ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTHERN AFRICA

TYDSKRIF VAN DIE BROODBOOMVERENIGING VAN SUIDELIKE AFRIKA

NO. 20

DECEMBER / DESEMBER 1989

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NO. 20 DECEMBER / DESEMBER 1989

EDITOR/REDAKTEUR

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VOORBLAD/COVER

Three magnificent **E. transvenosus** at Modjadji's Nature Reserve.

Photo: Neil Munro

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FROM THE PRESIDENT

This twentieth issue of ENCEPHALARTOS, itself a milestone in the Society's history, coincides with the two other significant events. Firstly, I am pleased to report on the enrollment of member number 1000 to the Society (**Mrs Hentjie Barnard** from Pietersburg). Secondly, I am honoured to hand over the Presidency of the Society to Professor **Nat Grobbelaar** with effect from 1 January 1990 (also see report elsewhere). The recent ballot for the election of two additional committee members attracted a good response and was closely contested. I can now report that the newly-elected Executive Committee members are **Ben Visser** and **Piet Vorster.**

The first five, formative years of the Society have not been without teething troubles; in some ways it is remarkable that a group like ours, with the diverse interests of collectors, conservationists, commercial growers and research workers has indeed managed to evolve as it has into a stable organisation. Credit for this must go in large measure to the sometimes quite extraordinary efforts of the Society's office bearers and the mini-army of unofficial helpers. Since this is my last Presidential letter, may I express my personal thanks to all those who have assisted in their various ways over the past five years and to all the members who have so willingly shared their cycad interests with me.

With best wishes to you all,

Roy Osborne, President 1988/89.

VAN DIE PRESIDENT

Hierdie twintigste uitgawe van ENCEPHALARTOS, op sigself 'n baken in die geskiedenis van die Vereniging, val saam met twee ander belangrike gebeurtenisse. Eerstens: ek kondig met genoee die aansluiting van lid nommer 1000 by ons Vereniging aan (**Mev Hentie Barnard** vanaf Pietersburg). Tweedens: dit is my voorreg om die Presidentskap van die Vereniging aan prof. **Nat Grobbelaar** oor te dra vanaf 1 Januarie 1990 (sien eweneens verslag elders). Die onlangse stemming vir die verkiesing van twee bykomende komiteelede het heelwat reaksie en strawwe mededinging uitgelok. Ek kan nou aankondig dat die nuutverkose Bestuurslede is **Ben Visser** en **Piet Vorster**.

Die eerste vyf vormingsjare van die Vereniging het nie probleemloos verloop nie. In bepaalde sin is dit merkwaardig dat 'n groep soos ons, met die uiteenlopende belange van versamelaars, bewaarders, kommersiele kwekers en navorsers, tog daarin geslaag het om tot so 'n hegte organisasie te ontwikkel. Grotendeels is dit te danke aan die soms buitengewone pogings van die Vereniging se ampsdraers en die skare nie-amptelike helpers. Aangesien dit my laaste brief as President is, wens ek my persoonlike dank te betuig aan elkeen vir sy besondere bystand die laaste vyf jaar en aan al die lede wat hulle broodboombelangstellinge so bereidwillig met my gedeel het.

Aan u almal - my beste wense

Roy Osborne, President 1988/89.

1990 MEMBERSHIP FEES

Members are reminded that their 1990 membership fees are due on 1 January 1990. The fee structure is detailed on the application form at the end of this issue of ENCEPHALARTOS.

As in previous years, a discount incentive is offered for those who respond immediately and thus avoid the necessity for invoices and reminder letters etc. *The "discount rates" are R 20 (ordinary members), R 10 students and pensioners) and R 50 (overseas members).*

LEDEGELD VIR 1990

Lede word daarvan herinner dat hulle 1990-ledegeld betaalbaar is op 1 Januarie 1990. Besonderhede oor die samestelling van ledegeld verskyn op die aansoekvorm in hierdie uitgawe van ENCEPHALARTOS.

Soos in vorige jare word 'n aanmoedigingsafslag aangebied aan lede wat dadelik reageer en daardeur rekeninge en aanmanings, ens. uitskakel. *Die "afslagkoers" is R 20 (gewone lede), R 10 studente en afgetredenes) en R 50 (buitelandse lede).*

APOLOGY

The editorial which appeared on pages 2-3 of ENCEPHALARTOS 18 (June 1989) has resulted in adverse responses from members of the Society and from the Provincial Nature Conservation authorities. These responses have been referred to, and carefully considered by, your Executive Committee. Evaluation of the editorial shows that, although undoubtedly written in good faith by your ENCEPHALARTOS co-editor, the content was strongly emotive and based in part on unproven facts. As such, we accept that it was offensive.

The President, Executive Committee and Editors of ENCEPHALARTOS therefore wish our readers to accept this statement as a public apology; we sincerely regret having caused embarrassment to persons or bodies who may have been unjustly maligned by the text of the previous editorial.

Signed: ROY OSBORNE, President, for the Executive Committee.

Signed: NEIL MUNRO and BUNNY WENTZEL as ENCEPHALARTOS co-editors.

VERSKONING

Die redaksionele artikel wat verskyn het op bladsye 2-3 van ENCEPHALARTOS 18 (Junie 1989) het gelei tot besware van lede van die Vereniging, sowel as van die Provinsiale Natuurbewarings outoriteite. Hierdie besware is verwys na, en oorweeg deur, die Hoofbestuur. Ons gevolgtrekking was dat, hoewel die artikel sonder twyfel in goeder trou geskryf is deur die mede-redakteur van ENCEPHALARTOS, die inhoud emosiebelaai en gedeeltelik op onbewyste feite berus het. In die lig hiervan erken ons dat die artikel offensief was.

Die President, Hoofbestuur, en Redakteurs van ENCEPHALARTOS vra gevolglik ons lesers om hierdie verklaring te aanvaar as 'n openbare verskoning; ons betreur dit dat persone en instansies in verleentheid gestel is deurdat hulle onregverdig beswadder is deur die teks van die vorige redaksionele artikel.

Geteken: ROY OSBORNE, President, namens die Hoofbestuur.

Geteken: NEIL MUNRO en BUNNY WENTZEL as mede-redakteurs van ENCEPHALARTOS.

'n Wens van vreugde
en vrede
aan u met Kersfees
en deur die
Nuwe Jaar

VAN
DIE PRESIDENT,
REDAKTEUR,
NASIONALE
EN
STREEKKOMITEES

With best wishes
for a joyful
Christmas and
peace throughout
the New Year

FROM
THE PRESIDENT,
EDITOR,
NATIONAL
AND
REGIONAL COMMITTEES

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3. Subject index of shorter notes.

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REPRINT SERVICE.

In view of the fact that some of the back copies are now out of stock, the compiler of this index is prepared to arrange for photostat copies of articles for members of the society. Please remit the appropriate amount as detailed below . Cheques or Postal Orders should be made out to "The Cycad Society of South Africa"

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PO Umlaas Road
3730 South Africa.

FOCUS ON... FOKUS OP...

In each edition of ENCEPHALARTOS, we focus on one Southern African species, in the form of an in-depth article in layman's language. In this edition the spotlight falls on:

In elke uitgawe van ENCEPHALARTOS fokus ons op een Suider-Afrikaanse broodboom-spesie, in die vorm van 'n in-diepte-artikel in leketaal. In hierdie uitgawe val die kollig op:

ENCEPHALARTOS TRANSVENOSUS

by Roy Osborne

The south east facing slope at Modjadji's Nature Reserve showing the dominance of **E. transvenosus** in the flora.

Impressive trunks of the cycad stems at Modjadji's Kraal dwarf Bunny Wentzel.

INTRODUCTION

In Volume I of the *Flora of South Africa* (1966) Drs. Dyer and Verdoorn make the statement : "The Modjadji Cycad is the grandest species of them all". In the preface to her book, Cynthia Giddy captures a quality of mysticism when she writes : "It has been my privilege to stand in the swirl of cloud and mist amongst the age-old stems of the Modjadji Palms on the hill below the Kraal of the Rain Queen and feel something of the magic of rain in Africa". It is these two qualities, the grandeur of the plant and the mysticism of the locality, which make *Encephalartos transvenosus* Stapf and Burtt Davy one of the most fascinating of all cycads.

DISCOVERY

It is difficult to say who "discovered" *E. transvenosus*. Certainly when the Balobedu Baga Modjadji tribe migrated south across the Limpopo and settled in the Duiwelskloof area in about 1650 they came to know and respect the plants. The association of the various rain Queens of these people, from Modjadji I to Modjadji V, with the plants, has been well- documented. [Readers interested in the history and customs of the Rain Queens and their people are referred to Mrs. M.R. Short's article in ENCEPHALARTOS 2: 5-6, Lawrence Green's book "These Wonders to Behold" - an extract of which appeared in ENCEPHALARTOS 6: 17 - and E.J. and J.D. Krige's 1943 book, "The Realm of the Rain Queen", now reprinted by Juta. A fascinating account of a visit to Modjadji's Kraal was written by Frances Milner and appeared in the 1944 issue of the Journal of the Botanical Society of Southern Africa; by special permission this text was reprinted in

ENCEPHALARTOS 19: 21-22.

The species was brought to the attention of the western world by Joseph Burtt Davy. His 1926 description with Dr. Stapf of the four Transvaal cycads, *E. laevifolius*, *E. lanatus*, *E. paucidentatus* and *E. transvenosus* was detailed in ENCEPHALARTOS 16: 3-9 and need not be repeated here. In 1933 Hutchinson and Rattray felt this plant did not warrant species status and included it with *Encephalartos altensteinii* in *Flora Capensis*. Henderson's investigations revised this and in 1945 *E. transvenosus* was re-instated as a valid species. Botanical interest in this species reached a climax in the 1940's when 27 different herbarium specimens were filed with the Botanic Research Institute. A resurgence of interest in this species is seen at present with several on-going research projects exploring aspects of its growth and development, its ecology, the coralloid root symbiosis and the seed toxins.

DISTRIBUTION

The distribution of *E. transvenosus* extends somewhat intermittently over quite a large area of the northern and north-eastern Transvaal, including the Lebowa and Venda territories. The main localities fall in the Soutpansberg and Letaba districts and their distribution is bisected by the Tropic of Capricorn. Smaller populations occur sporadically to the south-east in the Wolkberg-Great Escarpment-Marieps complex in the Pietersburg, Letaba and Pilgrim's Rest districts. All localities are at relatively high elevations (ca. 1000m) on mountain mistbelt zones. Rainfall varies from about 500-1000mm p.a., falling mainly in summer. Most zones are relatively frost-free.

The largest and best-known group of plants exists as a unique "forest" in the 308ha Modjadji Nature Reserve situated about 30km north-east of Tzaneen in the self-governing state of Lebowa (30°20'E and 23°40'S). The 10-15,000 mature plants dominate the vegetation on a steep south-east facing slope. This forest was proclaimed at

National Monument in 1936 (see ENCEPHALARTOS 3: 20-22) and the area has recently been designated a nature reserve by the Lebowa Government.

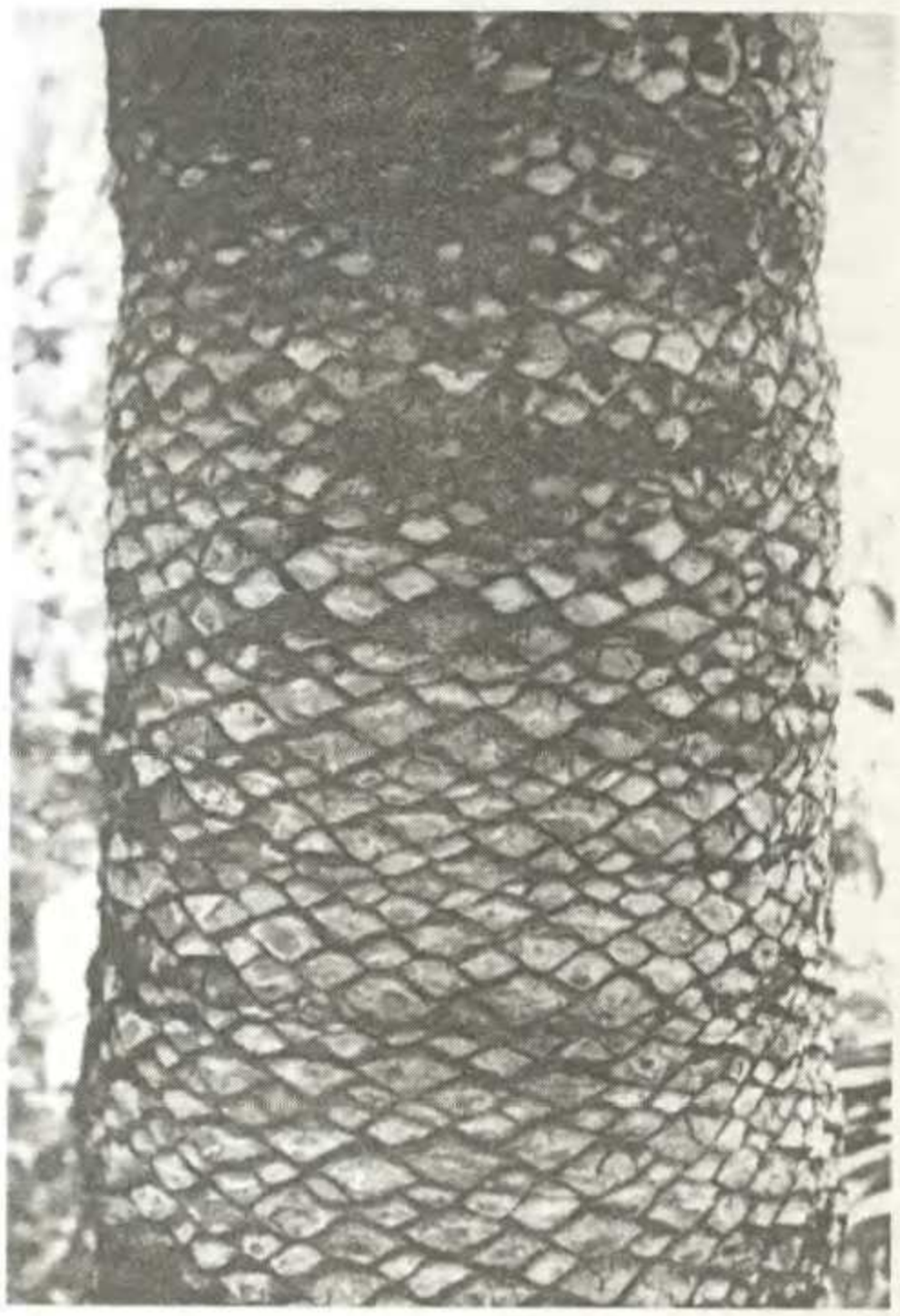
Two other less well-known reserves in the vicinity hold substantial numbers of this species. The first is Lekgalameetse Nature Reserve, proclaimed in 1986, about 30km south of Tzaneen. About 1000 mature specimens are present on this site. The second is the Mphaphuli Cycad Forest on the slopes at the eastern end of the Soutpansberg Mountains, about 30km north-east of Thohoyandou (capital of Venda). This reserve, proclaimed only this year, extends over 1200km and hosts approx. 5000 mature specimens in a magnificent setting.

Fine specimens of *E. transvenosus* are found in many Transvaal parks and gardens including the grounds of the Botanic Research Institute, the campuses of Pretoria University and Unisa and the Lowveld Botanic Gardens at Nelspruit. Kirstenbosch and Durban Botanic Gardens host examples as does Ewanrigg in Zimbabwe. Internationally, the species is represented in the collections of Fairchild Tropical Garden, the Missouri Botanical Garden and the Huntington and Foster Gardens in the U.S.A. In Europe, examples are found at Kew and Edinburgh Gardens in the U.K., at the Paris and Les Cedres Gardens in France, at Naples in Italy and at Munster, Mainz and Munich Botanic Gardens in Germany.

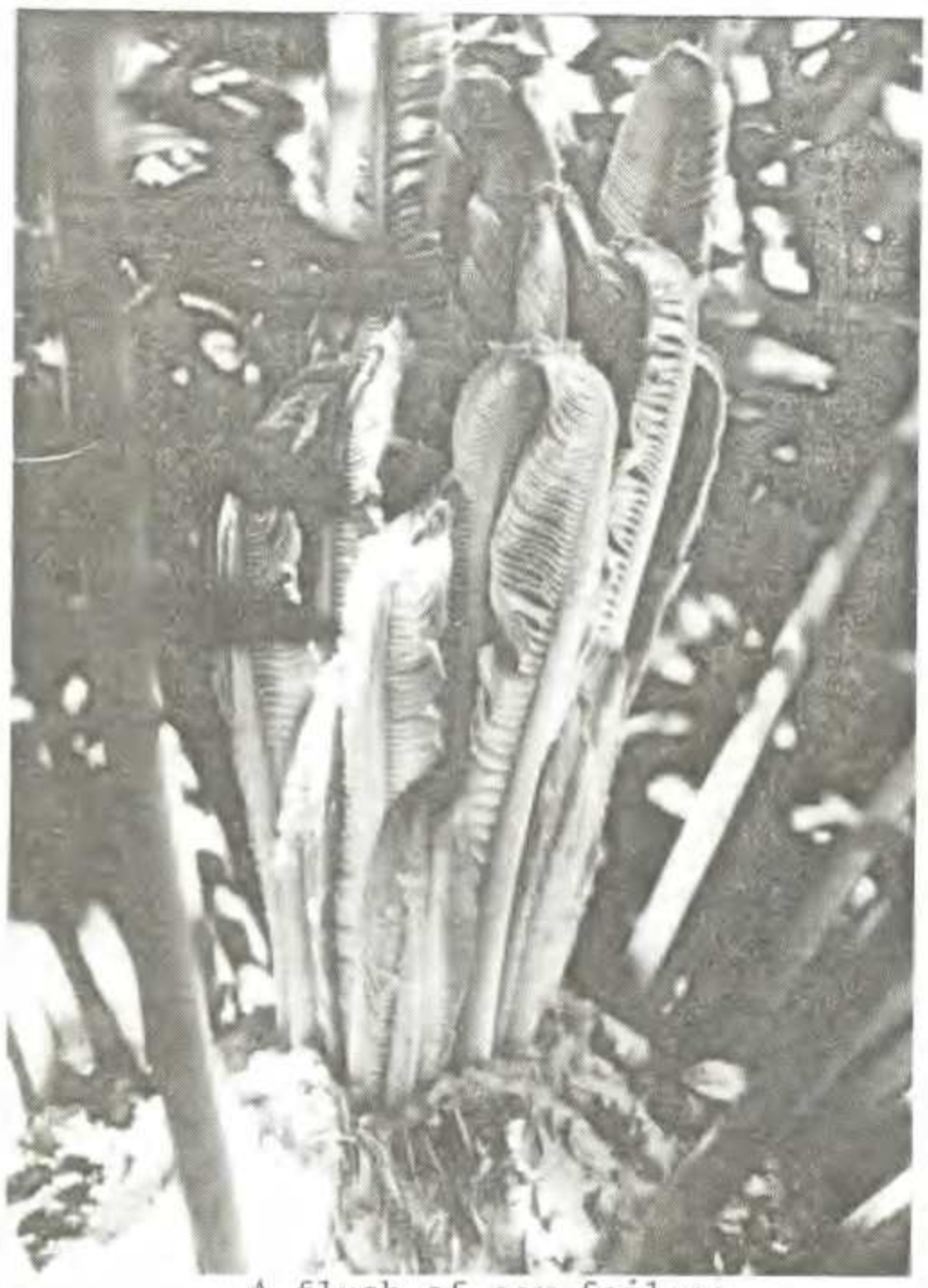
DESCRIPTION

1. STEM

Encephalartos transvenosus is the tallest of the South African cycads, if not the tallest representative in the genus as a whole. Stems quite often reach up to 9.5m at Modjadji's Reserve and heights of 13m have been recorded. The trunk diameters vary from 40-45cm in drier localities but may reach 65cm in sites where more water is available. Cynthia Giddy notes that a feature is the many dormant buds along the entire length of the stem, a character which this species shares with *E. paucidentatus* and *E. woodii*. The stem apex is covered with brown wooly hairs. Like most arborescent cycads, older trunks often fall and the growing part resumes vertical growth, while suckering occurs at the base.



The trunk of a mature speciment of *E. transvenosus* shows the characteristic leaf base pattern.



A flush of new foilage of *E. transvenosus* shows the vigour of this species.

A specimen of *E. transvenosus* from Sibasa in the northern Transvaal shows a more symmetrical leaf packing than is seen in plants from other localities.

2. LEAVES

The leaves of large plants emerge in great flushes of vigorous succulent growth, the leaf surfaces being protected at the juvenile stage by a covering of hairs. The leaves expand to between 1-2.5m long and bear glossy dark green leaflets on a straight yellowish-green leafstalk.

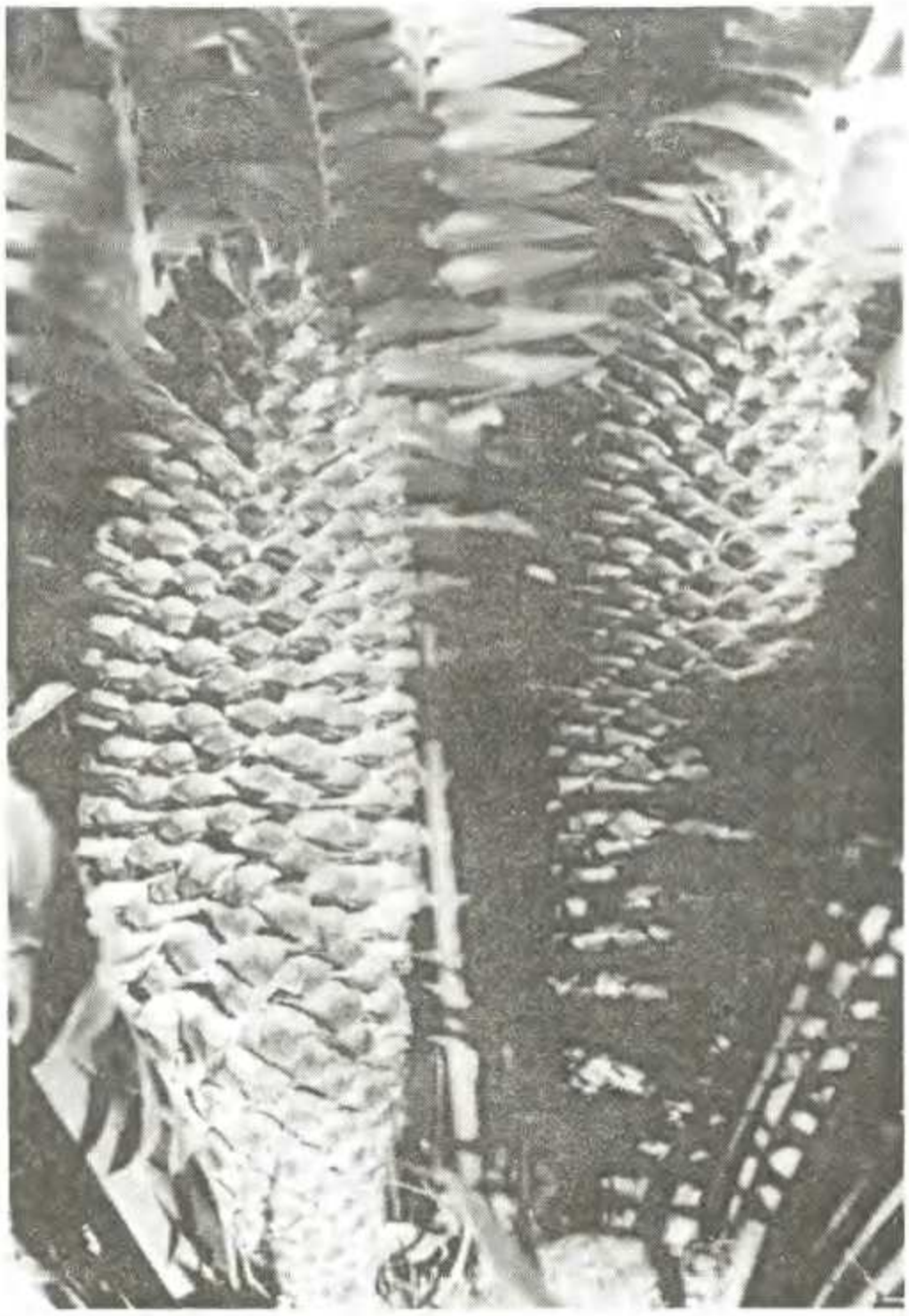
The leaflets are closely packed and overlap upwards. Leaflets are reflexed away from the leafstalk, a character shared with *E. paucidentatus*. Median leaflets are typically about 18cm long and 3cm wide, with between 1 and 3 teeth on both margins. Leaflets become progressively smaller towards the leaf base, ending in a series of prickles. The leafstalk is bare for about 14cm at the base.

Leaflets have a smooth upper surface but have prominent uneven veins on the lower surface. Several references make the statement that Burtt Davy used the epithet "transvenosus" in relation to the network of finer veins visible between the main veins when a leaflet is held up to the light. However, both Nat Grobbelaar and the author have difficulty in seeing this - even with a strong hand lens - and we wonder if the epithet has a different derivation.

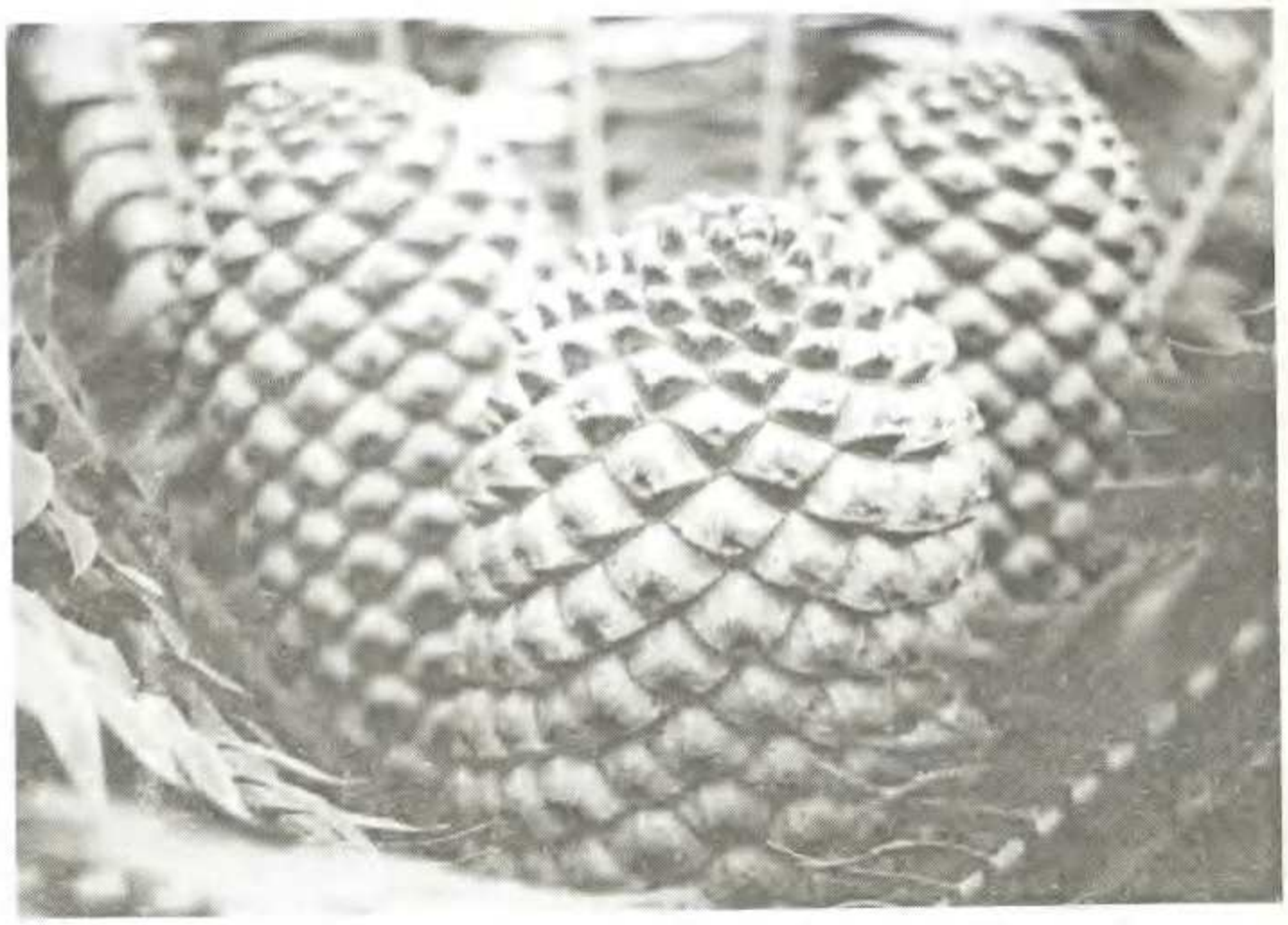
3. CONES

E. transvenosus plants bear up to 5 golden-orange cones which are woolly on emergence but at maturity retain only a clump of short brown hairs at the tip of each cone scale.

Male cones are about 40-60cm long and 13-15cm in diameter, each scale projecting into a short blunt beak. These cones show a significant temperature rise at the time of pollen release; Nat Grobbelaar has recorded



Male cones of
E. transvenosus.
From a plant in
the Lowveld Botanic
Garden, Nelspruit.



Female cones of *E. transvenosus* with the characteristic tuft of hairs at the cone scale facets. A plant in Ita van der Walt's Pretoria garden.

temperatures of 15°C above ambient. [In his other studies on the Modjadji population, Prof. Grobbelaar has shown a bias in the sex ratio of plants towards maleness, especially in older plants. It seems likely that abundant water and a fire cycle are two effects which contribute to coning in female plants.]

Female cones of *E. transvenosus* are amongst the largest of all cycad cones. Typical measurements are 65cm long by 25cm diameter and weighing in at 20 kgs. [The biggest cone on which data are available was 75cm long, 30cm wide and a massive 35,8kg.] In favourable conditions the plants may bear cones in successive years and since the cones remain on the plants for about 18 months, it is not uncommon to have cones from two successive seasons on the same trunk simultaneously. Median cones scales are about 8cm long, 6-7cm broad (horizontally) and 3-4cm thick (vertically). The cone scale terminates in a slight warty or wrinkled face (bulla) with well-defined lateral ridges. Female cones have from time-to-time been known to sprout vegetative outgrowths at the apex (see ENCEPHALARTOS 12: 4, 13: 18-19 and 14: 20).

The female cone bears typically about 500 (up to 614 have been counted) seeds which have a glossy red skin over a layer of orange fleshy tissue. Several plants at the Mphaphuli Reserve however bear cones with yellow seeds. The seeds typically measure 5cm by 2.7cm. The seed kernel inside measures about 3.4cm by 2.1cm and displaces a volume of $8cm^3$. The seed kernel surface is prominently ribbed. These dimensions are large by standards for the genus; amongst the South African species only *E. dyerianus* and *E. middelburgensis* have similarly-sized seeds. The vervet monkey (*Cercopithecus aethiops*) is particularly fond of the fleshy outer layer of these seeds and serves as a dispersal agent in its seed-foraging activities. John Burchmore points out that the enthusiastic attention of these monkeys often results in severe damage to the growing point of the stems.

AFFINITIES AND HYBRIDS

Encephalartos transvenosus has some affinities with *E. paucidentatus* but can be quite readily distinguished on leaflet morphology. Recent work by the author confirms the belief that these two species in turn are not too distant botanically from *E. altensteinii* and *E.natalensis*.

No natural hybrids of *E. transvenosus* and any other species have been reported. Piet Vorster has however succeeded in using *E. transvenosus* pollen to fertilize a female cone of *E. longifolius*, the resulting seedlings showing some characters of each parent, (see ENCEPHALARTOS 10: 10-15).

CULTIVATION

An unusual developmental pattern is that seeds of *E. transvenosus* are retained on the female cone for a much longer period than in most other species. Consequently, the embryo is much further advanced at the time of seed-shedding and hence too, germination occurs more quickly. Once established, the seedlings grow rapidly (by cycad standards). A number of reports in this journal testify to the fast growth rate for the species (see ENCEPHALARTOS 8: 33 and 10: 9). Coning has been observed in plants which are only 11 years old.

For optimum results the species requires ample moisture, especially in summer, some shade, protection from both scorching sun and winds, and shelter from winter frosts. Any garden site for this plant must be carefully choosen in view of the ultimate size it will reach. Like most cycads, some additional nutrition (in the form of either mineral or organic fertilizers) is beneficial, but overdosing must be avoided.

CONSERVATION

The conservation philosophy of the succession of Modjadji Rain Queens is a lesson to us all. By appreciating the plants in their habitat, by knowing and respecting them, the Balobedu tribe can take both pride and pleasure that the plants in their territory exist as "a forest". Unfortunately the habitats outside the Modjadji, Lekgagameetse and Mphaphuli Reserves are not as prolific and the species is thus classified as rare (but not threatened nor endangered). A notable success story is the action of the Lebowa Government in establishing a cycad nursery to enable the legalized and controlled sale of specimens to members of the public at very reasonable prices. Prime movers in this operation have been Chief Nature Conservator John Burchmore and Nursery Superintendent Nahason Malawa. In the past few years a total of 54000 *E. transvenosus* seedlings have been grown in the nursery situated on the road to the Reserve.

TOXICITY

The fleshy outer covering of *E. transvenosus*, like other representatives of the genus, was reported to be toxin-free. Current investigations by the author indicate that this may not in fact be true. Cynthia Giddy reports that she has seen children at Modjadji's Kraal eating the fleshy pulp. However the seed kernel - like other species of *Encephalartos* - is rich in the toxin macrozamin. The toxin was isolated from *E. transvenosus* by B. Altenkirk of the S.A. Medical Research Council in 1974.

ACKNOWLEDGEMENTS

I thank Nat Grobbelaar for his valuable comments on the first draft of this text and I am grateful to John Burchmore who first introduced me to *E. transvenosus* in habitat. All photographs were taken by the author unless otherwise specified.

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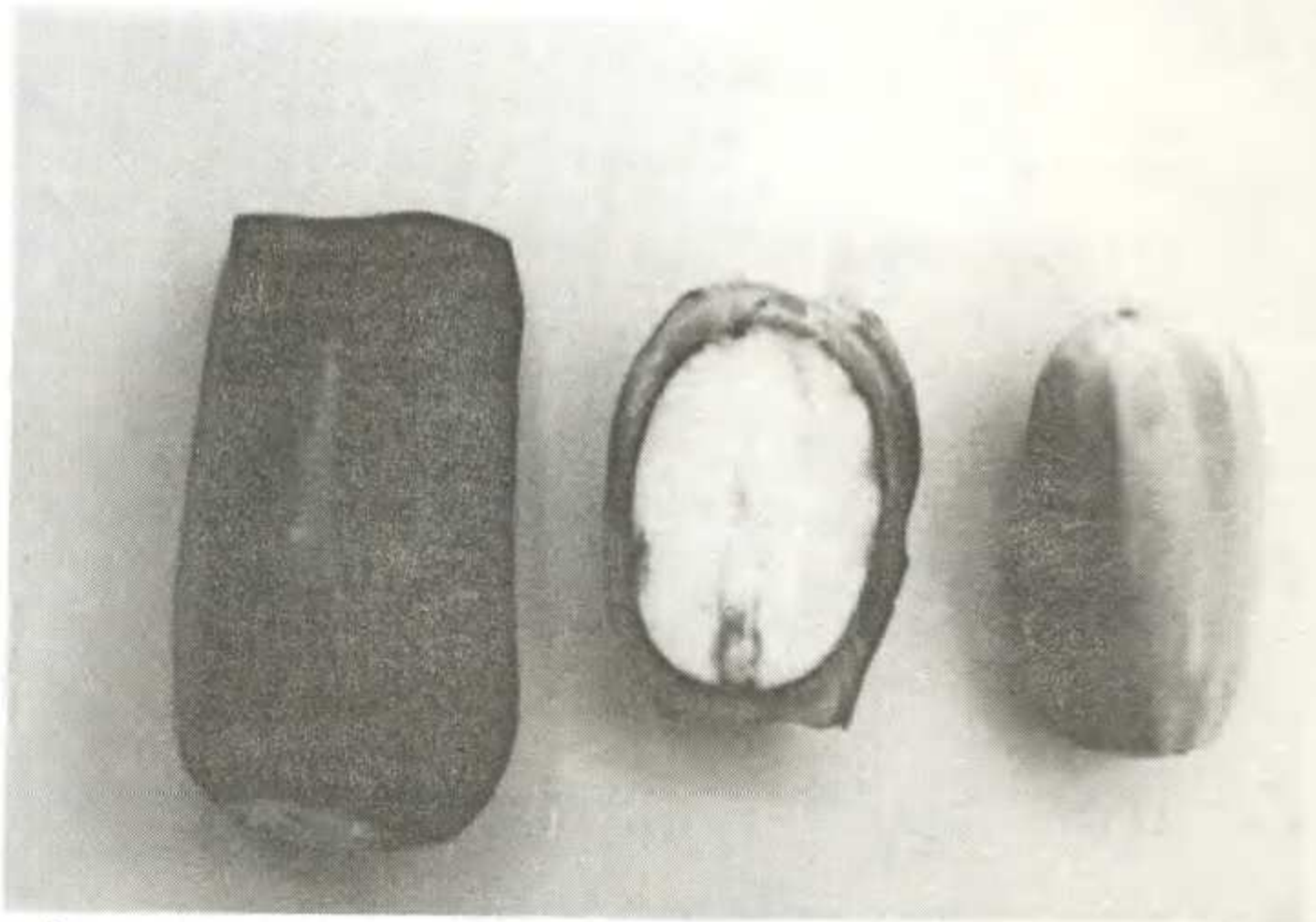
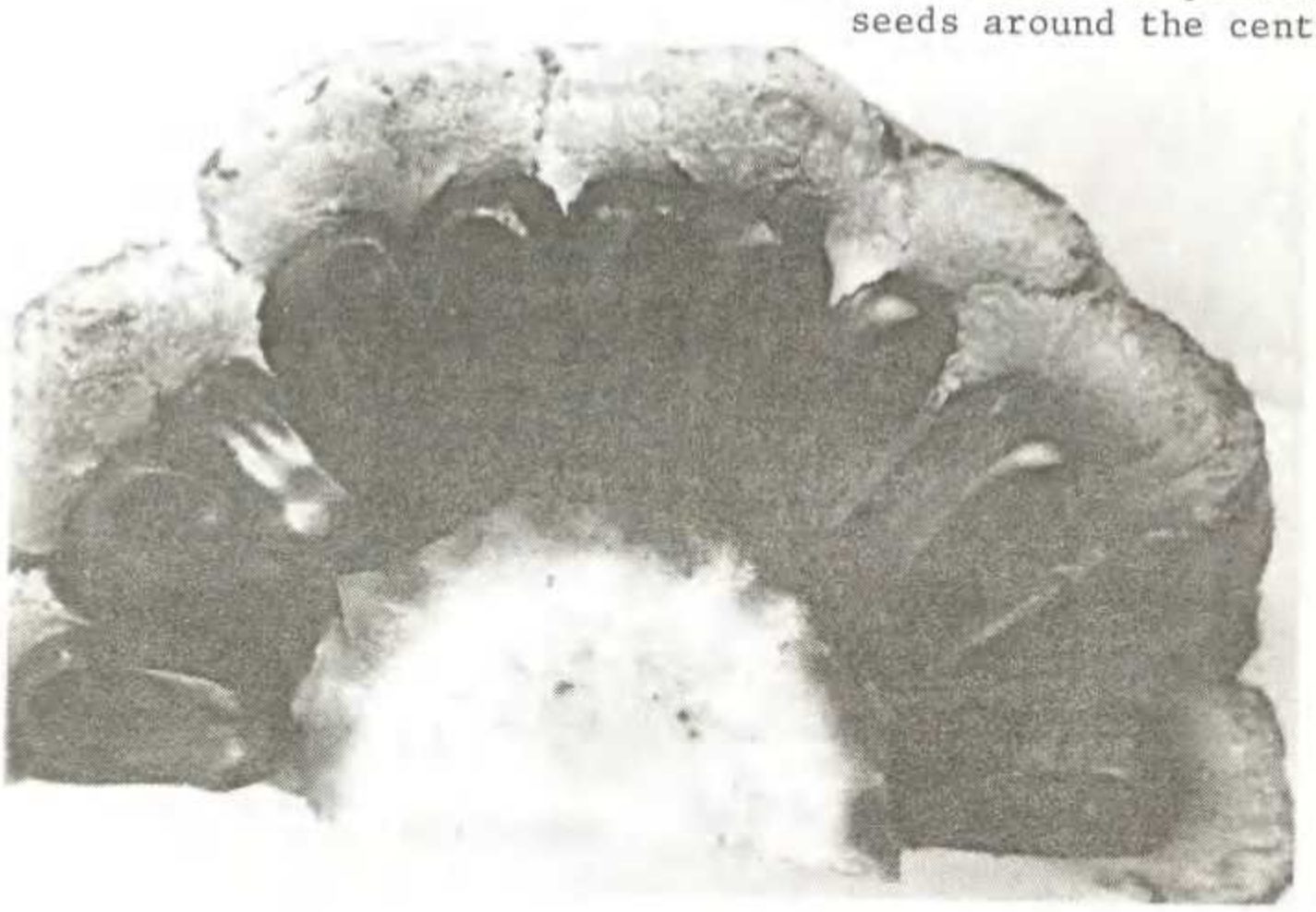
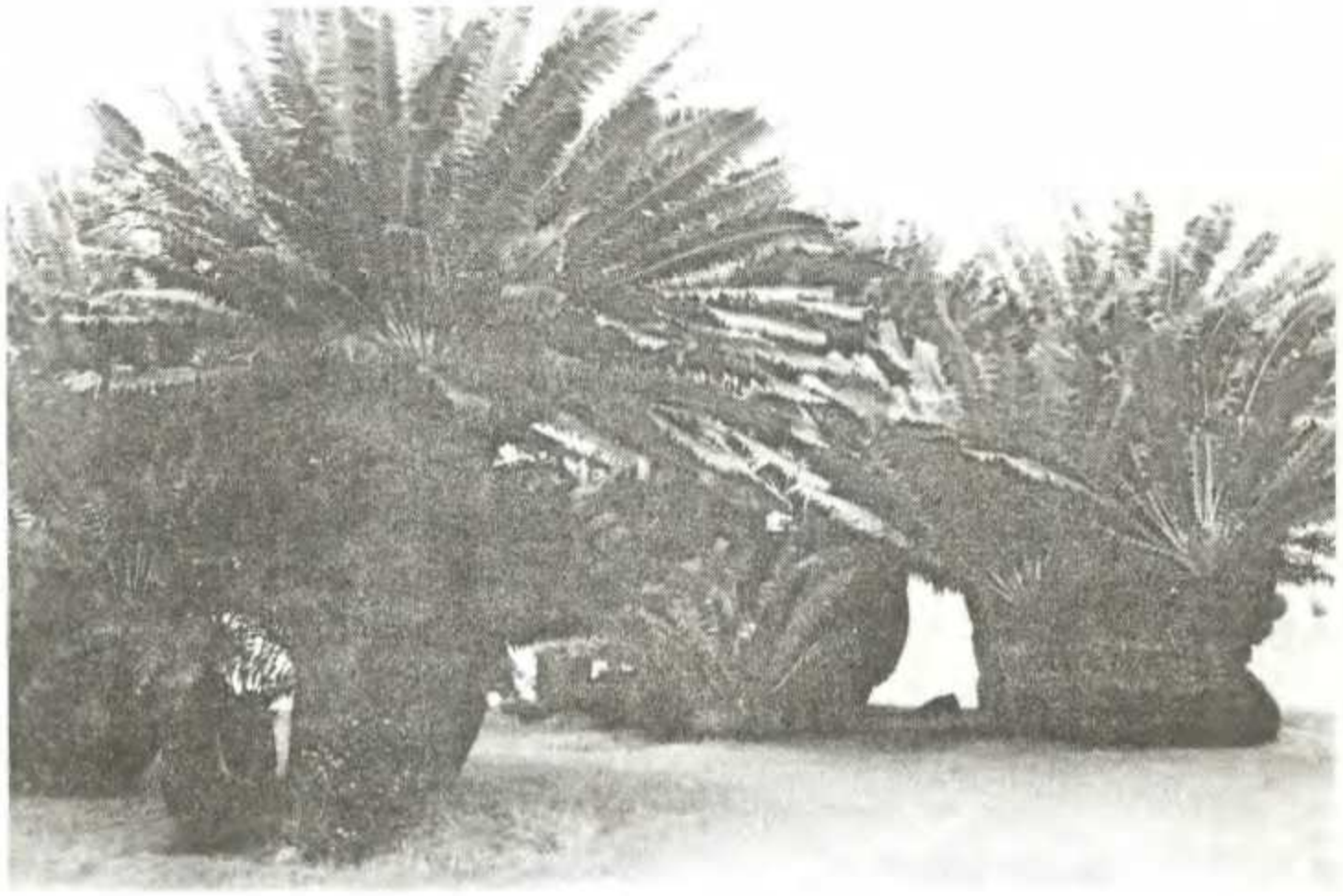


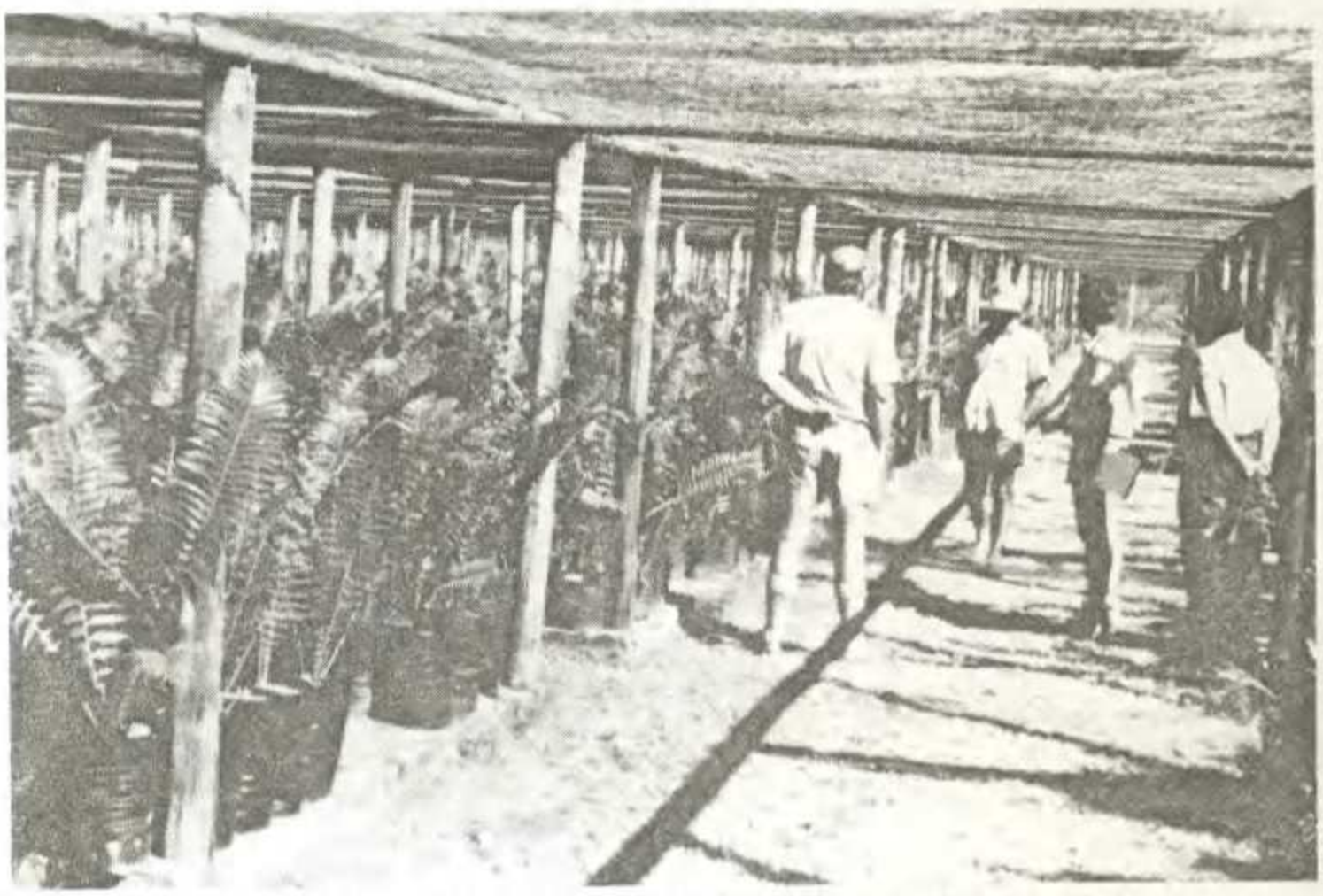
E. transvenosus. (Left-to-right): Whole seed, longitudinal section of seed showing well-developed embryo at the time of shedding, and seed kernel showing prominent ribbing.

A transverse section across one half of a female cone shows the pattern created by the ring of seeds around the central axis.





Large multi-stemmed plants of *E. transvenosus* dominate the picnic site at Modjadji Nature Reserve.



Part of the huge nursery run by the Lebowa Government where large plants are available for sale to the public. Inspecting the plants are (L to R) John Burchmore, Neil Munro, Bunny Wentzel and nursery superintendent Nahason Malawa.

EDITORIAL

Our Founder and National President Dr. Roy Osborn, has produced a Journal that is to my knowledge, unique. Subscribed to and read throughout the Republic of South Africa, Zimbabwe and abroad by Botanists, Horticulturists and Cycad lovers - to name but a few. Sadly, Roy is about to retire after five years of **stirling** service. We wish him everything of the best for the future.

From January 1990 our society is to enter a new era with a new President - Elect Professor Nathanael Grobbelaar -Professor of Botany at the Pretoria University. "Nat" as we fondly know him, is a most unassuming person, but has a very exciting personality. His main interest like all of us , is Cycads. The Editor and I are sure that we speak on behalf of the members of this Society by wishing "Nat" - Welcome , and hope he will enjoy many happy experiences during his term of office.

B.W.

REDAKSIONEEL

Na vyf jaar van onoortreflike diens het Dr. Roy Osborn, ons Stigter en President, jammerlik besluit om uit te tree. U sal met my saam stem dat die tydskrif wat Roy die lig laat sien het, uniek is in alle opsigte. Dit is n tydskrif wat reg oor die Republiek van Suid Afrika, Zimbabwe en tot in the buiteland deur Plant en Tuinboukundiges en Broodboom liefhebbers gelees word. Ons beste wense vergesel hom vir die toekoms.

Ons Vereniging betree vanaf Januarie 1990 n nuwe era onder die leierskap van n Verkose President naamlik Professor Nathanael Grobbelaar - Professor van Plantkunde aan die Universiteit van Pretoria. "Nat" soos hy by ons almal bekend is, is n baie beskeie maar geesdriftige persoon. Soos ons almal,is sy voorliefde ook Broodbome. Namens die Redakteur en ons lesers, heet ons "Nat" baie welkom. Ons hoop dat die jare wat hy saam met ons sal dien in die Vereniging baie genotvol en vrugbaar sal wees.

B.W.

Another Cycad Monster

By Willie Tang

In 1982, I noticed an unusual cone developing on an *Encephalartos trispinosus* growing at Fairchild Tropical Garden (Fig. 1). It emerged rapidly in the manner of a cone and immediately produced a head of leaves. Like a cone it also had a well-developed stalk, however, it lacked sexual parts. As the seasons passed it flushed new sets of leaves and scale leaves. In time its stalk was covered by its own growth and it came to resemble a branch of the plant (Fig. 2). This subsequent growth is uncharacteristic of cones, which die after shedding pollen or seeds.

Like the occasional cone that forms leaves at its apex (1, 2, 3, 4, 5, 6) or on its sporophylls (7) this one was a morphological mixture of cone and stem - a cone monster. A quirk during development revealed the stem and leaf ancestry of cycad cones (8). This particular cone monster emphasizes how, through evolution, cones have become specialized and ephemeral structures. Unlike stems, which are theoretically immortal, cones are borne to breed and die, but as the following article describes in their short lives some cones literally burn intensely and bright.

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Readers are invited to write to the editor (see address elsewhere). Where applicable, experts will be asked to deal with specific questions.

Lesers word genooi om aan die redakteur te skryf (sien adres elders). Waar van toepassing sal kenners gevra word om spesifieke vrae te beantwoord.

Fig. 1. Deformed *Encephalartos trispinosus* cone shortly after emergence.

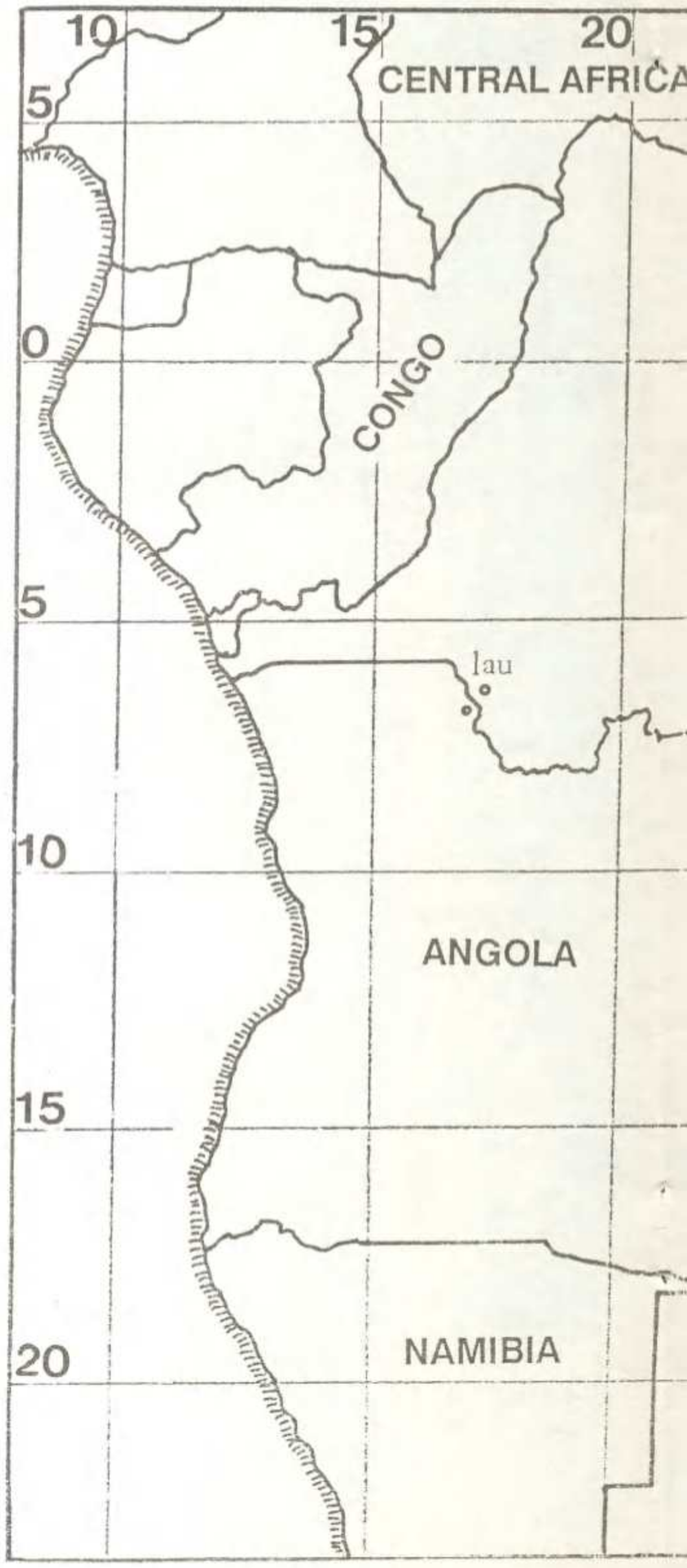
Fig. 2. Same cone one season later with a new set of scale leaves.

DISTRIBUTION OF ENCEPHALAR

Much confusion exists as to the names and distribution of the central African cycads. In time, **ENCEPHALARTOS** will cover these plants in the "Focus on...." series. For the moment we have prepared the accompanying map which shows the approximate locality for each species of *Encephalartos*. The information depicted represents data from all available published work and which has been modified on the basis of consultations with botanists who have visited these areas. The three-letter codes represent the species names given below in chronological order of their appearance in the scientific literature.

fer *E. ferox* Bertol.f. (1851)
sep *E. septentrionalis* Schweinf. (1871)
hil *E. hildebrandtii* A.Br. & Bouche (1874)
pog *E. poggei* Aschers. (1878)
lau *E. laurentianus* De Wild.(1903)
gra *E. gratus* Prain (1916)
man *E. manikensis* Gilliland (Gilliland) (1939)
bub *E. bubalinus* Melville (1957)
teg *E. tegulaneus* Melville (1957)
mar *E. marunguensis* Devred (1958)
pte *E. pterogonus* Dyer & Verdoorn (1968)
chi *E. chimanimaniensis* Dyer & Verdoorn (1969)
con *E. concinnus* Dyer & Verdoorn (1969)
mun *E. munchii* Dyer & Verdoorn (1969)
sch *E. schmitzii* Malaisse (1969)
'c' *E. species 'C'* Heenan (1977)
tur *E. turneri* Lavranos & Goode (1985)
scl *E. sclavoi* De Luca et al. (1988)
kis *E. kisambo* Faden & Beentje (1989)
itu *E. ituriensis* Bamps & Lisowski (in print)

Notes:-
(1) "*" indicates the approximate localities of possible new species as presently under investigation.
(2) The only other non-southern African *Encephalartos* is *E. barteri*, in two subspecies from Western Africa, not conveniently shown on this map. Readers are referred to **ENCEPHALARTOS** 14: 8-16 for details.



RTOS IN CENTRAL AFRICA

by ROY OSBORNE

NEW PRESIDENT

Professor Nathanaël Grobbelaar, Vice Chairman of the Eugene Marais Branch of the Society, has been elected, unopposed, as President of the Society for the 1990/91 term. Although he is no stranger to many of our Transvaal members, and indeed no stranger to botanists in this country and overseas, it is appropriate to introduce him briefly to our readers in general. Nat retires this year from his position as Professor of Botany at the University of Pretoria, a post he has held since 1960. A Ph.D. graduate from Cornell University, USA, he has had a distinguished teaching, research and service career. He is the author of numerous research papers and seven textbooks and the recipient of prizes which include the Junior and Senior Captain Scott Memorial Medals of the S.A. Biological Society and the Havenga Prize in Biology from the S.A. Academy of Science. Nat and his charming wife Hanneke have their home on the slopes of the Magaliesberg range, just outside Pretoria and their garden well reflects the family orientation to our indigenous flora.

Nat takes over the Presidency from Roy Osborne with effect from 1 January 1990. Thus all future "presidential correspondence" should be addressed to: Prof. N. Grobbelaar, P O Box 15357, 0039 Lynn East.

RESEARCH UPDATE

A number of research investigations have recently been published and readers who may be interested in further details are invited to write for reprints.

Dr Xueqiong Zhou and colleagues from the Shangai Institute of Biochemistry, Chinese Academy of Sciences, Shangai, China, has published in *Shengwu Huaxue Yu Shengwu Wuli Xuebao* 20(5):534-539 (1988), a paper entitled "Nucleotide sequence of a chloroplast 5S rRNA from a living fossil plant *Cycas revoluta* Thunb." The contents will be of interest to those interested in cycad genetics and biochemistry, who can also read Chinese (this may restrict its widespread demand somewhat !)

Our member Peter Lindblad from the University of Uppsala (Dept. Physiological Botany, Box 540, S-751 Uppsala, Sweden) and colleagues have continued their very active work in the physiology of the cycad-*Nostoc* coralloid root symbiotic system. A paper "Comparison of DNA restriction fragment length polymorphisms of *Nostoc* strains in and from cycads" appears in the *Archives of Microbiology* 152: 20-24 of 1989 and a second project on "Occurrence and localisation of phycoerythrin in symbiotic *Nostoc* of *Cycas revoluta* and in free-living isolated *Nostoc* 7422" is reported in *Plant Physiology* 89: 783-785 of 1989.

ZAMIA IN EQUADOR

Together with Dick Endt's article **A cycad experience in Equador** in ENCEPHALARTOS 19: 13--15, we published a note by Dennis Stevenson. Prof. Stevenson expressed the opinion that Dick Endt's arborescent *Zamia* is not *Z. lindenii*, but *Z. poeppigiana*. The second, epiphytic, species was thought to be either a juvenile *Z. poeppigiana*, or else *Z. lecointei*, none of which are epiphytic. Prof. Stevenson stated that no epiphytic zamias are known from that area.

However, Dick Endt disagrees with these views, and wrote as follows:

"The comments made by Dennis Stevenson are likely to draw flak from Dr. Calaway Dodson, himself a respected botanist who has a close first hand experience on Equadorean plants.

"The comments I would like to make is that my facts stated in my article were derived from what Dr. Dodson told me. The unidentified cycad *is* in fact unidentified. It is not a juvenile *Zamia poeppigiana*. I cannot imagine that 'there are many collectors who have been in this area' etc. North- western Equador is largely unexplored. It is very likely in fact that undiscovered plant species turn up from time to time. Judging by Dr. Dodson's comments on the unidentified cycad he has enough authority and knowledge not to make statements that are not true."

Male Cycad Cones
Structure and Function

By Willie Tang

The male cycad cone has historically been neglected as an object of study. Its internal structure, how it functions, and what it does has never been fully elucidated. Recent work, described below, indicates that it is a highly specialized organ of reproduction.

Cycads like other plants are metamerous in structure, that is to say like earthworms they are composed of serially repeating parts. Whorls of leaves follow one another along the stem as the plant grows. Every now and then a cone is produced. Sporophylls (literally leaves with spores) are borne spirally along the axis of the cone much like a whorl of leaves.

Axis

When male cones are developing and still emerging from the apex of the plant, the cells are small throughout and usually filled with starch. Just prior to maturity and elongation the tissues of the cone axis become differentiated. The cells of the axis become large, block-shaped, parenchymous, and filled with water. During pollen shedding the axis elongates rapidly in most species (Fig. **1**). In species of *Bowenia*, *Ceratozamia*, *Cycas*, *Dioon*, *Encephalartos*, *Lepidozamia*, and *Macrozamia* the axis of the male cone will double its length in about a week's time. Examination of the cells of the axis (Table **1**) shows that at the end of axis elongation the cells are up to twice as long as they are wide, indicating that cone elongation is achieved by rapid elongation of cells.

Sporophylls

The sporophylls at pollen shedding have small, dense cells packed with starch, not unlike in a potato tuber. At elongation the male cones of cycads produce heat in a circadian pattern (Fig **1**). This phenomenon has been reported in several species as an oddity since the19th century (1, 2). A comprehensive survey at the generic level (3) indicates that cone heating is present in most cycads and occurs in cycles lasting up to 10 days. Temperatures reached can be as high as 15°C above the ambient air and can easily be sensed by hand. Tremendous amounts of heat are produced in larger cones and the disappearance of the starch over the heating cycles suggests that starch is a major fuel for heat production (3, 4). Carbon isotope analysis of the CO_2 released during heating and of starch and lipids in the sporophylls of one species, *Macrozamia moorei*, indicates that lipids are also burned (2).

In addition to heat all cycad cones examined so far release odors, particularly at the time of heat production (3). In the genera *Dioon*, *Cycas*, and *Microcycas* the odor is "dusty" and unpleasant. In *Bowenia*, *Ceratozamia*, *Stangeria*, and most *Zamia* the odors are fruity and sweet. Many *Encephalartos* and *Macrozamia* emit resinous fragrances. Like floral fragrances these cone odors are composed of many substances. Some of the substances identified so far, using gas

chromatography-mass spectrometry, are similar to those of some flowers, as in the fragrance of *Zamia furfuracea* cones (Fig. 2). Others, like *Cycas rumphii* , have odors composed of substances unlike any found in flowers (4).

Function

The function of male cycad cones is to (I) produce pollen and (II) promote its transfer to the female cone. Once this is achieved the cone dies. For a description of pollen production see (5). Rapid elongation of the cone appears to facilitate rapid release of pollen. The function of odor, though as yet unproven, may be to attract insect pollinators. The function of heat production, an energetically expensive activity, appears to assist the release and propagation of odors beyond the cone. The pollination mechanisms of cycads thus appear to be similar to those of some palms, aroids, and water lilies where odor and heat production are also associatied. Observations on the few species where pollination has been studied suggest that there are a variety of pollination mechanisms among cycad genera (6, 7). Nursury pollination, where the insect pollinators are raised in either the male or female cone, may be prevalent among African and New World species.

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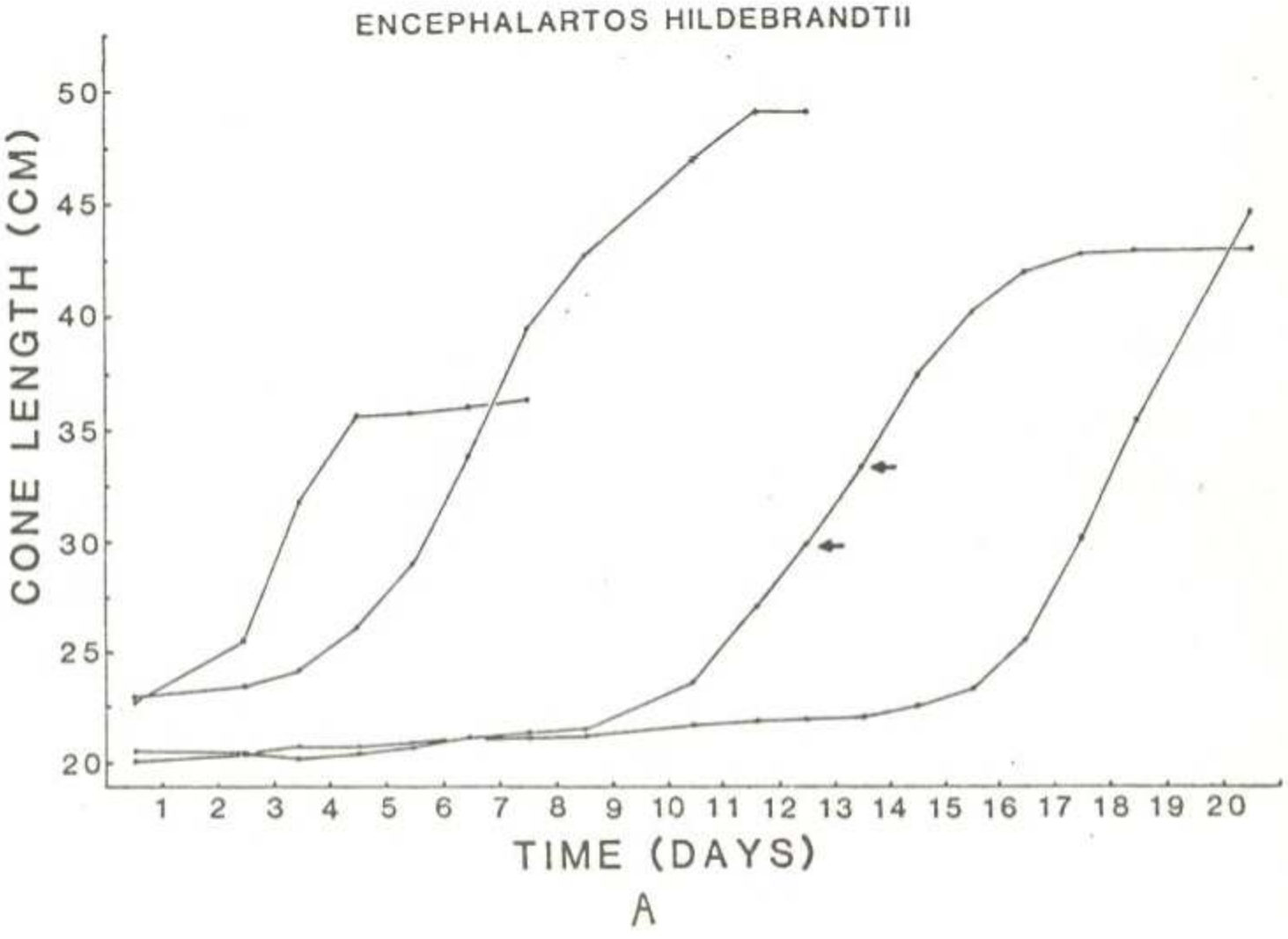
Table 1. Length and width measurements of cells from the mid portion of male cone axes of four cycad species, at the start and end of cone elongation. Other portions of the cone axis show similar patterns. Sample sizes: 23-30 measurements per category. Unit: micrometer.

Species	*Encephalartos ferox*	*E. hildebrandtii*	*Dioon edule*	*Zamia fischeri*
START				
Length	122 ± 30 um	120 ± 26	56 ±15	64 ± 17
Width	88 ± 20	126 ± 26	53 ± 8	58 ± 9
L/W ratio	1.4	.95	1.1	1.1
END				
Length	244 ± 30*	207 ± 40*	219 ± 54*	126 ± 28*
Width	118 ± 11	126 ± 33	96 ± 14	77 ± 10
L/W ratio	2.1	1.6	2.3	1.6

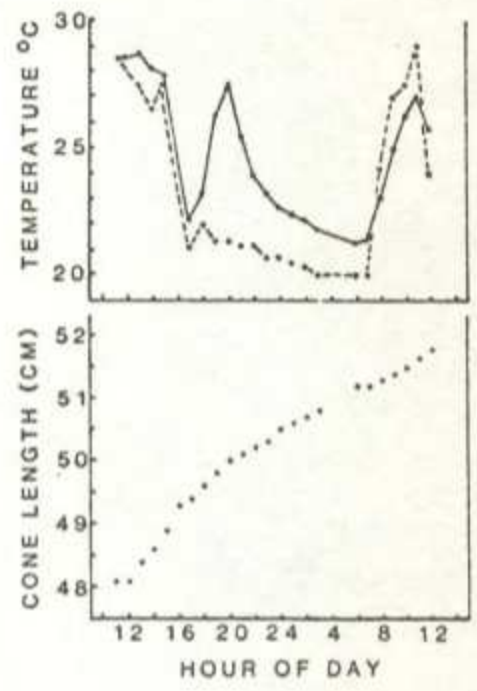
*Cell length significantly greater than cell width, t-test at $P < 0.05$

Fig. 1. A) Growth measurements of four male cones of *Encephalartos hildebrandtii* produced in sequence by one plant. Arrows bracket the period of detailed measurements in B. B) Cone growth and temperature over a 24-hour period. Dashed line indicates ambient air temperature. From (7).

Fig. 2. Gas chromatograph of a fragrance sample from a male cone of *Zamia furfuracea*. A main ingredient is linalool, a sweet smelling alcohol that is also found in some orchid flowers. Analysis was done with the help of Inga Groth, Gunnar Bergström, and Olle Pellmyr at the University of Gothenburg, Sweden.


ENCEPHALARTOS HILDEBRANDTII
CONE LENGTH (CM)
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (DAYS)

A


TEMPERATURE °C
30
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52
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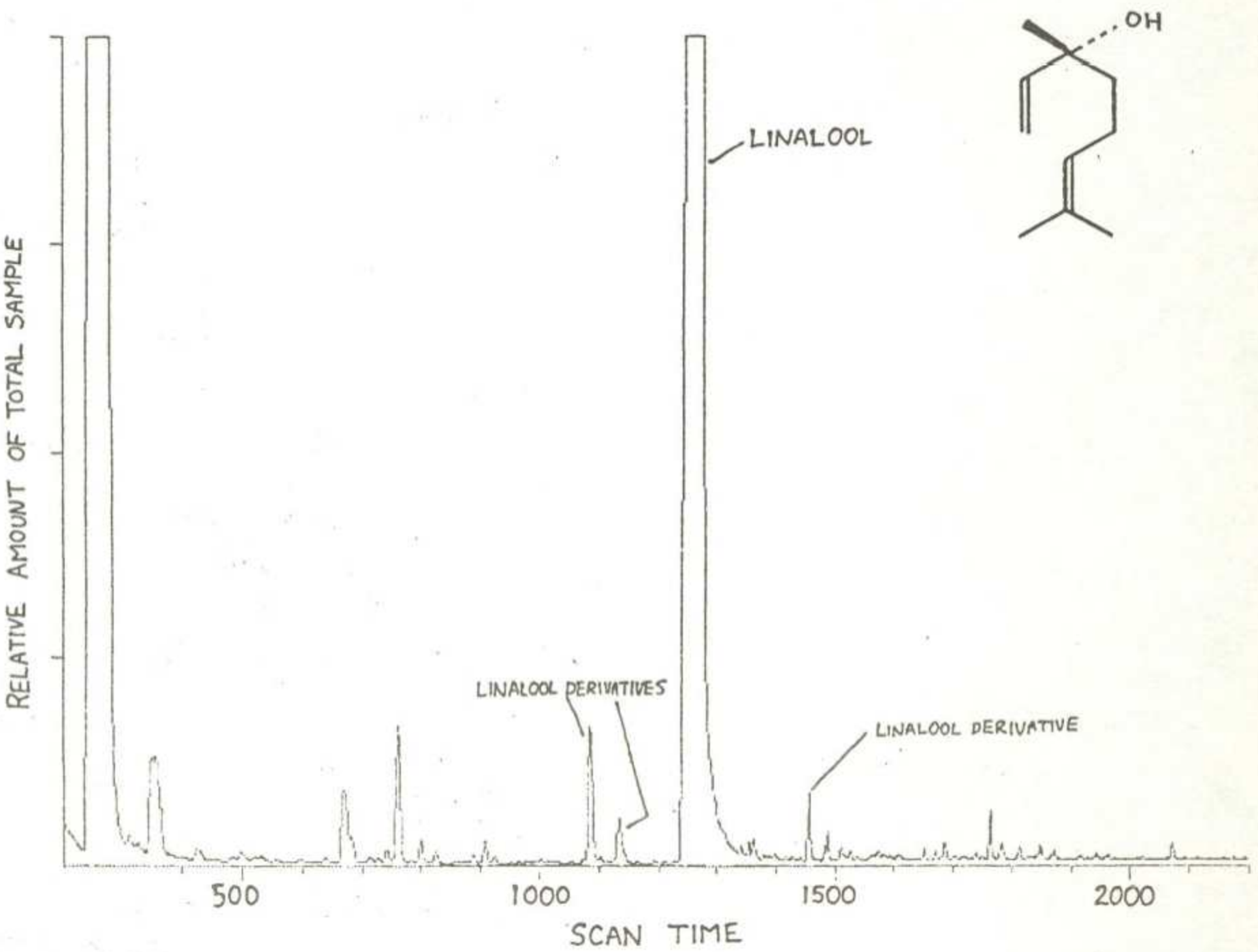
12 16 20 24 4 8 12
HOUR OF DAY

B


RELATIVE AMOUNT OF TOTAL SAMPLE
LINALOOL
LINALOOL DERIVATIVES
LINALOOL DERIVATIVE
500
1000
1500
2000
SCAN TIME

OH

PROBLEMS OF ENDANGERED SPECIES CONSERVATION IN MEXICO: CYCADS AN EXAMPLE

By: Andrew P. Vovides

I have read with great sadness the news in your June 1989 edition of Encephalartos concerning the controversial export of endangered South African cycads which has prompted me to write this article. I have never ceased to be impressed by the efforts taken in South Africa to protect, conserve and propagate cycads for the benefit of Humanity and its future generations. You have now for some years an efficient legislation and licensing procedure concerning the removal and transportation of cycads and in my opinion, a truly enviable achievement for any society deeply concerned with the conservation of its natural biota. I use S. Africa as an example of what can be done for endangered species conservation during my lectures throughout Mexico.

I shall try to give you some idea of what is happening in Mexico in the field of cycad conservation and trade. This is a modified version of a paper I presented with Mario Vàzquez Torres at the 10th Mexican Botanical Congress in 1987.

THE MEXICAN FLORA

Because of its geographical position, topography and the passing of geological time, Mexico has developed a biota of world importance occupying 4th place world-wide for biological diversity, (Reunion on the Conservation of Biological Diversity in Mexico, WWF 1987). To give an example; estimates of the number of vascular plant species in Mexico range between 25,000 - 30,000 (Rzedowski,1978). In the coastal state of Veracruz there are estimated to be approximately 9,000 species of vascular plants. This contrasts with European countries such as Great Britain for example, that has approximately 1,600 species (Stace, 1980). In America (north of Mexico) there are estimated to be some 16,000 species whilst the Amazon basin, an area smaller than north America, has about 20,000 species (Stace, 1980).

In brief, the Mexican vegetation types range from alpine and taiga in the high sierras, cactus-dessert, matorral, chaparral, tropical and subtropical thorn-forest, temperate woodlands, montane rain forest or cloud-forest to evergreen lowland tropical rain-forest.

This richness unfortunately is threatened by Man's activities which has accelerated enormously over the last few decades. One of IUCN's estimates for world-wide rain-forest destruction is 21 hectares per minute. Estimates for annual deforestation in Mexico is some 500,000 hectares (Toledo, 1987), in other words about 1 hectare of forest is destroyed every minute in Mexico, this is 5% of the world figure. This has caused much concern and has resulted in the establishment of certain wilderness areas as biosphere reserves and national parks. Ecological parks, botanic gardens and research institutes were also created (Vovides and Gomez-Pompa, 1976).

In spite of efforts to conserve plant and wildlife within the 126 official protected areas of Mexico, much natural vegetation is disappearing largely through human population growth, agricultural expansion very often on to marginal lands and also the ever present spectre of the plant and wildlife black market. The latter has been effectively summed up in WWF's magazine "Traffic" (Anon, 1986):

"The prosperous Mexican wild-life market, largely fomented by Mexico's northern neighbour and facilitated by an ineffective bureaucracy and political corruption also creates a tremendous drain on native flora and fauna."

THE SAD CASE OF THE CYCADS

Native cycads in Mexico consist of about 35 species distributed amongst three genera; **Ceratozamia**, **Dioon**, and **Zamia**. With a conservative estimate, over 75% are endemic. They have been a neglected natural resource until recently (they are officially protected, but in spite of this for reasons already mentioned, destruction and extraction continue unabated).

In Mexico, cycads are not popular as ornamentals compared to other countries but their popularity is increasing. One can often see in Mexico city and other large cities street salesmen touting foliage crowns of **Dioon edule** as "palms". These are the leaf crowns of large individuals that have been cut with a machete with a portion of the trunk apex, just enough to keep the leaves together, the whole thing being reminiscent of a giant Badminton shuttle-cock, see fig. 1. The buyer is simply told to plant this in soil and "it will quickly take root". Of course, nothing is further from the truth, the starch-rich injured apex quickly rots and turns into a gelatinous mess. The rotting base is not noticed since this is usually completely buried in the soil to provide certain mechanical stability. Since **D. edule** leaves are very tough they stay green and rigid for over a month. Deterioration is not noticed until the leaflets begin to yellow and this often prompts the prospective cycad gardner to water more frequently than before, thus accelerating the rotting process in the cycad and the frustration in the gardener. Whole teams of collectors armed with cane-cutting knives, burlap sacs and pick-up trucks annually harvest natural **D.edule** populations decapitating large individuals.

Fortunately this does not kill the plants as it would a palm and eventually adventitious buds are produced which, if left unmolested, turn into branches or multiple crowns (fig.2). The adverse effect however, is the almost complete nullification of the population's seed production. The buds take some years to reach a minimum size cone, by which time they are often harvested long before coning. This results in stagnant relict populations awaiting eventual deforestation.

INTERNATIONAL TRADE

Cycad commerce in Mexico has increased alarmingly over recent years, between the years 1977 and 1982 more than 130,000 cycads have been taken out of Mexico (see table 1.) and some of the official export permits I have seen, issued by the ministry of agriculture declare the following:

"wildlife or plants covered by this document is in accordance with the laws of MEXICO; will not be detrimental to the survival of the species in the wild;".

During 1978 Joseph Kenneth Smith, a North American obtained such a permit (fig. 3) enabling him to export one million cactus plants, in this permit were also listed cycads and orchids. This individual was heard to boast in the U.S.A. that the permit only cost him 10,000 dollars. More recently in 1986 E. Morin of San Andres Tuxtla, Veracruz obtained a permit **"IN LIEU OF PERMITS"** (fig. 4) to export two tons of **Zamia furfuracea**. In 1980 one single USA nursery imported 30,000 **Zamia furfuracea** plants per month to supply the landscape gardening industry (Gilbert, 1984). **Z. furfuracea** is endemic to the coastal areas of the Los Tuxtlas region of Veracruz, it has now been almost exterminated from most of its localities.

Gilbert (1984) showed that Mexico took first place world-wide for cycad exports in 1981 showing a steady increase since 1979. The exception being Japan which largely exports seeds and dried leaves. Table 2 compares Mexico with other Latin American cycad exporting countries such as the Dominican Republic.

Japan, however appeared to be the largest importer for Mexican cycads for 1981. I constructed table 3 myself from copies of export permits that came to my attention for cycad exports from Mexico to the USA during the period 1985 to 1986. This is worthy of mention since during recent years there has been a "tightening-up" of the legislation governing the issue of permits and the only official body issuing permits is the ministry of ecology and urban development (SEDUE). However the permits that I have seen have been issued by the ministry of agriculture and one official explanation to this anomaly is "that they have been falsified".

There have been two occasions where shipments of cycads from Mexico have been stopped at the U.S. border for lack of CITES documentation. The first instance were 2,000 plants of **Ceratozamia hildae** and the second were 20,000 seedlings of **Zamia furfuracea** this latter shipment being smuggled out under the name of a **Chamaedorea** palm species. Both shipments were distributed to the national university of Mexico and INIREB (biotic resource investigation institute). In both cases the shipments had Mexican export permits (Mexico is not a CITES member)

SOME ALTERNATIVES

It is felt that there is still time to insist on tighter controls and a "clean-up" in the ministries on issuing permits as well as the ratification of CITES by Mexico. Some of us have been working with the local people that have cycads growing naturally on their lands. These same peasants have been exploited in the past by collectors who offer a pittance for the plants they get them to dig up. We are encouraging these people to chase away collectors, start up their own nurseries and grow the plants from seed for sale later, thus taking pressure away from the wild populations.

This has been met with some enthusiasm near the town of Jalapa where **Dioon edule** is native. The ecological ministry SEDUE is becoming interested in encouraging this, but they take so much time in doing anything, thus living up to their bureaucratic inertia.

I am also trying to build up small breeding populations of the rarer and most endangered of the Mexican cycads, for example the recently described **Zamia soconuscensis** and **Ceratozamia euryphyllidia**. There exists a very small natural population of the latter at its type locality, plants were collected by myself for introduction at the Jardin Botanico Clavijero in Jalapa and at the time of collecting it could be seen that it would be a matter of months before clear-cutting of the rain-forest would wipe them out. Some seedlings were donated to Fairchild Tropical Garden in the hope that they will have the same success with this species as they did with **Microcycas**.

I envisage a lot of hard work and frustration before anything effective is achieved in Mexico, let alone anything approaching the standards you have in South Africa.

Fairchild Tropical Garden
10901 Old Cutter Rd.
Miami,
Florida 33156,USA.

ANDREW VOVIDES MOVES TO FTG

Dr Andrew Vovides, well-known to cycad enthusiasts internationally for his work on the Mexican cycads, has left his former base at the botanical garden in Xalapa, Mexico, to take up a research post at the Fairchild Tropical Garden, Miami, Florida. Dr Vovides will be investigating pollination processes and other aspects of cycad biology at FTG. We wish him every success with his new appointment and look forward to seeing results of his work in due course.

TABLE 1.

TOTAL NO. OF CYCADS EXPORTED FROM MEXICO DURING THE PERIOD 1977 TO 1982

(Modified from Gilbert, 1984)

1977	1978	1979	1980	1981	1982
3,481	----	6,503	12,391	102,126	8,299

TOTAL 132,800

TABLE 2

EXPORT CYCAD TRADE REPORTED FROM LATIN AMERICAN COUNTRIES DURING THE PERIOD 1979 TO 1981

(Modified from Gilbert, 1984)

Country	1979	1980	1981
Costa Rica	150	0	0
Dominican Rep.	35,640	27,000	36,494
Ecuador	40	0	0
Mexico	**6,503**	**12,391**	**102,126**
Panama	2	16	0
Peru	0	9	53

TABLE 3

CYCAD SPECIES EXPORTED FROM MEXICO TO THE U.S.A. DURING THE PERIOD 1985 TO 1986

Species	1985	1986
Ceratozamia norstogii	2,223	
C. microstrobila (latifolia)	59	
Ceratozamia "mulanga"	58	
C. kuesteriana	1,500	
Ceratozamia "Santiago"	550	
C. hildae	600	
Zamia fischeri		*4 kilos
Z. furfuracea		2 tons

TOTAL OVER 5,000 PLANTS

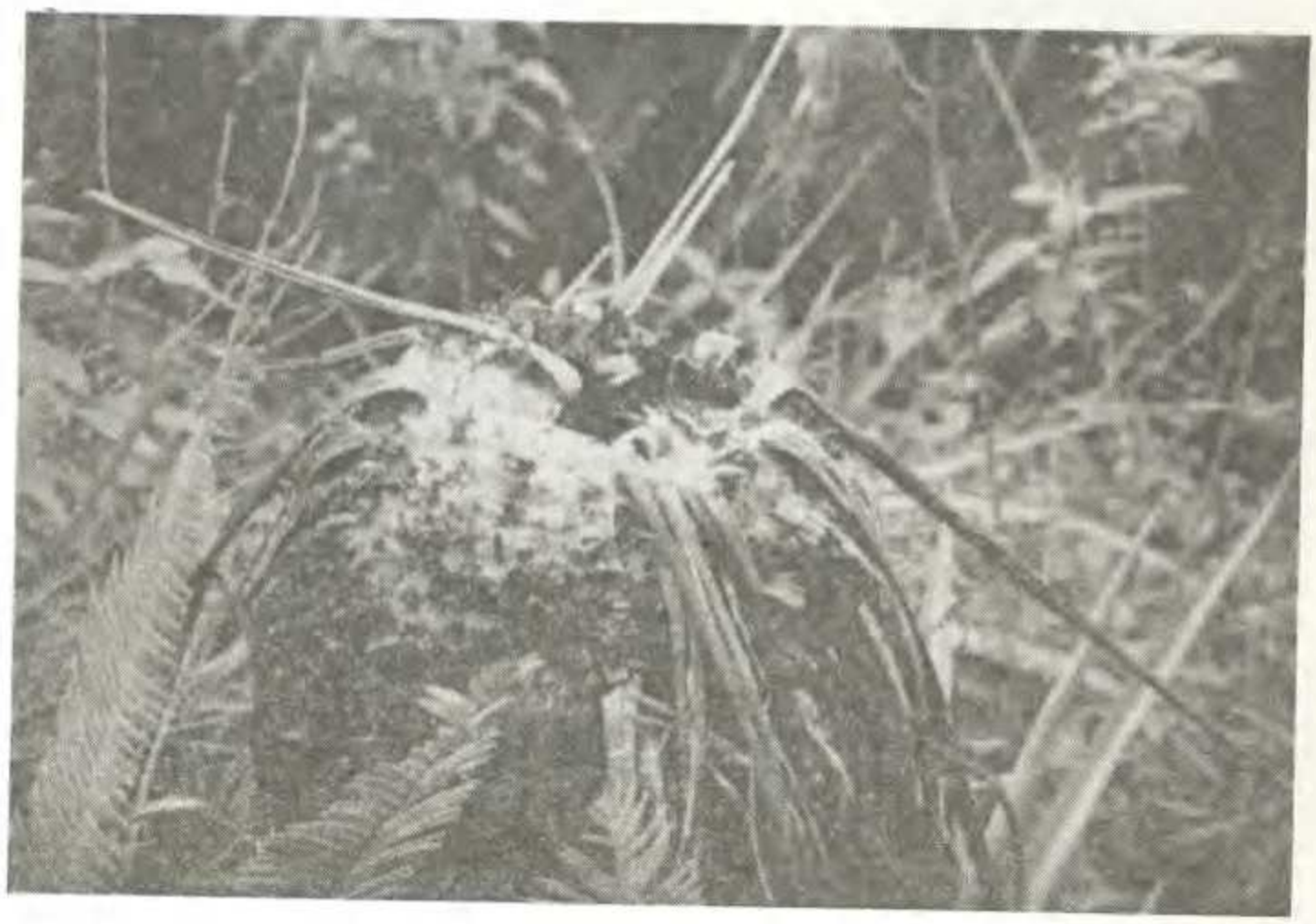
* Seeds

A

Fig. 1. A. **Dioon edule** crowns prepared for market.

B. Mutilated **D. edule** plant in the field.

B



A

Fig. 2. A. Large decapitated **D. edule** plants with adventitious buds in leaf.

B. Close-up of adventitious bud at base of decapitated trunk.

B

Fig.3

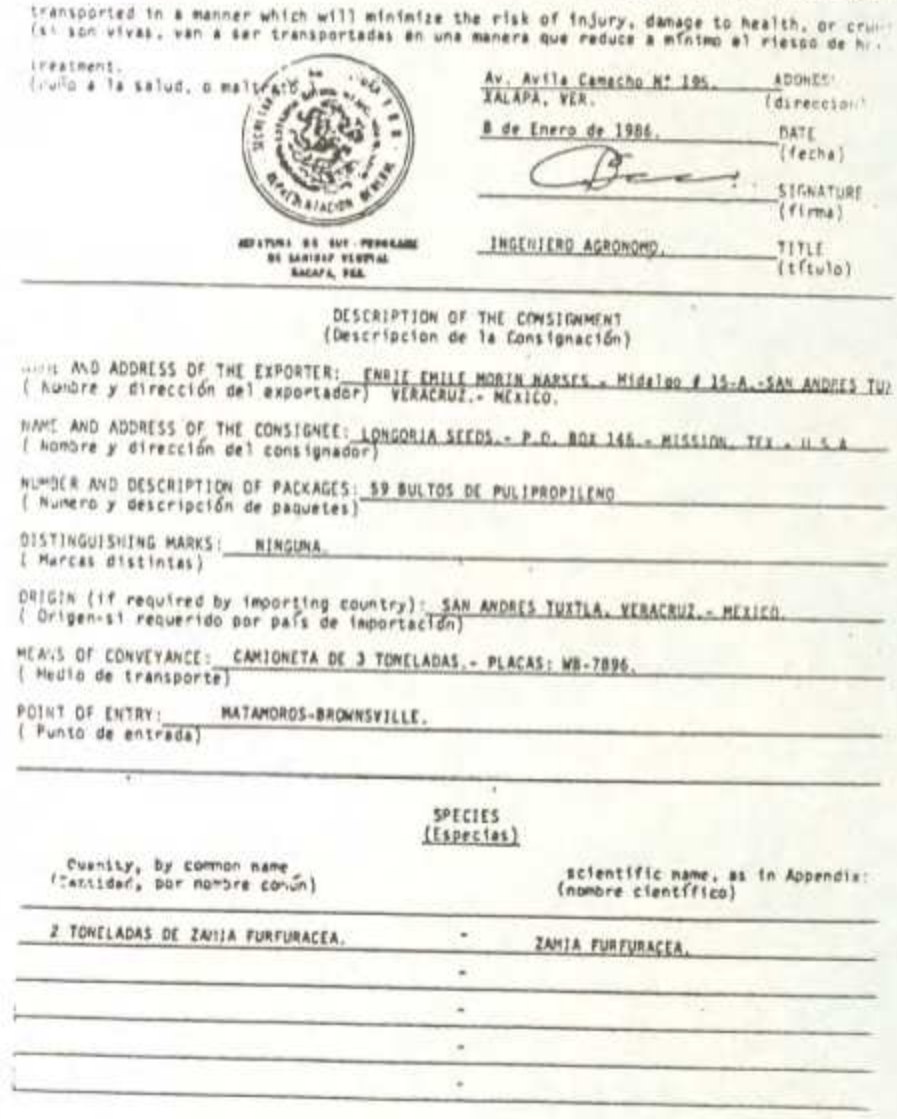


Fig.4

Fig. 3. Copy of permit issued to Joseph K. Smith, 1978.

Fig. 4. Copy of permit issued to E. Emile Morin, 1986.

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THE TAIWAN CYCAS NATURE RESERVE

by Roy Osborne

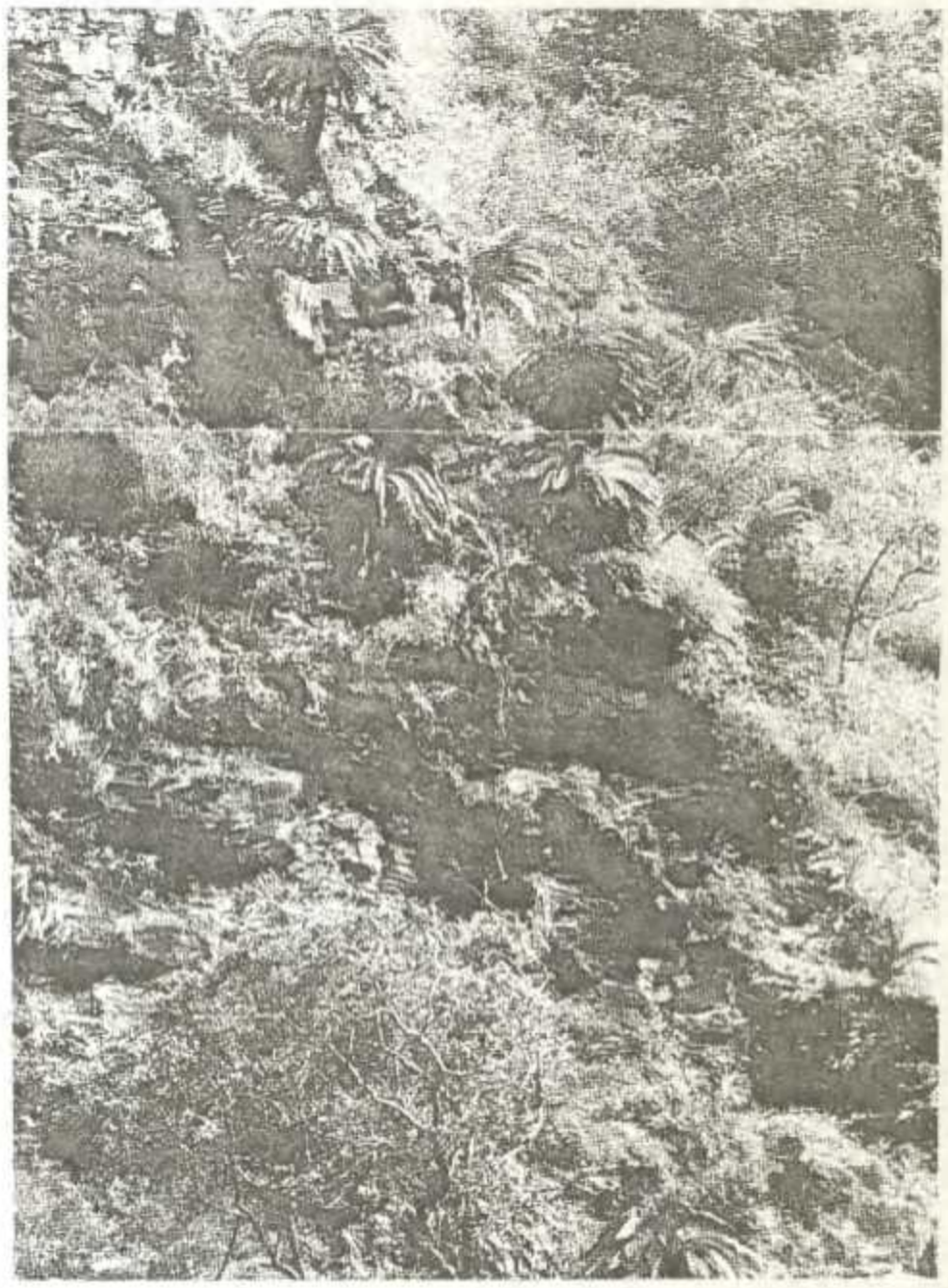
The Taiwan Cycas is an attractive, robust and comparatively fast-growing cycad. Originally called *Cycas taiwaniana* by Carruthers in 1893, it was renamed *Cycas revoluta* var. *taiwaniana* by Schuster in 1932. [The correct taxonomic status of the Taiwan cycad is still under debate.] It occurs sporadically in Hainan, Canton and Fukien but the main concentrations are found at two sites on Taiwan itself, one in the Lu-yeh Valley and the other in the Coastal Range. In an effort to prevent removal of habitat plants, the Taiwanese government has created the 300-hectare Taitung Hong-yeh Village Cycas Nature Reserve in the steep terrain of the Lu-yeh Valley, about 19 kilometers northwest of Taitung City.

The cycad grow mainly along the southern slopes at elevations between 400 and 900 meters. The structure of the slopes is an unstable shale formation and landslides are common. The climate is described as sub-tropical maritime, i.e. wet, warm and humid. The cycads are said to be shade-intolerant and thus prefer the more exposed sites. There they grow in association with plants such as the pendent reed, the silver grass, the switch sorrel and the subcostate crape myrtle. This vegetation is subjected to periodic fires to which the cycads are well-adapted.

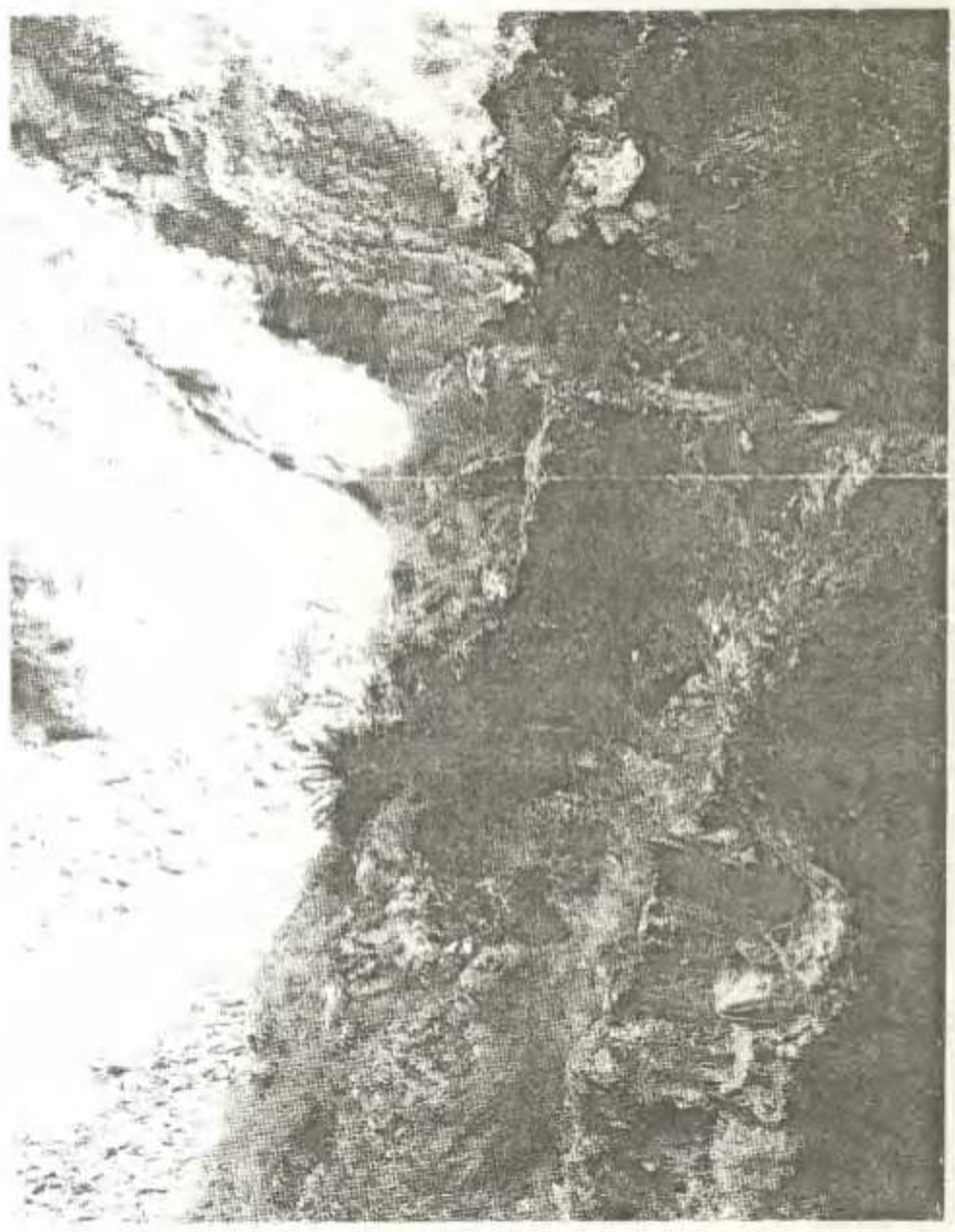
The Taiwan cycad is easily distinguished from *Cycas revoluta* as the leaf pinules do not have the revolute margins so characteristic of the latter taxon.

Any overseas visitors to Taiwan who would like to see the reserve should contact Dr Yuen-po Yang, The Herbarium, Division of Forest Biology, Taiwan Forest Research Institute, Taipei, Taiwan, well in advance of their visit so that the appropriate arrangements can be made.

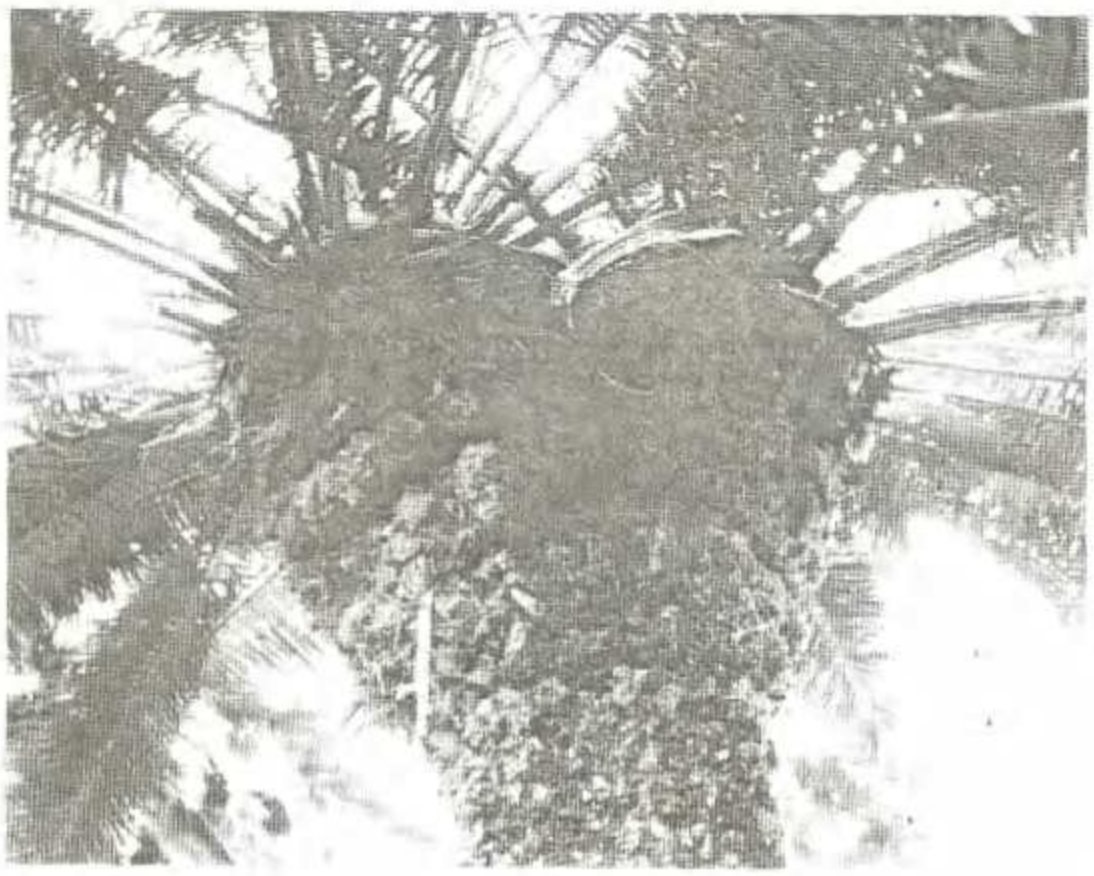
We are indebited to the Taiwanese Council of Agriculture for permission to reproduce the accompanying photographs, and to Professor Ching-I Peng and Dr Tan-Chi Huang of the Institute of Botany, Academia Sinica, for their kind help. [Members of the Society may recall meeting Dr Haung and his delightful family at a Society function in Pretoria on 18 July 1988.]



The Taiwan Cycas scattered all over the bare sites



The steepest and most dangerous section in the reserve

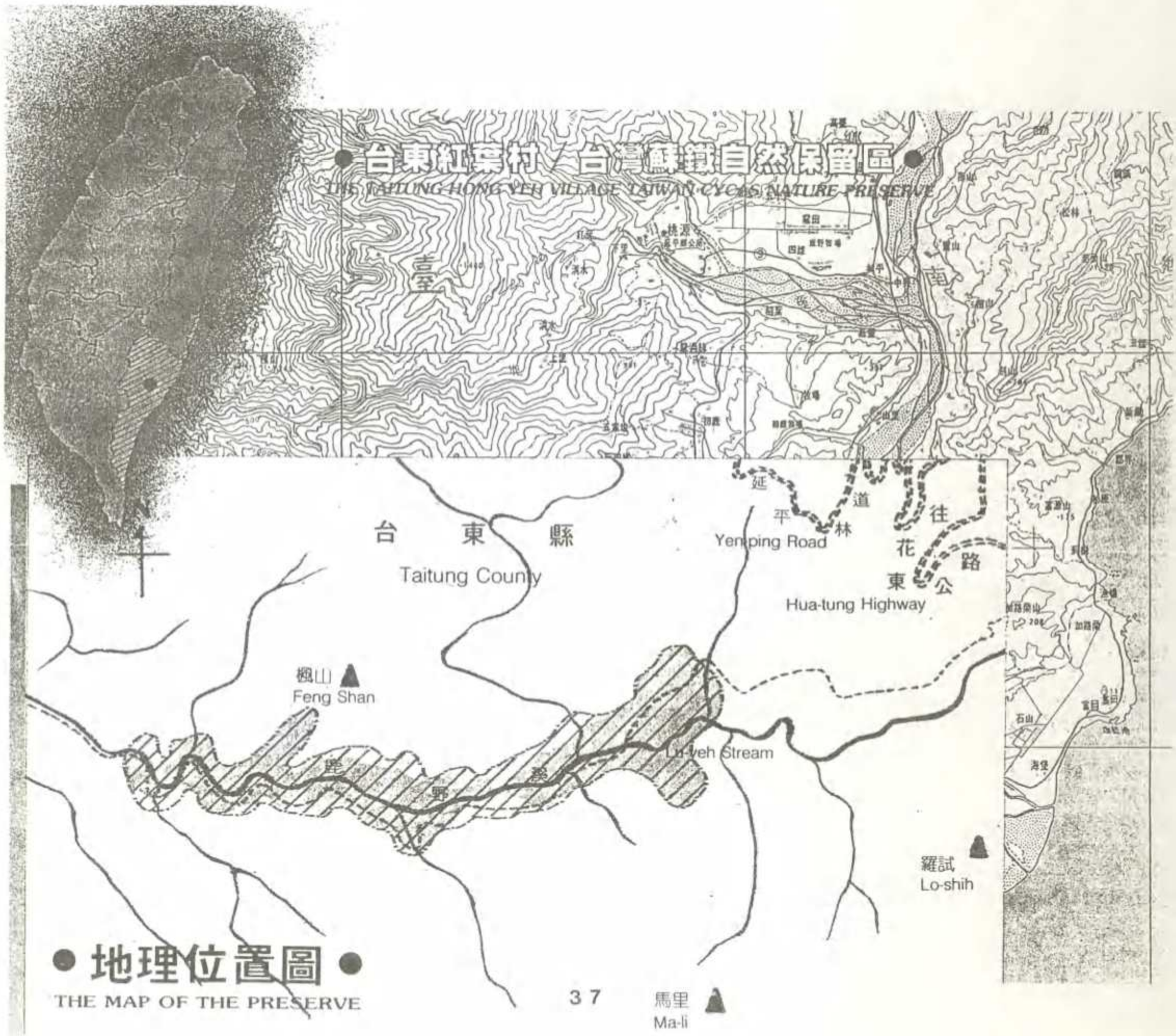


The brownish woolly hair on the trunk

The exposed slope is good for the growth of the Taiwan Cycas

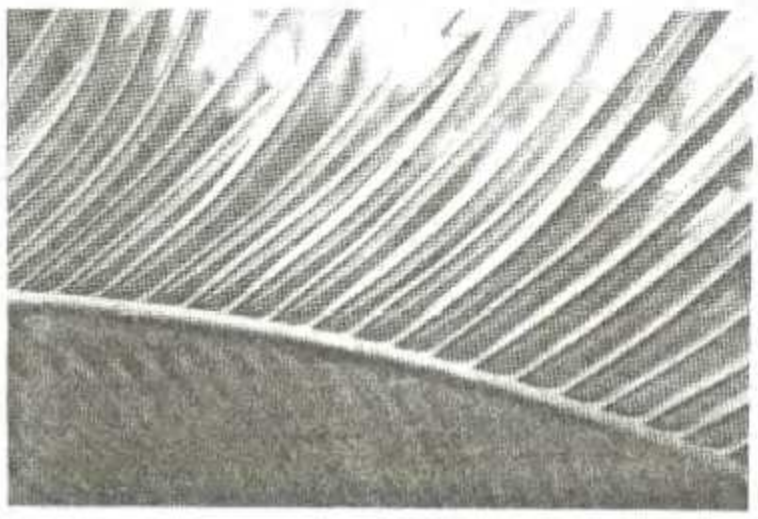
●台東紅葉村／台灣蘇鐵自然保留區●

THE TAITUNG HONG YEH VILLAGE TAIWAN CYCAS NATURE PRESERVE



●地理位置圖●

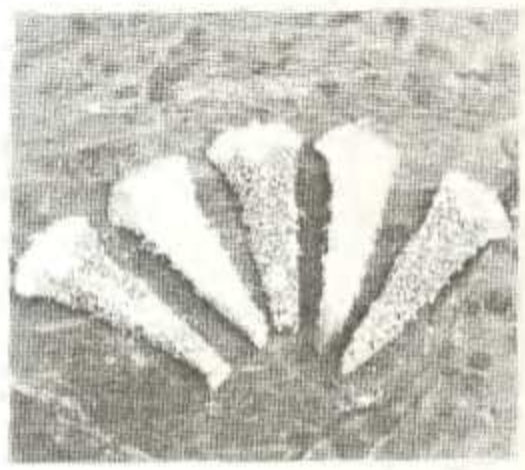
THE MAP OF THE PRESERVE



Non-Revolute margains of the Pinnae

Male Cone

Spirally arranged sporophylls maturing acropetally



Microsporangia borne beneath the microsporophyll

Seeds of the Taiwan Cycas

A Pinnate leaf-like megasporophyll with 2-5 naked ovules

ENCEPHALARTOS no. 19 contains a number of points on which I wish to comment:

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Botany Department,
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7600 STELLENBOSCH.

PIET VORSTER

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Mint condition, R5 each. P. Vorster, 34 Brandwag Street, 7600 STELLENBOSCH.

NURSERY NEWS

The Pretoria wholesale and retail cycad nursery of Henkie and Ita van der Walt was featured in **ENCEPHALARTOS** 16 (p.17). But behind the scenes is an impressive cycad farming operation not normally known about by the customers. The farm is in the Tzaneen area in the Northern Transvaal where the rainfall is high and the soil clayish with good drainage. In their operation the van der Walts have concentrated on fast-growing species like *E. manikensis, E. transvenosus, E. natalensis, E. ferox* and *E. villosus.* The operation began in 1984 when several hundred 5-7 year old seedlings were planted out. Now, five years later, the original plants - all in full sun - have grown so well that it is difficult to walk between the rows. In addition, both male and female plants of *E. manikensis,E. ferox* and *E. villosus* have coned this year. ("Who says cycads are slow growing?" comments Ita). New seedlings, including more *Encephalartos* and some *Cycas* and *Dioon* spp. are presently being planted. The farming project has been inspected and approved by the Transvaal Nature Conservation authorities. Several specimens are being monitored for growth rates in a project organised by the University of Pretoria, and it is also intended to keep stock plants for future seed production.

Part of the Cycad Farm of the Van Der Walts at Tzaneen.

SEEDBANK

Seed now available:

Encephalartos natalensis
E. villosus

Expected:

E. lebomboensis
E. manikensis
Australian spp.

Danie Nel, Seedbank Officer
120 Bowker Road, 4093 ESCOMBE.

SAADBANK

Saad nou beskikbaar:

Encephalartos natalensis
E. villosus

Verwag:

E. lebomboensis
E. manikensis
Australia spp.

Danie Nel, Saadbankbeampte
Bowkerweg 120, 4093 ESCOMBE.

CYCAD 90

THE SECOND INTERNATIONAL CONFERENCE
ON CYCAD BIOLOGY
Queensland, Australia : 22-29 July 1990

We are urgently in need of funds to subsidise the costs of the southern African representatives who will be giving lectures at CYCAD 90. So far only a small amount has been received from members of the Cycad Society of Southern African and from external sources. If you can suggest *any person or organisation* who you think may be responsive to a fund-raising approach, please let me have such details as soon as possible.

Any personal donations from Cycad Society members to the CYCAD 90 fund are still most welcome.

Roy Osborne (20 Maryvale Road, Westville 3630, tel 031-866953).
for CYCAD 90 COMMITTEE.

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EASTERN PROVINCE HERALD 5 AUGUST 1989

GROWING THINGS — Babiana

The Fouries are fascinated by the split-level cycad that is the focal point of their garden on Witgatvlakte in the Port Elizabeth district. Mr Johan Fourie, an earth-moving contractor, recovered the plant in a tricky operation from a kloof where he was scraping a dam. He had to use a front-end loader and a big crane to lift the cycad and convey it home. To plant it in the same stance as in the kloof he had to build the special stand that can be seen beside his daughter Anneke and visitor, tree-watcher Mary Yates.

Unit to protect endangered species

THABAZIMBI — The Minister of Law and Order, Mr Adriaan Vlok, has announced the formation of an Endangered Species Protection Unit within the South African Police to investigate any action threatening any protected or threatened animal or plant species.

Addressing a game festival at Thabazimbi, he said: "In so doing, South Africa is rapidly coming in line with the requirements of the convention on the international trade in threatened species."

South Africa was being accused of encouraging illegal trade in rhino horns and ivory.

This was because South Africa was sitting with large quantities of these commodities which it had acquired from natural deaths in game reserves and other game parks.

South Africa had also been accused internationally of not doing the share required of it to protect its endangered species.

This was untrue. South Africa was most concerned about the issue, Mr Vlok said. — Sapa.

Help needed to catch plant thieves

PRETORIA — The Transvaal Provincial Administration yesterday appealed to members of the public to be on the lookout for suspicious conduct "which may amount to illegal plant collecting", and to report such cases without delay.

In a statement, the TPA's director of Nature and Environment Conservation, Dr P.F.S. Mulder, said it had to be remembered that "one of South Africa's most precious natural treasures, the cycad, is disappearing from right under our noses".

A reward of 25% of any fine imposed for illegal plant collection could be offered to people who assisted in trapping plant thieves. Fines could be as high as R20 000. — Sapa.

South Africa faces scandal over export of rare plants

Sue Armstrong, Johannesburg

HUNDREDS of specimens of endangered primitive plants are being exported from South Africa in contravention of international law. An opposition MP in Pretoria has alleged in parliament that conservation officials have come under pressure from "a very high level" in the government to allow the exports. Campaigners have alleged that some of the plants' exporters are using the trade to beat the country's stringent regulations on the export of currency.

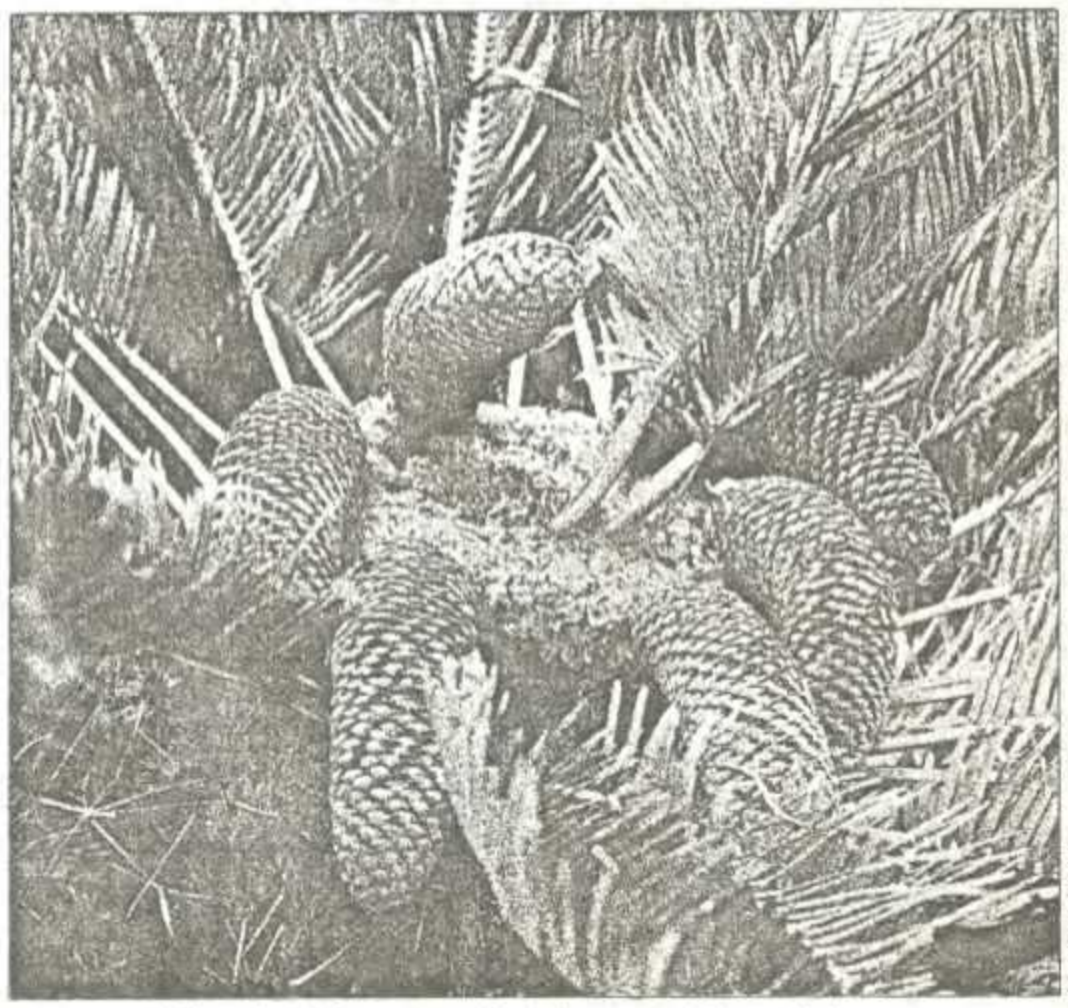
The plants, all cycads, are endangered species under international classification. "The different species are very difficult to distinguish, and with sympathetic middlemen in foreign institutions, it's an easy matter to grossly undervalue cycads on export permits and to invest the balance overseas," said a recent article in the *Johannesburg Star*, a daily newspaper.

The government in Pretoria has now been forced to set up an inquiry into the matter, following allegations in parliament that Joe Berardo, the chairman of the Johannesburg Mining and Finance Corporation, received permission to export 725 cycads to Madeira in August last year. The plants, for which he is believed to have paid hundreds of thousands of rand in South Africa, were valued on the export document at just R22 300 (£5000), according to parliamentary records. However, an opposition MP, Rupert Lorimer, who has been fighting a campaign to expose the illicit trade, said in parliament: "Their value on the international market has been estimated at in excess of R700 000."

Cycads—known as living fossils because they have changed very little for 150 million years—are protected by the Convention on Trade in Endangered Species (CITES), which South Africa signed in 1975. The law specifies that people may export the plants only if they grow from seedlings in nurseries or form part of a noncommercial exchange between scientific institutions.

Berardo's shipment was supposedly bound for the Madeira Botanic Gardens, but Lorimer and another MP, Clive Derby-Lewis, appeared unconvinced, according to parliamentary records. "I would like to ask . . . whether in fact this consignment of cycads is going to the botanic gardens," said Derby-Lewis. "Is it not perhaps going to the grounds of a hotel which is being built in Madeira, using South African capital?" Another newspaper report, this time in the *Sunday Star*, alleged that Lorimer "had received information that the cycads had been planted in the gardens of Mr Berardo's Monte Palace Hotel in Funchal".

"Joe Berardo certainly doesn't qualify as a scientific institution," said Lorimer in parliament. He continued: "On the other hand, he is well known in (ruling) National Party circles as a friend and supporter. [It seems that] a friend of the [National] party is able to bend regulations and export, supposedly as a donation, a large quantity of priceless botanical specimens when South Africa has given a solemn undertaking to abide by CITES regulations."



Heather Angel

A South African cycad of the genus Encephalartos

South Africa has 29 native species of cycad in two genera (*Encephalartos* and *Stangeria*). Only Mexico and Australia approach this diversity. Already, two South African species have become extinct in the wild. "At least another 18 species are heading for extinction if nothing is done," said Douglas Goode, the author of a forthcoming book on cycads.

In recent years, collections of cycads have become an international cult among the rich. Markets are particularly strong in Japan and the US. One Californian nursery alone was importing 30 000 cycads a month from Mexico in 1981. In South Africa, where collectors need a licence for each plant and trade in cycads across provincial boundaries is supposedly strictly controlled, illicit trade flourishes, according to an expert source who also says that members of the police and army are usually involved.

The consignment that Berardo sent to Maderia contained mature plants, some several metres high. This means that "they were probably alive when Van Riebeeck landed at the Cape," said Lorimer in parliament. According to a report in the *Sunday Star*, the Cape Nature Conservation Department—which granted the export licence—claimed that the plants had been collected legally before cycads were classified as endangered species. The report quoted Lorimer as saying: "That is no good reason. CITES states that no cycad collected in the wild may be exported—and these shipments were a blatant violation of the agreement."

The Natal Parks Boards had refused a licence for Berardo's consignment. Lorimer said in parliament that "it appears to me that a dedicated conservation organisation like the Cape Department of Conservation would not have granted the permit for export unless pressure had been exerted on them from somewhere. This pressure must have come from a very high level." □

Illegal cycads: police arrest second suspect

By Dawn Barkhuizen

Police have arrested a second suspect for the alleged possession of illegal cycads.

The man, from Sunninghill Park, Randburg, was arrested on Tuesday night after police allegedly found 30 illegal cycads worth about R30 000 growing in his garden.

Captain Piet Lategan of the Endangered Species Protection Unit said police believed the man was connected to Woodmead, Sandton, landscape gardener Mr Ernest Bouwer and three other Sats employees from Despatch in the Eastern Cape who were allegedly found in possession of 374 cycads on Saturday. Mr Bouwer appeared in court on Monday.

Twenty of the cycads found on Tuesday were more than 2 m tall.

The Star Thursday October 12 1989

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