have no difficulty in detecting the "play of nature" he went on to say that he intended to examine all the populations once more in their natural state. The outcome of this undertaking is not recorded and Zeyher's warning seems to have gone unheeded.

Plants of supposed hybrid origin occur two miles up the Bushmans River and in the lower reaches of the Fish River Valley. These appear to combine the characters of *E. trispinosus* and *E. altensteinii* both of which are present in the areas. *E. arenarius* R. A. Dyer, the typical form of which is a few miles west of Bushmans River in a secluded valley may also be involved and *E. latifrons* cannot be ignored. (There is a strong suspicion that *E. latifrons* has been involved in hybridization with *E. altensteinii* at least).

On the other hand neither typical *E. horridus* nor *E. lehmannii* occurs as far east as Bushmans River. *E. horridus* is apparently isolated in its distribution range in the districts of Uitenhage and Port Elizabeth while only *E. longifolius* occurs with *E. lehmannii* in a limited area of its distribution range along the Klein Winterberg.

If one indulges in speculation one might suggest that both *E. horridus* and *E. lehmannii* evolved in the far distant past from *E. tridentatus* stock. The stem has been reduced and the lobing of the leaflets accentuated in *E. horridus*, whereas in *E. lehmannii* the stems are more robust and the leaflets mainly entire. An occasional part-reversion within the normal populations of these two species in the direction of *E. tridentatus* indicates this possibility—a stem up to 4 ft. in *E. horridus* (Story 2338) and specimens of *E. lehmannii* with teeth on the lower margin of some leaflets (Verdoorn & Christian 689, 689a, 689b). It is believed that these variations have been viewed on a rational basis in the present treatment in not giving them distinctive rank. Were cones available from all specimens, it is felt that they would be relatively uniform and sufficiently distinctive within the groups afforded specific status.

**Encephalartos cycadifolius** (Jacq.) Lehm. — *Zamia cycadifolia* Jacq.

When describing *Zamia cycadifolia*, Jacquin, *Fragm.* 27, t. 25 & 26 (1801) stated that the plant collector Georgius Scholl had returned from the Cape with three new species of *Zamia*, which were then flourishing in the royal garden of Schoenbrunn in Vienna. Scholl brought also one male and two female cones, which were presumed to have belonged, one each to the same species as the living plants. Jacquin described and figured the species, filling in the missing parts of the cones. Unfortunately any specimen which Jacquin may have preserved at the time has since perished and one must rely for the most part on his description and figures to interpret his concept of the species. There is, however, a leaf specimen of *Z. cycadifolia* from the Schoenbrunn garden in the Willdenow herbarium under the number 18529, now the property of the Berlin-Dahlem Herbarium.

In 1834 Lehmann, in *Pugil.* 6 13, transferred the name *Z. cycadifolia* to *Encephalartos* and at the same time described the species *Encephalartos friderici-guilielmi*, which he distinguished from *E. cycadifolius*, mainly on the following grounds the trunk was woolly (as opposed to glabrous) the rhachis was woolly (as opposed to pubescent) and the fruit densely woolly (as opposed to the presumed glabrous cone of *E. cycadifolius*). The identity of *E. friderici-guilielmi* in the wild state in the districts of Queenstown and Cathcart is unquestioned because it fits Lehmann's description so well, based on specimens collected in that area by Ecklon & Zeyher

With little preserved material to judge by, there has been continuous speculation whether Lehmann was justified in distinguishing his species from that of Jacquin. To cite a few authorities, Miquel in his *Monograph. Cycad.* 1842, accepted the two as distinct, although he queried whether *E. cycadifolius* could be a juvenile form of *E. friderici-guilielmi*. A. De Candolle, in *Prod.* 16, 2 530 (1868), combined the two species, whereas Thiselton-Dyer, discussing the relationship of *E. cycadifolius*, *E. friderici-guilielmi* and *E. ghellinckii* Lehm. a decade later in the *Gardener's Chronicle* 1878 p. 810, remarked on the glabrous cones ascribed to *E. cycadifolius* and concluded by giving the opinion that the three were closely allied but distinct.

Subsequently Hutch. & Rattr in *Fl. Cap.* 6, 2 42 (1933) claimed that Jacquin's concept of *Zamia cycadifolia* was based on a mixture of two species, the stem and leaf of one and the cone of another. The cone was considered to belong to a species such as *E. villosus*. The plant was considered by them to be specifically equal to Lehmann's *E. friderici-guilielmi*, which name they consequently relegated to synonymy. Jacquin, it must not be overlooked, compared his species with *Cycas revoluta* for habit and it is clear that the leaf figured by Jacquin (and confirmed by the specimen in the Willdenow Herbarium) has leaflets with slightly recurved margins, narrower and significantly more widely

spaced than those of mature leaves of *E. friderici-guilielmi*, to such an extent that it is highly improbable that it represents even a juvenile form of the latter. The stem figured by Jacquin appears young, but certainly beyond the seedling stage, as it was said to be 1 ft. long and budding from the base. There is another important point and that is that European penetration, let alone botanical collectors, had not reached the Bantu-occupied neighbourhood of Cathcart or Queenstown (the western-most occurrence and type locality from which *E. friderici-guilielmi* is recorded) in the time of Scholl, who returned to Europe in 1799.

It is now clear that the leaf figured by Jacquin resembles closely those of *Encephalartos eximius* Verdoorn, described in *Bothalia* 6, 2 246 (1954). *E. eximius* is known from the districts of Bedford and Cradock, which area was more accessible to European exploration before 1799 than was Cathcart. On the other hand there is no published record of a botanical expedition through the area at such an early date. The mountains east of Bedford and Cradock are still comparatively isolated in a farming area and the Cycad there appears to have been collected only two or three times in the 150 years since 1800, whereas the more robust species from Queenstown-Cathcart has for many years been evident from the railway line and national road passing through the district. It is fairly common in cultivation.

Is one justified in taking the viewpoint that Jacquin's description and figure 26 covered *E. eximius* and not *E. friderici-guilielmi* or should Jacquin's epithet *cycadifolius* be rejected as a *nomen confusum*.

To answer this query it was essential to consult, if possible, the leaf specimen in Willdenow's herbarium, No. 18529. An excellent photograph and a pinnule were obtained by the courtesy of the Director of the Berlin-Dahlem Herbarium. There seems no doubt that the leaf was from Jacquin's type plant. The comparison with *E. eximius* is very close but there is not absolute identity. The pinnule is 9 cm. long, 3 mm. broad, has 3—4 veins on the lower surface in addition to those along the margin and is glabrous on both surfaces. Jacquin describes the leaves as with greyish hairs which fall away by rubbing. Median pinnae of *E. eximius* are 9—13 cm. long, 4—5 mm. broad with thickened, slightly recurved margins and, on the lower surface, has 5—6 prominent nerves in addition to those along the margin and is sparsely pilose or scurfy. The pinnae of seedlings, however, are glabrous.

To refer again briefly to the cone Jacquin illustrated, he described it as "fuscum" (dusky, too brown for grey) and the seeds "coccineam" (red, cochineal or carmine). He omitted to state whether it was glabrous or tomentose. Lehmann and subsequent workers have taken it as glabrous. Present knowledge makes it clear that no species from the eastern Cape has fuscous glabrous cones with red seeds. The only cones which could be described as fuscous are the old woolly



cones of *E. friderici-guilielmi* and *E. eximius*, but both have orange-yellow to amber-brown seeds, not red. It is conceivable that the cone was originally woolly and that an error was made in the colour of the seeds recorded by Jacquin, because the seeds could not have been fresh when he first saw them. Nevertheless it does seem that the illustration of the cone must be excluded from an interpretation of *Zamia cycadifolia* Jacq.

In giving specific status to *E. eximius*, the author, Inez Verdoorn, was influenced by the view supported by Hutchinson and Rattray in Fl. Cap. 1933, that *E. cycadifolius* (Jacq.) Lehm. was conspecific with *E. friderici-guilielmi* Lehm. She was at pains to distinguish three closely related species (as was Thiselton-Dyer mentioned earlier), the first from the upper catchment area of the Great Fish River (Bedford-Cradock) the second further east in the upper catchment of the Great Kei River (Queenstown-Cathcart) and the third species even further east on the eastern Cape-Natal border (*E. ghellinckii* Lem.).

The reassessment of available data, as outlined above, seems overwhelmingly in favour of identifying *E. cycadifolius* (Jacq.) Lehm. with the species in the Bedford and Cradock districts (the photograph illustrating *E. eximius* shows a strong likeness to the portion of stem figured by Jacquin). The decision to follow this conclusion necessitates the re-application of the name *E. cycadifolius* to the Bedford-Cradock plants, the placing under it the synonym *E. eximius* and the restoration of the specific status of *E. friderici-guilielmi* for the Queenstown-Cathcart plants. However awkward it may be to pronounce the specific epithet *friderici-guilielmi* one may not overlook the fact that the name honours an early patron of botany

#### ***Encephalartos villosus***

In 1788 Gaertner, in de Fructibus et Seminibus Plantarum, described a cone under the name *Zamia-caffra* (*villosa*), founded on *Cycas caffra* Thunb. But on his accompanying plate, t. 3, Gaertner called it simply *Zamia villosa*. There is little doubt that the cone was specifically equal to Thunberg's *Cycas caffra*, as to t. 5 in Nov. Act. Soc. Scient. Upsal. 2 (1775), which now bears the name *Encephalartos caffer* (Thunb.) Lehm.

The name *Zamia villosa* in Herb. van Royen, referred to by A.DC. in DC. Prod. 16, 2 54 (1868) as a synonym of *E. caffer* (presumably of (Thunb.) Lehm.), has no nomenclatural standing and may be ignored.

In 1867 Lemaire described a species under the name *Encephalartos villosus* in Ill. Hort. 14, Misc. 79, which was the first use of the epithet in combination with *Encephalartos*, although he mentioned that the plant already bore this appropriate epithet *villosus* in commerce and cited *Zamia villosa* Hort. A. Verschaffelt as his authority for this. There is no allusion to *Zamia villosa* Gartn. It is also important that there is no reference to *Zamia villosa* under Bot. Mag.

t. 6654 (1882) which is undoubtedly what it is titled, namely *Encephalartos villosus* Lem. and it may well have been based on specimens from the same source. There is no apparent reason why Lemaire should not have selected the epithet *villosus* in the genus *Encephalartos* for a plant which he regarded as botanically undescribed.

There was, therefore, no justification for Schuster in *Pflanzenreich* 4, 1 118 (1932) and Hutch. & Rattr in *Fl. Cap.* 5, 2 (Suppl.) 30 (1933) to regard the Lemaire epithet *villosus* as an adoption from Gaertner. Had this been so it is clear that *E. villosus* Lem. would require a new name. Fortunately this is not so because the species is widespread in nature and cultivated in many parts of the world.

In the absence of exact information one might assume that the type specimen of *E. villosus* was collected in the neighbourhood of East London, because it is abundant there and it is the nearest natural habitat to the Cape. Mr R. Strey, Officer-in-Charge of the Natal Herbarium, Durban, brought to my notice a register kept by M. J. McKen during his period of office as curator of the Durban Botanic Garden. McKen arrived in Natal in 1850, was appointed as curator in 1851 and the register refers to the period 1865–1872. It is learnt from this that McKen sent Natal plants throughout the world, to the public gardens of Hongkong, Mauritius, Australia and Europe. In the last seven years of office before he died he despatched overseas no less than 670 specimens of *Encephalartos*. His records show that on 22.2.1867 a consignment of 25 specimens of *Encephalartos* from Umtwalumi was sent to Ambroise Verschaffelt, Gent, Belgium, (Lemaire's nurseryman friend), 12 more on 29.2.1868 from 'Krans Kloof', 50 on 20.7 1868 and others on later occasions.

*E. villosus* Lem. is still common in Natal and there is little doubt that most, if not all of the specimens sent from Umtwalume, about 50 miles south of Durban, on 22.2.1867, were of this species and either this or some earlier consignment probably contained the specimen or specimens on which Lemaire founded the name in that year. It is significant that McKen used the name *E. villosus* (*villosa*) for the first time when dispatching four specimens from "Krans Kloof" to Melbourne on 15.2.1869.

It is necessary to add that McKen later dropped the name *villosus* and refers to *E. mackenii* in his register. The name *E. mackenii* was used in synonymy by Miquel in 1869, for a garden plant which he identified with *Macrozamia pauliguilielmi*, and was used again by G. Henderson in his *Ill. Dict. Hort.* 508 (1885). The description in the latter agrees with our conception of *E. villosus* Lemaire, for which reason the name is regarded as a synonym of this.

#### ***Encephalartos ghellinckii***

This species was described by Lemaire in 1867 at the same time as he described *E. villosus*. Since *E. ghellinckii* is restricted in its natural distribution

almost entirely to Natal and in view of the strong circumstantial evidence in support of the suggestion that McKen was instrumental in supplying the type material of *E. villosus* Lem. from Natal, there is good reason to suggest that McKen also had a part in sending the type material of *E. ghellinckii* Lem. from Natal to the nursery garden of Verschaffelt, where it was studied by Lemaire.