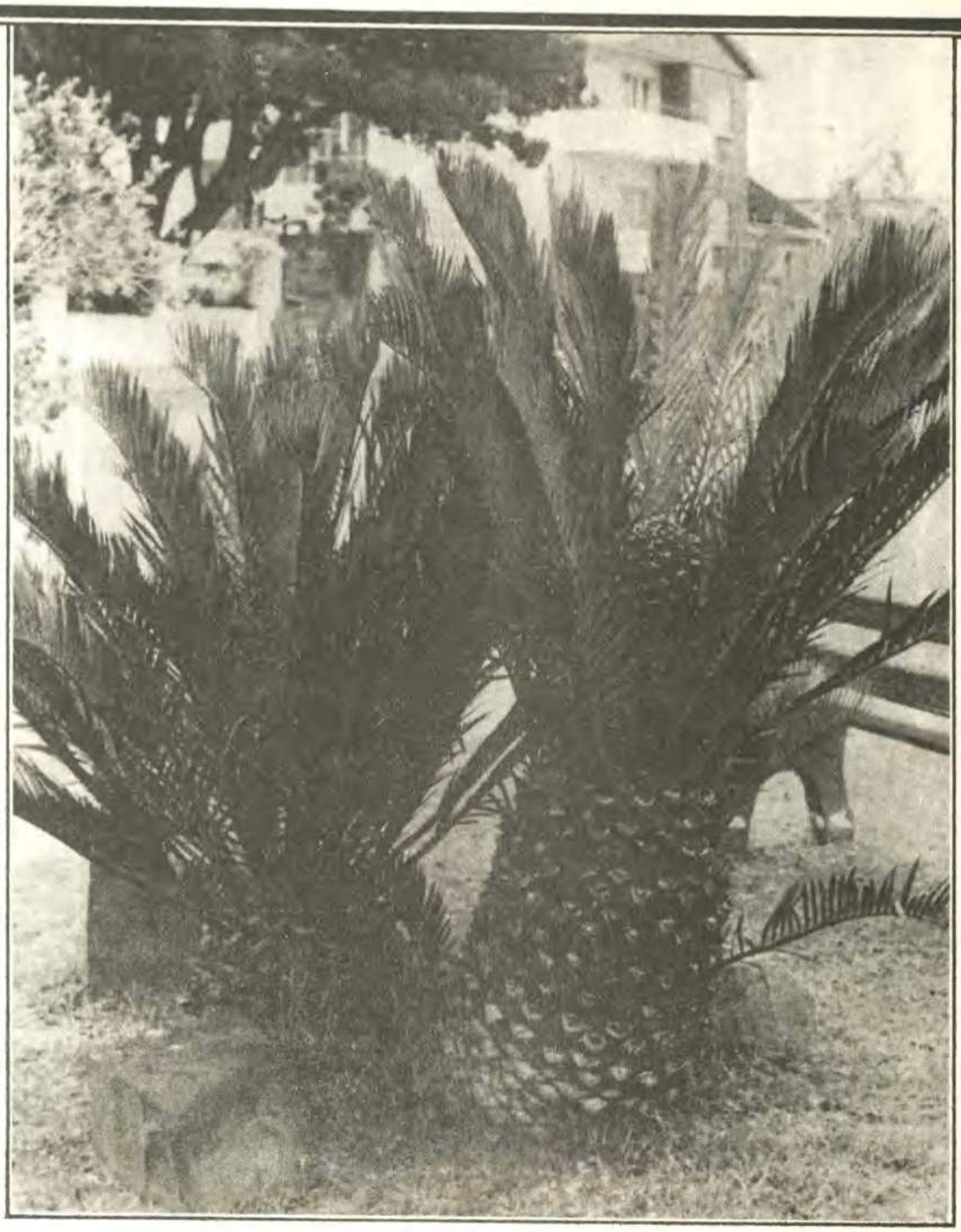
ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

NO. 4

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

DES. / DEC. 1985



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VOORBLAD / COVER

Encephalartos lehmannii

EDITORIAL

Every now and then one meets someone who tells you that he or she possesses or collects cycads, and when you ask them which species they have, they say that they do not know the names; or they refer to "that type with the long, green leaves" or "those with the grey leaves". In the Cape Province, where all persons in pos= session of cycads recently had to apply for permits, it was amazing to see how many people possess or collect cycads without having the most basic knowledge about their cycads. Have you ever heard of people who collect postage stamps or coins or teaspoons or paintings, who are not able to tell you everything in detail about their collectors' items? Is it therefore not strange, or even disturbing, that some cycad collectors have so little knowledge about their cycads? Surely, the more you know about your cycads, the more you can enjoy them and the more meaningful your collection becomes. Many cycad lovers will agree that knowledge about your cycads contributes much more to the pleasure of a collection, than the number of plants in your possession. A person with a small collection can derive as much (or more) satisfaction from his or her collection as someone with hundreds of plants.

REDAKSIONEEL

Elke nou en dan loop 'n mens iemand raak wat vir jou sê dat hy of sy broodbome besit of versamel, en as jy hulle vra watter spesies hulle het, sê hulle hulle ken nie die name nie; of hulle praat van "daardie soort met die lang, groen blare" of "die met die vaal blare". In die Kaap-provinsie, waar almal wat broodbome besit onlangs om permitte aansoek moes doen, was dit verstommend om te sien hoeveel mense broodbome besit of versamel sonder dat hulle die mees basiese kennis oor hulle broodbome het. Het u al ooit van mense gehoor wat pos= seëls of muntstukke of teelepels of skilderye versamel, wat nie vir jou haarfyn alles oor hulle versamelaars- items in detail kan vertel nie? Is dit dus nie vreemd, of selfs ontstellend, dat sommige broodboomversamelaars so min kennis oor hulle broodbome het nie? Hoe meer jy van jou broodbome weet, hoe meer kan jy hulle tog geniet en hoe sinvoller word jou versameling. Baie broodboomliefhebbers sal saamstem dat kennis oor jou broodbome 'n baie belang= riker bydrae tot die genot van 'n versa= meling lewer, as die aantal plante in jou besit. 'n Persoon met 'n klein ver= sameling kan net so veel (of meer) be= vrediging uit sy of haar versameling put as iemand met honderde plante.

EDITORIAL

- CONTINUED -

Each owner of cycads, few or many, should learn as much as possible about their plants and about cycads in general. Every=one should possess and use the standard book on South African cycads. In addition, members of the Cycad Society should make use of all the opportunities offered by the Society to extend their knowledge, for example by attending meetings and excursions of the regions, by talking to other members and by reading ENCEPHALARTOS properly. Also ensure that you renew your membership of the Society by returning the form at the back of this edition immedia=tely.

We as members should also help other owners of cycads to gain more knowledge. If you know of someone who possesses cycads and who is not yet a member of the Society, give him or her the application form at the back of this edition. By joining the Society, all cycad lovers can increase their knowledge and derive more enjoyment from these remarkable plants.

Opinions which are expressed in the editorial are those of the Editor and do not necessarily represent the policy of the Cycad Society. Likewise are opinions expressed in articles published in ENCEPHALARTOS those of the authors and not necessarily those of the Cycad Society or the Editor.

REDAKSIONEEL

- VERVOLG -

Elke besitter van broodbome, min of baie, behoort so veel as moontlik oor hulle plante en oor broodbome in die algemeen te leer. Elkeen behoort die standaard-boek oor Suid-Afrikaanse broodbome te besit en te gebruik. Daar=by behoort lede van die broodboomvereni=ging gebruik te maak van al die geleent=hede wat die Vereniging bied om hulle kennis uit te brei, deur bv. byeenkomste en uitstappies van die streke by te woon, met die ander lede te gesels en ENCEPHALARTOS goed te lees. Maak ook seker dat u u lidmaatskap van die Ver=eniging hernu deur die vorm agter in hierdie uitgawe dadelik terug te stuur.

Daarby behoort ons as lede ook ander besitters van broodbome te help om meer kennis in te win. As u van iemand weet wat broodbome besit en wat nog nie 'n lid van die Vereniging is nie, gee hom of haar die aansoekvorm agter in hierdie uitgawe. Deur by die Vereniging aan te sluit kan alle broodboomliefhebbers hulle kennis uitbrei en meer genot uit hierdie merkwaardige plante put.

Menings wat in die redaksionele artikel uitgespreek word, is dié van die Redakteur en verteenwoor=dig nie noodwendig die beleid van die Broodboomvereniging nie. In=gelyks is menings uitgespreek in artikels wat in ENCEPHALARTOS gepubliseer word, dié van die skrywers en nie noodwendig dié van die Broodboomvereniging of die Redakteur nie.

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

VAN
DIE REDAKTEUR,
VOORSITTER
EN
KOMITEE

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

FROM
THE EDITOR,
CHAIRMAN
AND
COMMITTEE

PHILATELIC CYCADS

by ROY OSBORNE

It is considerably easier to collect a complete set of cycad stamps than it is to collect a complete set of cycad plants. Despite the spread of cycads in tropical and sub-tropical regions throughout the world, only very few stamps featuring these plants have ever been issued.

Most members in Southern Africa will recall the Transkei Cycad series issued in 1980. Four stamps were produced, featuring Encephalartos altensteinii (5c), E. princeps (10c), E.villosus (15c) and E. friderici-guilielmi (20c). The artist was Dick Findlay, well known for his very popular 'Protea' series of South African stamps. First-day covers are still quite readily available from local dealers at about R2 to R3.

The only other stamp which featured Encephalartos was a 1977 Mozambique issue depicting E. ferox.

The only other cycad featured on stamps to my knowledge, is Cycas revoluta, found on stamps issued by the Ryūkyū Islands (pronounced ree-oo-ky-oo), a chain of about 100 smallish islands between Japan and Taiwan. Supporting more than one million inhabitants, these hot and humid territories have now been incorporated into Japan. In the very first issue from the Ryūkyū Islands in 1948, C. revoluta figured on the 5 sen (red) and 20 sen (dull green) stamps. In 1970 they issued a commemorative 3c stamp honouring a very large specimen of C. revoluta, known as 'The Great Cycad of Une'. This remarkable plant was declared a national monument in 1959. Estimated at 250 years old, it stands 5 m high and has more than 200 branches. It grows in a private garden on Kumejiwa Island.

We have received a picture of the Great Cycad of Une from the Ryūkyūian Tourist Board but unfortunately it doesn't copy well and we are unable to print it.

(I thank Mr Denis Heenan (Swaziland), Mr Ernest Smith (Plettenberg Bay), Mr Rex Osborne (Durban) and Mr D.C. Speirs (Calgary, Canada) for most of the above information - Roy Osborne)

The Transkei 1980 Cycad stamps on first-day cover

KORAALVORMIGE WORTELS

deur Nathanaël Grobbelaar

WAT IS KORAALVORMIGE WORTELS?

Die meeste plantsoorte se wortels groei óf regaf óf skuins in die grond af. 'n Broodboom het dan ook gewoonlik 'n reg= afgroeiende penwortel waarvan die basis geneig is om dik en vlesig te word en as 'n belangrike bergplek van die plant se reserwestowwe dien. Uit hierdie pen= wortel ontstaan sywortels wat meestal dun bly en skuins in die grond afgroei. Al hierdie "gewone" wortels se funksies is hoofsaaklik om die plant in die grond te anker en om water en ander voeding= stowwe (soute) uit die grond op te neem.

Reeds in 1872 het Reinke egter 'n artikel oor ander eienaardige wortels wat hy by Cycas revoluta waargeneem het gepubli= seer. Hierdie koraalvormige wortels (Figuur 1) ontstaan meestal direk uit die plant se hoofas waar die stam oor= gaan in die penwortel (Figuur 2). Hulle kan egter op enige plek uit die gewone wortels ontstaan (Figuur 3).

In teenstelling met gewone wortels, groei koraalvormige wortels apogeotro= pies (opwaarts) in plaas van afwaarts. Hulle groei ook relatief stadig in die lengte en vertak dikwels maar op 'n heel ander wyse as gewone wortels. By 'n gewone wortel sal 'n sywortel 'n hele ent agter die punt van die bestaande wortel uitgroei. By 'n koraalvormige wortel is dit die punt van die wortel self wat vurk en dan as twee identiese wortels verder groei. Hierdie soort vertakking word digotomiese vertakking genoem.

Omdat die koraalvormige wortels opwaarts groei, verskyn hul punte dikwels soos 'n plaat vingerpunte bokant die grond. Koraalvormige wortels het egter skynbaar nie 'n baie lang lewe nie maar sterf na sowat 'n jaar of twee af. Om dié rede verskyn die punte van die massas koraal= vormige wortels wat in die dieper grond= lae gevorm word nooit bokant die grond= oppervlak nie.

WATTER BROODBOOMSOORTE VORM KORAALVORMIGE WORTELS?

Vir gerief word daar in hierdie artikel na al die sowat 134 spesies wat onder die orde Cycadales ressorteer, as brood= bome verwys. Hierdie orde omvat drie families met tien genusse. Uit 'n lite= ratuuroorsig blyk dit dat koraalvormige wortels tot dusver by sowat 49 van die spesies aangetref is (Tabel 1). Vir slegs een genus, naamlik Microcycas, is daar skynbaar nog nie enige spesies

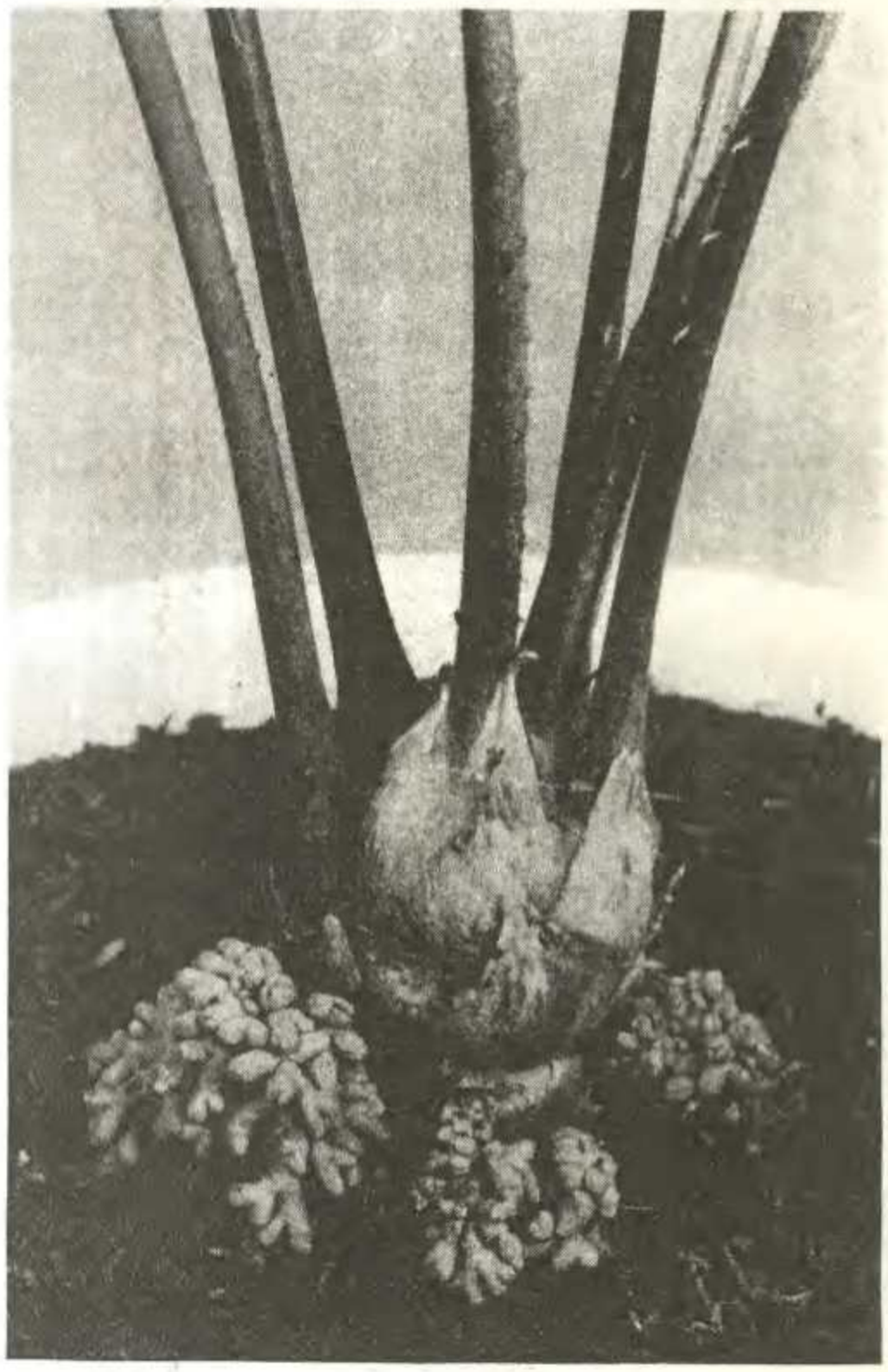

Fig. 1.: Jong Cycas thouarsii - plant met bogrondse koraalvormige wortels

gevind wat koraalvormige wortels vorm nie. Uit die jongste werk van Grobbelaar en Hattingh (1986) blyk dit dat al die inheemse broodboomspesies van die Republiek van Suid-Afrika wel koraal= vormige wortels kan vorm.

WAT IS DIE NUT VAN KORAALVORMIGE WORTELS?

Omdat die koraalvormige wortels (a) apo= geotropies groei en in party gevalle tot bokant die grondoppervlak uitgroei, en (b) omdat hulle in baie gevalle talle lentikulas vorm (Figuur 4) waardeur die buite-atmosfeer in direkte verbinding met talle intersellulêre lugkanale in die wortels is, het party navorsers (Life 1901) gepostuleer dat die koraalvormige wortels niks anders as pneumatofore is nie.
Pneumatofore is kenmerkend van plante soos mangliete wat in moerasagtige ge= biede groei. Suurstofgas kan uit die atmosfeer, deur hulle, die dieperliggende wortels vir respirasiedoeleindes bereik. Hierdie hipotese insinueer dat die brood= bome miljoene jare gelede grootliks in moerasse gegroei het maar dat hul koraal= vormige wortels teenswoordig eintlik oor= bodig is. 'n Swak punt van hierdie hipo= tese is dat die meeste van 'n broodboom se koraalvormige wortels normaalweg nooit bokant die grondvlak uitgroei nie. As pneumatofore sou hulle dus van relatief min waarde vir die plant wees.

Tydens die ontdekking van koraalvormige wortels het Reinke (1872) reeds vasgestel dat die wortels met Cyanobacteria (blou= groen bakterieë) besmet kan wees. Winter (1935) het die Cyanobacteria uit die koraalvormige wortels van Cycas circina= lis, Encephalartos altensteinii en E. cycadifolius geïsoleer en aangetoon dat die isolate oor die vermoë beskik om stikstof te bind - m.a.w. om stikstofgas uit die atmosfeer tot ammoniak te redu= seer en dit dan in aminosure, proteïene, ens. in te bou. Sedertdien het Bond (volgens Fowden 1958), Bergersen et al. (1965), Grobbelaar et al. (1971), Halli= day & Pate (1976) en Grove et al. (1980) aangetoon dat die besmette koraalvormige wortels ook stikstof kan bind. Bergersen et al. (1965) het verder aangetoon dat die gebonde stikstof vryelik deur die res van die broodboom benut word.

Hierdie is 'n baie belangrike aspek van koraalvormige wortels. Van al die mil= joene soorte lewende wesens op die aarde is dit net sekere soorte bakterieë wat oor die vermoë beskik om stikstof te bind.

Fig. 2: Jong E. lebomboensis - plant met twee klossies koraalvormige wortels by die aansluitingsgebied tussen stingel en wortel.

Deur sulke bakterieë in hul koraalvor= mige wortels te huisves en as't ware die stikstof wat hulle bind vir eie ge= bruik te tap, word die broodboom waar= skynlik heeltemal "selfvoorsienend" vir sover dit sy behoefte aan gebonde stik= stof aangaan. Hy benodig m.a.w. nou nie meer stikstofbevattende stowwe soos ammoniumsoute, nitrate of ureum in die grond om normaal te groei nie.

Daar is aanvanklik beweer dat daar, af= gesien van Cyanobacteria, ook ander bakterieë en selfs skimmels in die ko= raalvormige wortels van broodbome voor= kom en dat die aanwesigheid van mikro= organismes in die wortelomgewing nood= saaklik is vir die ontstaan van koraal= vormige wortels ((kyk Lamont en Ryan (1977) vir literatuurverwysings)). Uit die meer onlangse werk wil dit egter voorkom asof koraalvormige wortels nor= maalweg slegs deur Cyanobacteria besmet

TABEL 1. Die getal spesies van die verskillende broodboomgenusse wat daarvoor bekend is dat hulle koraalvormige wortels vorm.

Onderafdeling van die Cycadales	Getal beskrewe spesies	
	in totaal	wat bekend is vir vorming van koraal=vormige wortels
Familie: CYCADACEAE	20	5
Genus: Cycas	20	5
Familie: ZAMIACEAE	113	43
Genusse: Bowenia	2	2
Lepidozamia	2	1
Macrozamia	14	4
Microcycas	1	0
Dioon	5	2
Ceratozamia	4	2
Zamia	40	3
Encephalartos	45	29*
Familie: STANGERIACEAE	1	1
Genus: Stangeria	1	1
	TOTAAL 134	49

*Hierdie syfer sluit die 16 Suid-Afrikaanse spesies in waarvoor data van hierdie aard nie voorheen gepubliseer is nie (Grobbelaar & Hattingh 1986)

raak (Caiola 1974) en dat mikro-organismes nie noodsaaklik is vir die ontstaan van koraalvormige wortels nie. Lamont & Ryan (1977) het die ontstaan van koraalvormige wortels onder aseptiese toestande by broodboomkiemplante waargeneem, terwyl de Luca & Sabato (1980) die ontstaan van koraalvormige wortels op die geïsoleerde megagametofiete van Cycas revoluta waargeneem het toe hulle dit onder aseptiese toestande d.m.v. weefselkultuurtegnieke gekweek het.

Hoe die Cyanobacteria die wortels binnedring is nog nie 'n uitgemaakte saak nie. Daar is egter in minstens sekere gevalle (Nathanielsz & Staff 1975) gevind dat die Cyanobacteria deur breuke in die oppervlakkige weefsel van die koraalvormige wortels toegang tot die intersellulêre lugruimtes van die dieperliggende weefsel verkry. Dit is egter onbekend of die Cyanobacteria self die breuke veroorsaak en of dit op 'n ander wyse ontstaan en bloot deur die Cyanobacteria as ingangspoorte benut word.

As die Cyanobacteria eers binne-in die koraalvormige wortel is, beweeg dit op 'n onbekende wyse hoofsaaklik in die lugkanale tussen die wortelselle deur, tot by een besondere laag selle wat ongeveer een derde vanaf die buitekant na die middelpunt van die wortel as 'n sirkelvormige band in die wortel voorkom. Die Cyanobacteria stimuleer nou op een of ander onbekende wyse die selle van hierdie band om grootliks in 'n radiale rigting te verleng en om van hul tangen-

siale buurselle los te gaan sodat daar 'n sirkelvormige band van besonder groot intersellulêre ruimtes ontstaan. Hierdie ruimtes word weldra met slym gevul waarin die Cyanobacteria tot so 'n mate vermenigvuldig dat hulle as 'n donker blou-groen band met die blote oog in 'n dwarssnee van die wortel gesien kan word (Figuur 5). Die endofiet bly egter normaalweg beperk tot hierdie band van die koraalvormige wortels en versprei nie na ander dele van die plant nie.

Die simbiose wat so ontstaan is skynbaar 'n mutualistiese een. Die broodboom voorsien skynbaar water, mineraalsoute en veral fotosinteseprodukte (waarskynlik suikers) aan die Cyanobacteria, in ruil vir produkte van die Cyanobacteria se stikstofbinding.

DIE ENDOFIET

Terwyl die Cyanobacteria binne-in die koraalwortels leef, word dit die broodboom se endofiet genoem. Uit studies wat op die endofiet gedoen is, lyk dit of die endofiet gewoonlik óf 'n Nostoc-spesie óf 'n Anabaena-spesie is ((kyk Scott et al. (1986) vir verwysings)).

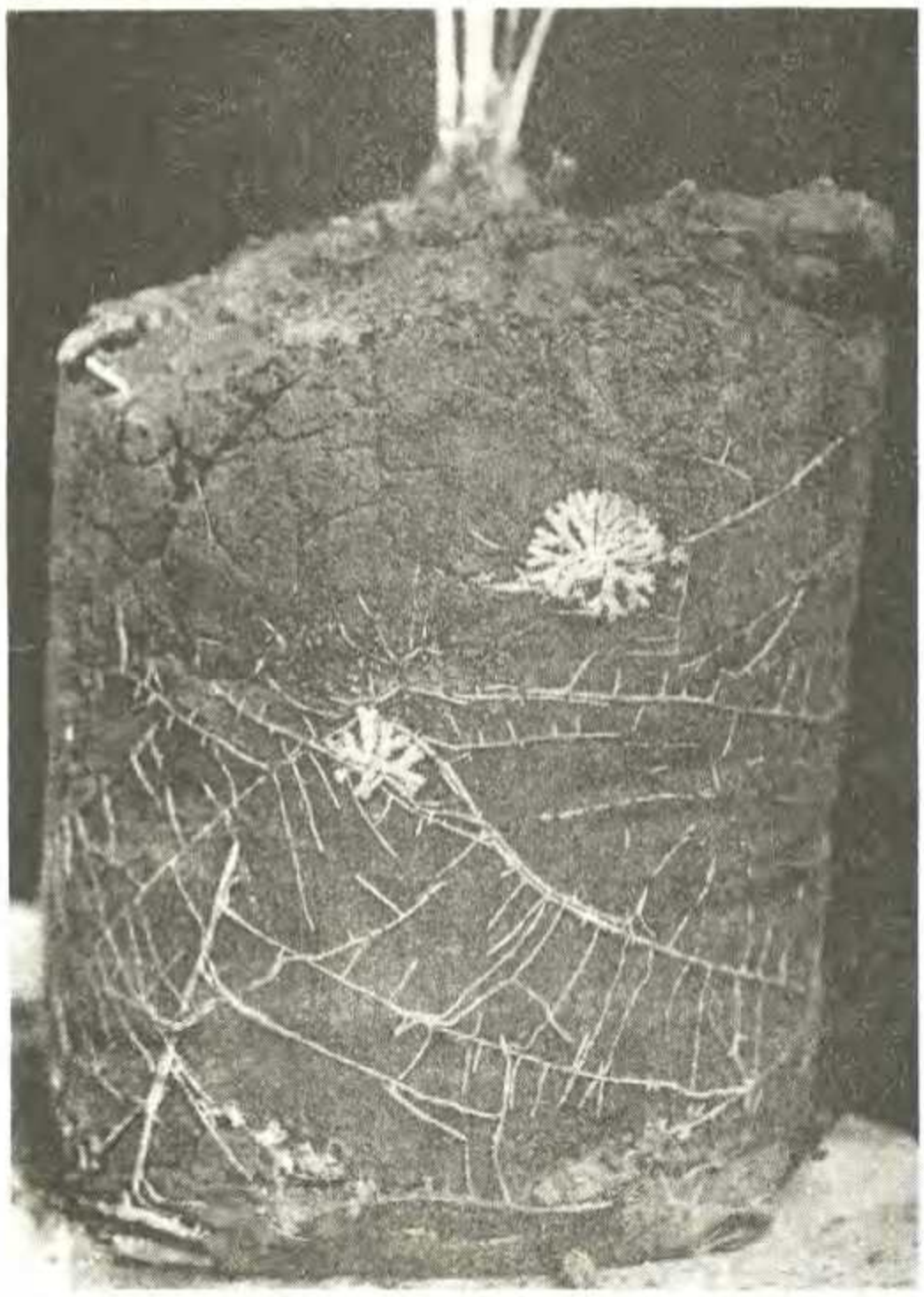

Fig.3: Jong E. lanatus - plant met verskeie klossieskoraalvormige wortels wat op die gewone sywortels van die plant ontstaan het.

Fig. 4: Klossie koraalvormige wortels van E. transvenosus om die talle lentikulas (wit vlekkies) te toon.

As hierdie Cyanobacteria op hul eie, vry in die natuur leef, bestaan hulle uit lang stringe selle waarvan die meeste (die vegetatiewe selle) kan fotosinteti=seer. Hierdie vegetatiewe selle kan egter nie onder gewone toestande stikstof bind nie - skynbaar omdat die suurstofgas wat hulle tydens fotosintese produseer, die stikstofbindingsproses vergiftig. In so 'n string selle is daar egter gewoonlik hier en daar 'n ander soort spesiale sel wat 'n heterosist genoem word (Figuur 6). Die heterosiste het 'n dik selwand, is gewoonlik groter as die vegetatiewe selle en lyk of hulle leeg is. Hulle is die setels van stikstofbinding en kan nie die gewone fotosinteseproses uitvoer nie.

Wanneer die Cyanobacteria in 'n broodboom se koraalvormige wortels leef, is 'n baie hoër persentasie van die selle heterosiste as wanneer dit vry leef. Die individuele selle kom ook dikwels los van mekaar voor. Die vegetatiewe selle het skynbaar ook hul vermoë om te fotosintetiseer verloor terwyl hulle in die wortels is want, al word die wortels belig, vind geen fotosintese plaas nie. Trouens, dit neem omtrent twee weke vir die Cyanobacteria nadat dit uit die koraalvormige wortels geïsoleer is, om weer hul normale funksies van o.a. fotosintese te herwin.

ANDER INTERESSANTHEDE

Sekere soorte broodbome kom in digte stande in Australië voor - dikwels op sandgronde in bloekomwoude. Uit navorsing wat daar gedoen is (Halliday & Pate 1976; Grove et al. 1980) word daar geskat dat die broodbome tot soveel as 18,8kg stikstof per hektaar per jaar bind. Aangesien 'n groot deel van hierdie stikstof mettertyd tot beskikking van die bloekombome sal kom, vervul die broodbome skynbaar 'n belangrike ekologiese funksie in sulke woude.

Rao et al. (1984) het bevind dat ekstrakte van die koraalvormige wortels van Cycas revoluta gebruik kan word om te voorkom dat tamatieplante sekere virussiektes opdoen.

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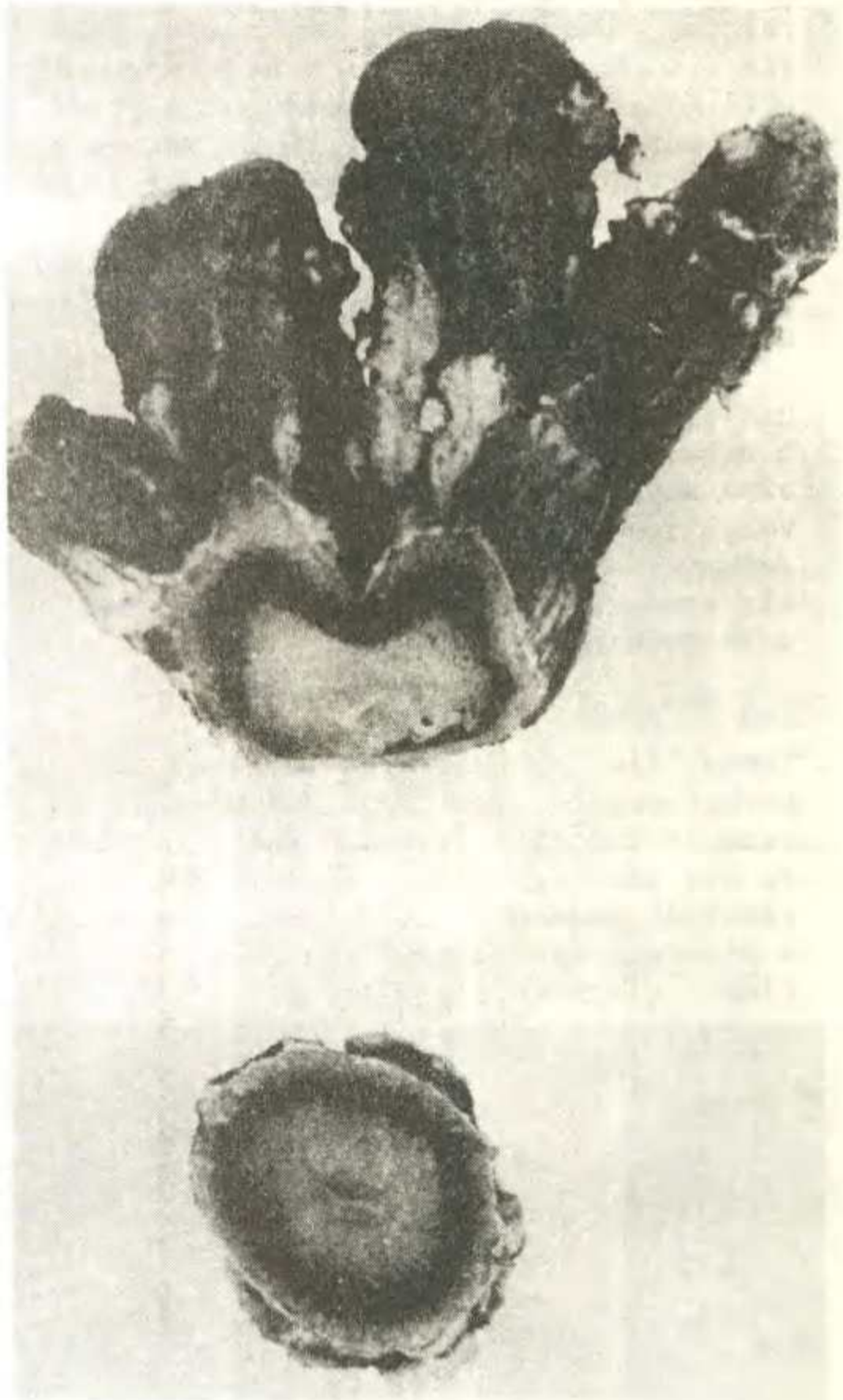

Fig.5: Deurgesnyde stukkies koraalvormige wortels van E. transvenosus om die sirkelvormige swart band van Cyanobacteria in die wortels aan te toon. Bo: Skuinsaansig van 'n deurgesnyde wortel. Onder: Vooraansig van 'n dwarssnee deur 'n wortel.

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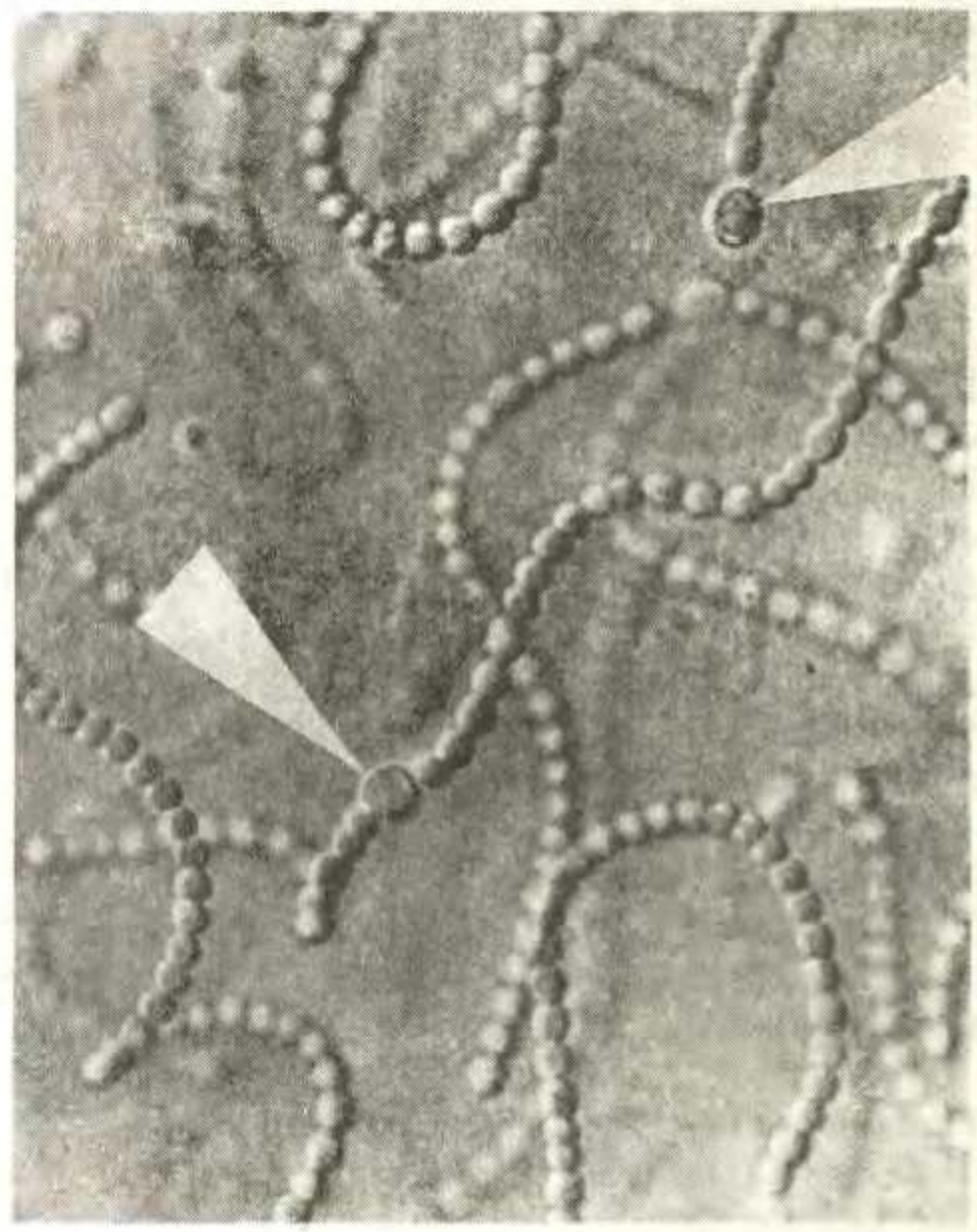


Fig. 6: Trigome van Cyanobacteria (Nostoc-spesie). Die groot selle (pyltjies) is heterosiste terwyl die ander, meer talryke en kleiner selle die gewone vegetatiewe selle is.

FROM THE BOOKSHELF

"CYCADS OF AUSTRALIA" - A MAJOR FEATURE IN THE JOURNAL "AUSTRALIAN PLANTS", VOL 13, NO. 101, DECEMBER 1984.

Those of our members who are 'into' exotic cycads will be pleased to know that almost the whole No. 101 issue of 'Australian Plants' has been devoted to a major feature on 'Cycads of Australia'. Written by Len Butt, leader of the Cycad Study Group in Australia, this 29-page article has 26 colour pictures, including a splendid front cover shot of Lepidozamia peroffskyana.

Len's work mentions evolution and reproduction in Australian cycads and a species description covers 14 Macrozamia, 2 Lepidozamia, 2 Bowenia and 10 Cycas species. I continue to be fascinated by Australian names, e.g. 'Tin Can Bay' and 'Warrumbungle Range' and others. (I wonder if Len has heard of Mtubatuba?)

I was interested to see that he included part of the botanical key devised by Dr L.A.S. Johnson in 1959 which shows the division of Macrozamia into the sections Macrozamia and Parazamia. Useful also were the distribution maps.

If I was to make any criticism, it would be that the treatment of Cycas is a little thin in comparison say to the details given under Macrozamia. However, this should not detract from the overall usefulness of this publication as an introductory text to the Australian species.

To obtain a copy of this Journal, write to: The Editor, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213, Australia, enclosing a bank draft to the value of 5,00 Australian Dollars to cover cost and airmail postage charge.

ROY OSBORNE

FROM THE CHAIRMAN

I am pleased to report that our numbers have now grown to some 375 members. May I extend our usual warm welcome to all 'new' cycad enthusiasts - we look forward to your active participation in the Society. I am pleased also to record continued positive response to ENCEPHALARTOS and must congratulate Maans Kemp on the sustained high stan= dard he has achieved with our magazine. Appreciation is extended to the many persons who have so willingly assisted in the preparation of material for publication.

The Society's constitution has now been ratified and becomes official. Our thanks are due to Piet Vorster for his kind work on finalising this impor= tant task. This issue sees the elec= tion of your new Executive Committee and your attention is drawn to the ballot form enclosed herewith. You are urged to participate in the election of your representatives. The new Committee assumes office from 1 January 1986 and will be responsible for the future mana= gement of your Society. It is appropriate for me to thank the outgoing steering committee very sincerely for the many and varied ways in which they have helped to get the Society 'off the ground' so suc= cessfully. In addition, thanks are due to the regional sub-committee members and the other willing helpers who have done various administrative jobs for the Society.

A full year-ending financial report will be presented in the first 1986 issue of ENCEPHALARTOS. At this stage I antici= pate the Society will close its books with a healthy balance, slightly in excess of R1 000. I would like to record thanks to the members who have recently sent in do= nations to our funds: Messrs D.G. Giese, D. Venter, P. Stroebel, Maurice Wood, A.F. Wentzel, Roy Shooter, Paul and Marion Debruyne and Robbie Swanepoel. Your assistance is much appreciated.

VAN DIE VOORSITTER

Dit is vir my aangenaam om te rapporteer dat ons getalle nou aangegroei het tot ongeveer 375 lede. Hartlik welkom, soos gewoonlik, aan al die 'nuwe' broodboomen= toesiaste - ons sien uit na u aktiewe deel= name in die Vereniging. Ek is ook bly om te noem dat positiewe reaksie steeds t.o.v. ENCEPHALARTOS ontvang word en ek moet Maans Kemp gelukwens met die volgehoue hoë stan= daard wat hy met ons tydskrif bereik het. My waardering gaan na die baie persone wat so gewilliglik gehelp het met voorberei= ding van die materiaal vir publikasie.

Die Vereniging se grondwet is nou goed= gekeur en is nou amptelik. Baie dankie aan Piet Vorster vir sy vriendelike werk t.o.v. die finalisering van hierdie belangrike taak. Hierdie uitgawe handel met die verkiesing van u nuwe Uitvoer= ende Komitee en u aandag word gevestig op die stembriefie wat hierby ingesluit is. U word aangemoedig om deel te neem aan die verkiesing van u verteenwoor= digers. Die nuwe Komitee neem die leisels op 1 Januarie 1986 oor en sal verantwoordelik wees vir die toekom= stige bestuur van u Vereniging. Graag bedank ek die uittredende loodskomitee hartlik vir die baie en uiteenlopende maniere waarop hulle gehelp het om die Vereniging so suksesvol van die grond af te kry. Baie dankie ook aan die streeks-subkomiteelede en die ander gewillige helpers wat 'n verskeidenheid administratiewe take vir die Vereniging verrig het.

'n Volledige finansiële jaarverslag sal in die eerste uitgawe van ENCEPHALARTOS in 1986 gepubliseer word. Op hierdie stadium voorsien ek dat die Vereniging sy rekeninge sal afsluit met 'n gesonde balans, ietwat meer as R1 000. Baie dankie aan dié lede wat onlangs donasies vir ons fondse gestuur het: menere D.G. Giese, D. Venter, P. Stroebel, Maurice Wood, A.F. Wentzel, Roy Shooter, Paul en Marion Debruyne en Robbie Swanepoel. U bystand word baie waardeer.

Finally, I must draw your attention to the membership renewal form for 1986 which is enclosed with this issue. It would greatly facilitate matters if members could kindly deal with this promptly. A reminder note will be sent to any members who have not renewed their 'subs' by the end of January and we would like to keep this mailing to a minimum.

ROY OSBORNE
CHAIRMAN

Laastens wil ek u aandag vestig op die lidmaatskap-hernuwingsvorm vir 1986 wat by hierdie uitgawe ingesluit is. Dit sal sake baie vergemaklik as lede spoedig hiermee sal handel. 'n Herinneringskennisgewing sal uitgestuur word aan dié lede wat nie teen die einde van Januarie hulle lidmaatskap hernu het nie, en ons wil graag die uitstuur van hierdie kennisgewing tot 'n minimum beperk.

ROY OSBORNE
VOORSITTER

LETTERS BRIEWE LETTERS BRIEWE

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.

Dear Sir,

I notice in the 'World List of Cycads' (ENCEPHALARTOS no. 3) that Cycas thouarsii is not mentioned. Is there any reason for this?

PIETER STROEBEL,
BLUEWATER BAY
PORT ELIZABETH

Roy Osborne replies:

The correct botanical position of 'Cycas thouarsii' is one of several contentious points in the overall taxonomy of the Cycas genus. This particular species occurs naturally in Madagascar, the Comores and Seychelles Islands and the East African Coast. It was first described by L.M.A.A. du Petit-Thouars in 1804, when he mis-identified it as C. circinalis. In 1829 Gaudichaud recognized it as a different species and re-named it after Thouars. It has also been mis-spelt C.thuarsii by R. Brown, and been described as C.madagascariensis by Miquel and C.comoroensis by Bruant. John Hendricks and I have followed Schuster's work of 1932 in which this species is described as C.circinalis subspecies madagascariensis.

An interesting article on this plant is 'The African Cycas' by Piet and Elsa Vorster which was printed in Excelsa, the Journal of the Aloe, Cactus and Succulent Society of Zimbabwe, issue no. 3 of 1973, pages 14-26. (This article will be reprinted in ENCEPHALARTOS in the near future - EDITOR)

Dear Sir

I have just received No. 3 of ENCEPHALARTOS and wish to congratulate you on a most interesting publication. It is most professional and the articles on Encephalartos caffer by Maans Kemp and "World List of Cycads" by Roy Osborne in conjunction with John Hendricks, were especially illuminating.

MAURICE G. WOOD
SCOTTSVILLE

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 the grey-leaved cycad from the Karoo.

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

ENCEPHALARTOS LEHMANNII

by Maans Kemp

INTRODUCTION

Encephalartos lehmannii is a very attrac=tive cycad with blue-grey leaves in its natural habitat. It is the South African cycad species most closely associated with the dry regions, particularly the Karoo. It may also be the species which occurs furthest to the west.

IDENTIFICATION AND NAME

E. lehmannii did not enjoy such a well-documented "discovery" as E. longifolius and E. caffer. It was identified and named in Europe from material collected in South Africa, probably by plant col=lectors in the eighteenth century. The earliest names which seemed to have applied to what later became E. lehmannii, are Zamia pungens (given by Aiton in 1813) and Zamia lehmanniana (given by Ecklon and Zeyher in 1833). When he created the genus name "Encephalartos" in 1834, Lehmann transferred both these names, as E.pungens and E.lehmannii respectively.

In 1933, J. Hutchinson and G. Rattray reduced E. pungens to E. lehmannii. At the same time they also reduced to E. lehmannii a number of the previously named species and varieties, including Zamia spinulosa, Zamia elongata, Zamia occidentalis, Encephalartos spinulosus, E. elongatus, E. mauritianus, E. lehmannii var. spinulosus, E. lehmannii var. denta=tus and E. horridus var. trispinosa.

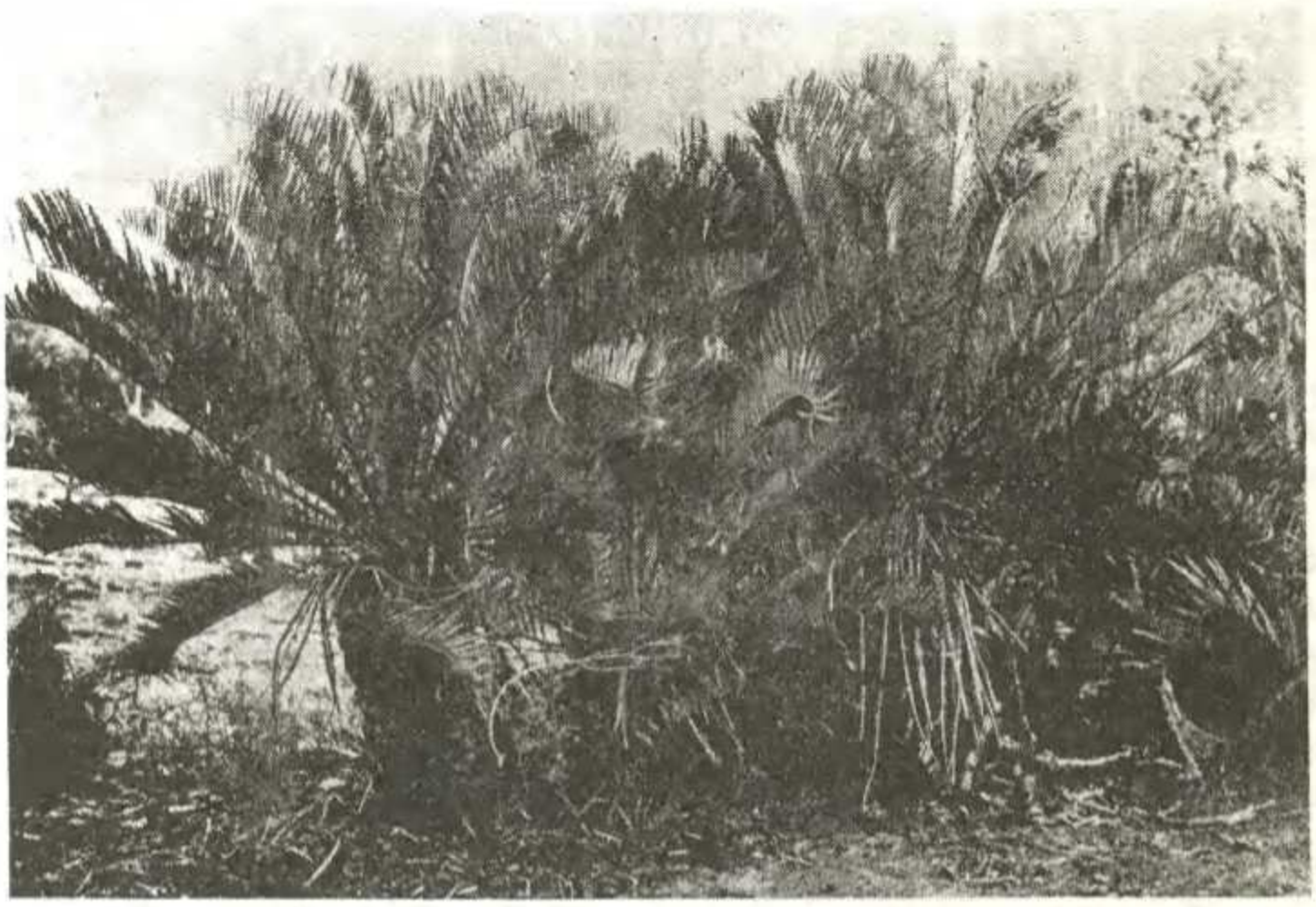
It became evident from field studies and studies at Kirstenbosch Botanic Garden, however, that there were wide variations amongst the plants grouped together as E. lehmannii by Hutchinson and Rattray. In 1965 Dr R.A. Dyer divided E.lehmannii, as it was known at that time, into three different species: E.lehmannii, E.prin=ceps and E. trispinosus.

E. lehmannii was named after Prof. J.G.C. Lehmann of Hamburg in Germany, who was Director of the Botanic Gardens at Hamburg and who published a number of papers on cycads. He was also responsi=ble for the genus name "Encephalartos".

DISTRIBUTION

E. lehmannii occurs on cliffs and moun=tain sides in the Eastern Cape Province; in the districts of Willowmore, Steytler=ville, Uitenhage, Pearston and Bedford. It grows on the Klein Winterhoek Moun=tains and Groot Bruintjieshoogte, in the drainage areas of the Groot and Sundays Rivers.

Plants usually grow on sandstone hill and mountain sides amongst Karoo scrub vegetation. It is often associated with the Euphorbia species ("noorsdoring") which is so characteristic of this part of the Karoo.



E. lehmannii in habitat. (Reproduced from Bothalia Vol. 8, Part 4, 1965, with kind permission from the editor and the Bothanical Research Institute.)

The climate in its distribution area is dry, with very hot summers. Night temperatures drop to extremes in winter and frost occurs. Rain falls mainly in summer and the annual rainfall is seldom higher than 350mm. Prolonged droughts occur periodically.

DESCRIPTION OF PLANT

1. STEM

E. lehmannii is not a very tall-growing cycad. The stems are usually short and sturdy, up to about 1,5m in length. Stems of 2m and taller are very rare. The diameter of the stem usually ranges between 25 and 50cm.

Although plants with single stems occur, it is more usual to see plants with two or more stems, branching from the same base. Some of these stems may be procumbent or curved. Occasionally "two-headed" or "multi-headed" stems are found; usually the result of damage to the growth point of the original stem. Stems with side stems are also sometimes seen, but these are rare. These branches probably originate where a stem is damaged.

Like in other cycads, the stem is covered and protected by a very resis= layer of old leaf bases.

2. LEAVES

The leaves of E. lehmannii are 1 to 1,5m long, including the leaf stalk which is up to 25cm long. The rachis is stiff and nearly straight, except for the tip, which may curve back slightly or may occasionaly be somewhat twisted sideways. The leaf base is quite large and has a conspicuous red-brown to yellow-brown collar. The leaves have a grey-blue colour when young, but may become green with age.

The leaflets at the middle of the leaf are approximately 12 to 18cm long and 1,5 to 2cm broad. The leaflets closer to the tip and the base of the leaf are smaller. Towards the base they are reduced in size to possibly one prickle. The leaflets are usually without teeth, although an occasional tooth or two may occur on the margin.

The leaflets are attached to the rachis in such a way that they are horizontal to the rachis, but that they form a V along the leaf. They are well-spaced, especially towards the base of the leaf. Towards the tip they are closer together, but seldom overlap much.

The leaves of seedlings are quite short with relatively few leaflets (8 or 10). The seedling leaflets have a number of teeth at its tip. The seedling leaflets are also well-spaced.

3. CONES

Single cones are borne by both female and male plants. In both sexes the colour of the cone is blackish-red as a result of short black hair which covers the ends of the cone scales. These are actually green in colour under the layer of hairs. The cone is borne on a short, stout stalk.

The male cone is more or less cylindrical in shape, but narrower towards the base and the tip. It is 25 to 35cm long, with a diameter of 8 to 10cm. The cone is made up of spiral rows of cone scales, each about 2,5cm broad and 1cm thick. The end of each scale forms a beak which projects about 1,5cm. The bottom surface of each scale is covered with pollen sacs.

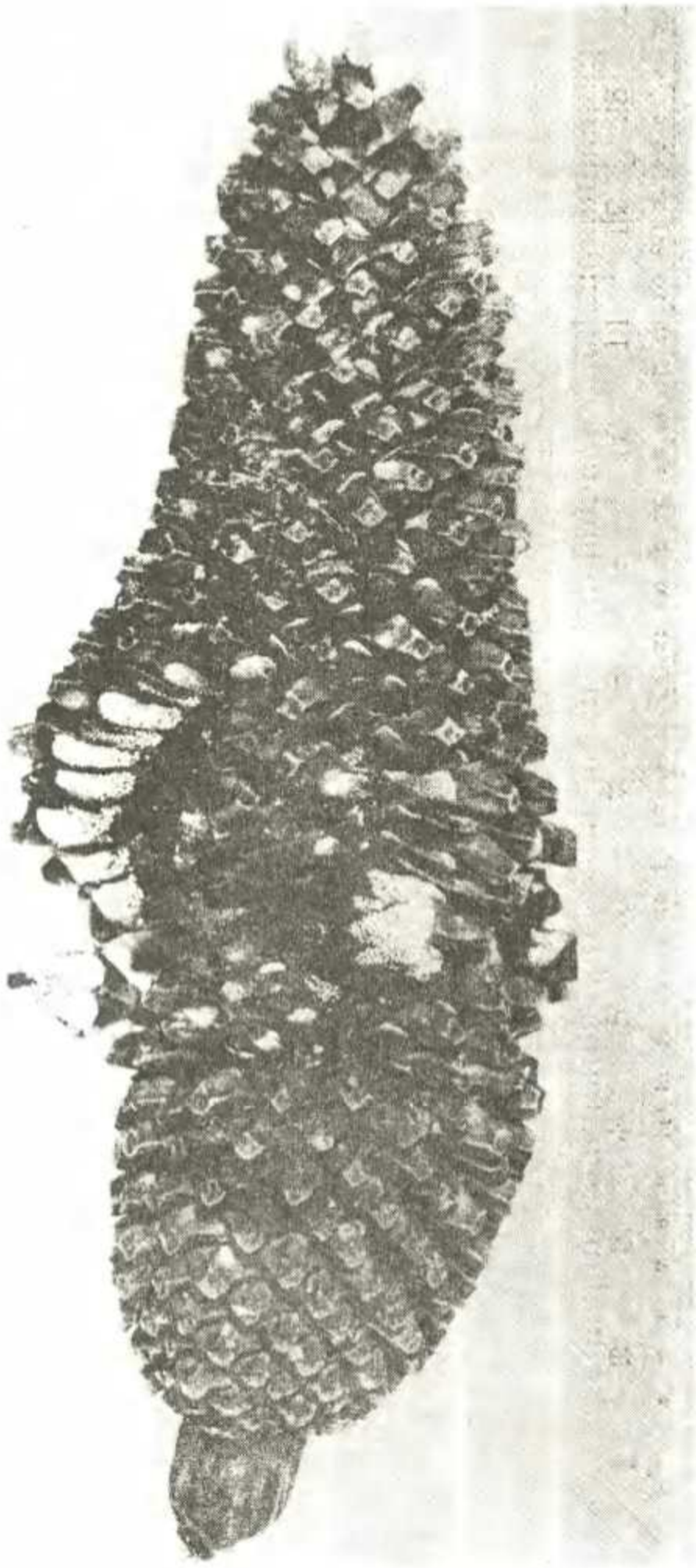
The female cone is more or less barrel-shaped and 30 to 50cm long, with a diameter of 15 to 25cm. The cone scales at the middle of the cone are

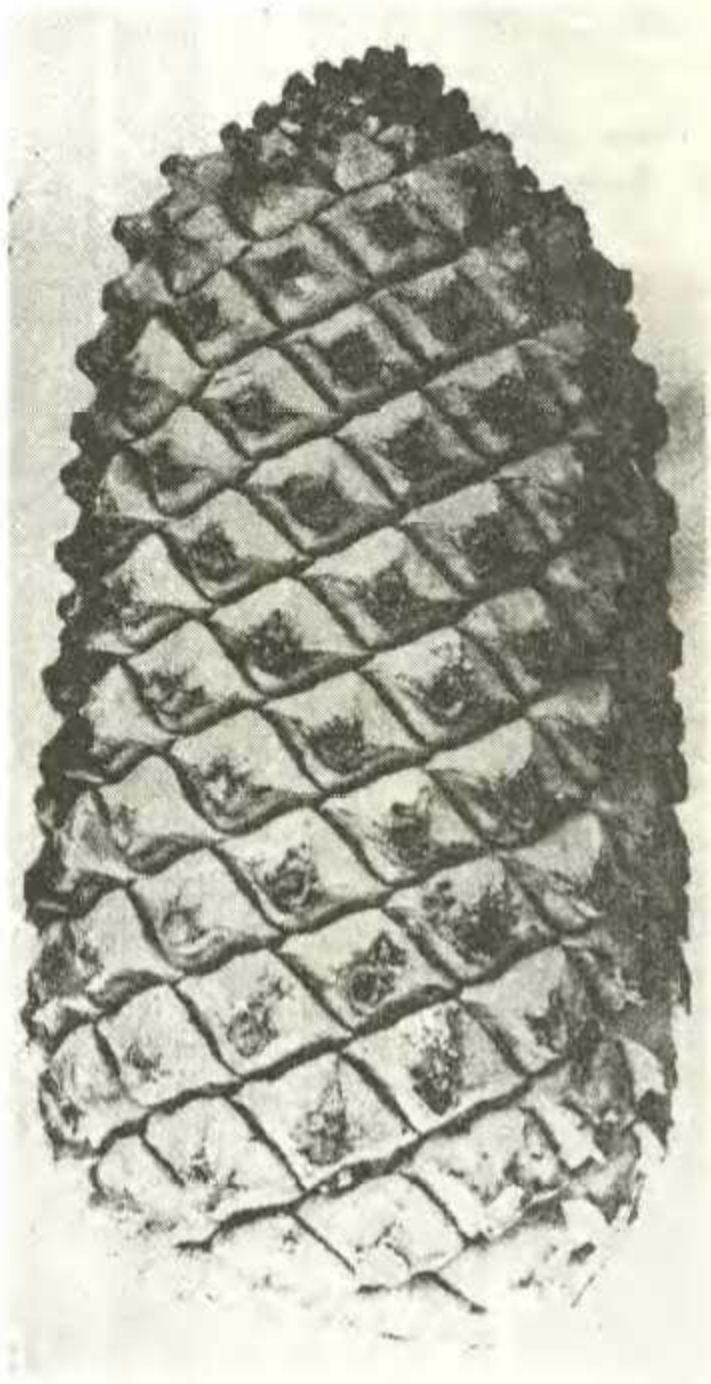
Female specimen of E. lehmannii, with cone. Note the well-spaced leaflets and prominent collar of the leaf-bases. The remains of two previous cones can be seen on the right below the leaves (arrows).

about 6cm long, 6cm broad and 3,5cm thick. The scale has a beak which projects approximately 2cm. The face of the cone scale is almost smooth. Mature cones lose the layer of fine hair and have more of a green colour. Two seeds are formed on top of each cone scale. The fresh seed has a bright red cover and is approximately 5cm long and 2cm in diameter.

RELATIONS

E.lehmannii is closely related to E.princeps, E. trispinosus and E.horridus. As mentioned earlier, the first three were classified as one species until fairly recently. The mostly toothless leaflets of E. lehmannii readily distinguishes it from E. horridus and E. trispinosus with their prominently-lobed leaflets. In nature E. lehmannii and E. princeps can also not be confused, as their distribution areas do not overlap. E. princeps occurs further to the north-east, in the districts of Queenstown, Cathcart, Komgha and Butterworth.





E. lehmannii, male cone (left) and female cone (above). Reproduced from Bothalia, Vol. 8, Part 4, 1965, with kind permission from the editor and the Botanical Research Institute).

In cultivation E. lehmannii and E. princeps may appear quite similar, however. They can be distinguished as follows, however:

1. E. lehmannii seldom has a stem of 2m or longer, whereas E. princeps may be 4m or taller.
2. The leaflets of E. lehmannii are well-spaced and do not overlap. The leaflets of E. princeps overlap conspicuously, especially near the leaf tip.
3. The leaf-base of E. lehmannii is large and prominent and has a brown collar. The leafbase of E. princeps is insignificant and sometimes completely covered by the surrounding old leaf-bases.
4. E. lehmannii bears a single cone whereas E. princeps may have as many as three cones.
5. The face of the female cone scale of E. lehmannii is smooth while that of E. princeps is covered with small warts.
6. The cones of E. lehmannii have a blackish-red over green colour, especially when young, while those of E. princeps are dull olive-green in colour.

HIBRIDIZATION

In the Uitenhage district the distribution areas of E. lehmannii and E. horridus are close to each other. No hybrids have been described officially, but there are reports of hybrids between these two species. If they occur, they are rare.

North of Uitenhage, E. lehmannii also grows in close proximity to E. longifolius, but no hybrids have been reported.

IN THE GARDEN

E. lehmannii grows quite well in the garden and its blue-grey leaves can be very attractive and effective in a well-planned garden, for example as a contrast plant. It also blends in well in a rock garden, amongst aloes and other succulent plants. The soil in which it is planted should be very well drained, fertile and neutral to alkaline. It should be grown in full sun. If it is grown in the shade, the leaves will lose their blue-grey colour and become green. Plants should not be over-watered. E. lehmannii is able to resist long periods of drought and is hardy to frost.

Seeds of E. lehmannii geminate easily and this species can quite easily be grown from seed. Seedlings do not grow very fast and the leaves remain relatively short for a number of years.

E. lehmannii, with an unusual horizontal, curved trunk in a garden.

CONSERVATION

Until fairly recently, E. lehmannii occurred in relatively large numbers. This situation seems to be changing rapidly. Numerous plants have been removed from their habitat by collectors, especially those closer to main roads. Most of those which remain are high up in the kranses (cliffs) in relatively inaccessable terrain.

The severe drought of the last few years has also had a devastating effect, in a number of ways. Because of the drought, coning did not take place at the usual rate, and few seeds were formed. The plants themselves also suffered because of the shortage of other food for the animals. New leaves were devoured by goats and wild animals as soon as they appeared, often resulting in damage to the growth point of the stem, which caused the death of some plants. Hungry porcupines bite chunks out of the stems of the plants and eat the contents, especially at the base of the stems. This causes severe damage and kills many plants. To complicate matters even more, E. lehmannii grows in areas heavily infested with the curculionid weevil, which lays its eggs in the immature seeds and consume the contents of the fertile seeds. With fewer cones formed, the infestation is even more disastrous and very few seeds reach the germination stage.

It is obvious that E. lehmannii is in need of strict protection. According to the amendments to the Cape Provincial Nature Conservation Ordinance, promulgated in March 1985, E. lehmannii, like all other species of Encephalartos, is classified as an endangered species. It may therefore not be removed from its habitat, possessed, transported, received, bought, donated or sold without a permit.

Another unfortunate aspect is that E. lehmannii is nowhere specifically protected in any area by the province or the state. To the best of the author's knowledge, E. lehmannii occurs only on privately-owned land. The establishment of one or more nature reserves which would include viable colonies of E. lehmannii, could save this beautiful species from extinction.

It is also essential that the species be cultivated on a large scale from seed obtained from the many plants in cultivation. This will go a long way towards satisfying the demand for this "blue" species; in South Africa and abroad.

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CYCADS AND THE LAW

by Roy Osborne

From the response to the first three issues of ENCEPHALARTOS it is evident that a number of members are interested in sending cycad seed outside their home province or importing seed into their own province. There has also been an increase in the number of seeds being offered or requested by overseas cycad enthusiasts and dealers. The Society would like to draw the attention of members to the legislation governing such transactions; the following notes summarise the position as we understand it.

IMPORT OF EXOTIC CYCAD SEED FROM OVERSEAS

The legislation of concern is laid down by the Agricultural Pests Act (Act 36 of 1983).

Application must be made in advance to the Department of Agricultural Economics and Marketing, Division of Plant and Seed Control, Private Bag X179, Pretoria, for a permit to import cycad seed from any source outside the Republic. Applications must be submitted in triplicate on a prescribed form available from the Department. The permit, when issued, will specify the details which have to be provided over and above the standard phytosanitary certificate which must be obtained by the supplier abroad.

EXPORT OF INDIGENOUS CYCAD SEED FROM THE REPUBLIC

The Republic is a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), implemented in 1975. Each of the Provincial Nature Conservation authorities has the responsibility of applying the terms of the Convention locally. Application for a permit to send cycad seed overseas will be considered only for non-habitat seed, and must be submitted to the relevant provincial authority.

Natal: Natal Parks, Game and Fish Preservation Board, PO Box 662, Pietermaritzburg 3200
Transvaal: Division of Nature Conservation, Private Bag X209, Pretoria 0001
Cape: Department of Nature and Environmental Conservation, Private Bag X9086, Cape Town 8000

Full details as to the quality, species, origin, applicant and beneficiary are required on the application.

In addition, the importing country will usually require that a phytosanitary certificate is issued for any seed being sent into their country. The issue of this document requires inspection by an officer of the Department of Agriculture who will require that the seed is properly treated with an appropriate fungicide and insecticide. The Department has offices in most major centres. A charge is made for the inspection and documentation service.

IMPORT OF INDIGENOUS CYCAD SEEDS FROM ANOTHER PROVINCE

Seed being imported into a province usually requires that an import permit is obtained from the relevant provincial authority as detailed above. Such permit will normally be issued only when the applicant can submit proof that an export permit has been issued by the province from which the seed originates.

EXPORT OF INDIGENOUS CYCAD SEED FROM ONE PROVINCE TO ANOTHER

Application must be made for an export permit to the relevant provincial authorities as detailed above and full details as to the quantity, species, origin, applicant and beneficiary are again required.

In the case of any doubts as to the procedures to be followed, members should contact their local nature conservation authorities and Department of Agriculture representatives. These people are knowledgeable of the current requirements, which do change from time to time, and any reasonable request will be dealth with sympathetically.

BITS AND PIECES STUKKIES EN BROKKIES

LIDMAATSKAP-HERNUWING

Lede van die Vereniging moet nou hulle lidmaatskap vir 1986 hernu. 'n Vorm vir hierdie doel word agter in hierdie uitgawe van ENCEPHALARTOS ingevoeg. Voltooi dit asseblief so gou as moontlik en stuur dit, tesame met u ledegeld, na ons Lidmaatskapbeampte, Marion Debruyne. Haar adres verskyn bo-aan die vorm. Voltooi asseblief die vorm volledig en in drukskrif, aangesien die besonderhede t.o.v. adres, ens. benodig word om die ledelys op datum te hou. Dui asseblief ook u taalvoorkeur aan deur óf die Afrikaanse of die Engelse kant van die vorm te gebruik. Let asseblief op die effens-verhoogde ledegeld vir 1986. Ons is seker u sal saamstem dat R1,00 per maand nog steeds baie min is.

Volgens die grondwet wat deur die lede aanvaar is, sal lede wie se lidmaatskap nie teen 31 Maart 1986 hernu is nie, se name van die ledelys geskrap word.

MEMBERSHIP RENEWAL

Members of the Society must now renew their membership for 1986. A form for this purpose is included at the back of this edition of ENCEPHALARTOS. Please complete it as soon as possible and return it, together with your subscription, to our Membership Officer, Marion Debruyne. Her address appears at the top of the form. Please complete the form fully and please print, as the information regarding address, etc. is required to keep the membership list up to date. Please indicate your language preference by completing either the English or the Afrikaans side of the form. Please take note of the slight increase in the subscription for 1986. We are certain that you will agree that R1,00 per month is still very little. Overseas members will now be receiving ENCEPHALARTOS by air mail, the cost of which is the reason for the increase in their subscription rate.

According to the constitution which was accepted by the members, the names of members whose membership has not been renewed by 31 March 1986, will be deleted from the membership list.

OVERSEAS SEED ORDER

ENCEPHALARTOS no. 3 carried a price list of Australian and other cycad seed available from a seed dealer in Australia. A number of Eastern Cape members are investigating the possibility of jointly importing seed of some or all the species listed in the price list, depending on the demand and response from members of the Society. All members interested in joining in this venture, must please write to Leon Meiring (PO Box 2847, North End, Port Elizabeth, 6056) before 31 January 1986, stating quantities and species required. After the replies have been received, prices will be established and members will be advised in the next edition of ENCEPHALARTOS, to enable them to place orders.

TRANSLATION OF ARTICLE

Some of our óverseas members have enquired about the possibility of obtaining an English copy of the first article in our "Focus On" series - on Encephalartos longifolius - which appeared in ENCEPHALARTOS no. 1. The article has now been translated and a copy is enclosed with this edition to all non-South African members. South African members who wish to receive an English copy, must please send a self-addressed envelope (preferably 220mm x 110mm), with the correct postage stamps on it, to the Editor (see the address on page 1).

AUDITOR NEEDED

The Society urgently requires the services of an auditor who would examine the financial records of the 1985 year in terms of the constitution. Whilst the offer of honorary services would be very welcome, the Society can meet at least partial costs in this regard. Please contact the Chairman, Roy Osborne, (tel. 031-866953) if you could help.

NEW NATURE RESERVE

According to a newspaper report (The Daily News, 16 October 1985), a new nature reserve was due to be declared in October. This reserve, the Starvation Creek Nature Reserve near Ngodwane in the Eastern Transvaal, will, amongst others, protect the endangered cycad species, Encephalartos laevifolius. The reserve will be under the control of the Forestry Branch of the Department of Environmental Affairs.

POLLEN EXCHANGE

Cynthia Giddy reports that the response to the pollen exchange scheme is still not satisfactory. Members are requested to complete and return to Cynthia the form which was enclosed with ENCEPHALARTOS no. 2 (June 1985), if they possess mature cycads of known gender. Another copy of the form will be enclosed with ENCEPHALARTOS no. 5 (March 1986).

REGIONAL NEWS STREEKNUUS

Natal

SHONGWENI OUTING

Despite the inclement weather, 24 Natal members and guests met on Sunday, 6 October 1985 to explore the habitat of Encephalartos villosus in the catchment area of the Shongweni Dam. The timing was fortunate in that the female plants were in full cone. A surprising feature was that coning was often at the cost of total die-back of all leaf growth, possibly due to the recent droughts in the area.

Members were very disturbed to witness evidence of the wholesale removal of large adult plants in what seemed to be an organised plundering of the population. It looked as though several hundred plants had been removed in the past few weeks alone. Especially distressing was the large number of plants that had been destroyed in abortive attempts to remove them from the more stony sites. Member, Mr C. Bleksley of Pietermaritzburg, was asked to report our concern to the Natal Parks Board, but the solution seems to be best tackled by education 'garden-lovers' NOT to buy cycads on the black market.

Good news was the presence of large numbers of healthy seedlings of E.villosus. If the exploitation of this plant could be curtailed, the population would re-establish its status quo within ten years or so.

NOTE FROM DANIE NEL:

While we were nearing the spot where the E.villosus are located, you could almost imagine the plants saying to each other: "Here come the humans again to remove us from our natural habitat where we have been growing for centuries." But were they surprised when they realised that these humans only came to study and to admire them! We were all very happy to see so many females in cones and so many seedlings. It was very nice to see the Bleksey couple from Pietermaritzburg and the Swart family from Newcastle who came so far for this particular outing. We missed the familiar faces who were present at our other outings. A special thanks to Danie Steyn who treated us to lovely "boerewors".

Oos-Kaap / Eastern Cape

JAARVERGADERING EN VLEISBRAAI

Die Streek het sy jaar afgesluit met 'n algemene jaarvergadering, wat gevolg is deur 'n baie gesellige vleisbraai. Die funksie, wat by die tennisklubhuis van die Universiteit van Port Elizabeth gehou is, is deur ongeveer 30 persone bygewoon.

Tydens die vergadering is die volgende komitee verkies:

Voorsitter: Frank Marx
Ondervoorsitter: Grey Greyling
Sekretaris/Tesourier: Pieter Stroebel
Port Elizabeth-verteenwoordiger: Vernon Rathbone
Uitenhage-verteenwoordiger: John Boshoff
Despatch-verteenwoordiger: Danie Slabbert
Addisionele lid: Maans Kemp

Die voorsitter, Frank Marx, is aangewys om die streek op die Nasionale Uitvoerende Komitee van die Vereniging te verteenwoordig.

EASTERN CAPE COMMITTEE

From left to right: Grey Greyling, Vernon Rathbone, Frank Marx, Maans Kemp, Pieter Stroebel, John Boshoff
Absent: Danie Slabbert

CYCAD TRADE AND CONSERVATION

by Willie Tang

Within the last two decades, horticultural interest in cycads has become a major threat to the persistence of these plants in the wild, not just in Southern Africa but in other parts of the world as well. In the 70's, South Africa became the focus of an international trade in cycads as thousands of Encephalartos and Stangeria were taken from their habitats and shipped to the U.S.A. and Europe in response to the demands of growing numbers of collectors. For a time the Australian cycads also came under heavy pressure from commercial collectors and Latin American Zamias, Dions and Ceratozamias continue to be so.

The most serious recent development in the international cycad trade has been its expansion into the U.S. landscape horticulture business. This has lead to vast increases in the trade since the late 70's and early years of this decade. In 1981, for example, 30 000 Zamia furfuracea a month were trucked over the Mexican border just to supply one wholesale California nursery. Between 1979 and 1982, over 145 000 Zamia debilis were imported into the U.S. from the Dominican Republic. Many of these were used for decorating shopping malls. Japan has also emerged as a major importer of cycads; in 1981 100 000 cycads were imported from Mexico in one shipment alone.

Although the impact of the trade on Mexican cycads is poorly known, the sheer magnitude of the numbers involved suggests that it has been enormous. Several species of Ceratozamia appear to be threatened with extinction as a direct result.

As individuals and as a society that is interested in cycads, the extensive destruction of wild populations by commercial collecting and by habitat destruction must be a serious concern. In a sense we have an obligation to do something to stop this destruction because, if we don't, no-one else has the expertise to do so. Below, I have outlined some routes the Society can follow to promote the conservation of cycads:

1) Encourage individuals, institutions and governments to preserve cycad habitats and the populations on them by demonstrating your concern, by offering moral support and praise for acts of conservation and, when situations are appropriate, by arousing public attention.

2) Disseminate information that will promote cycad conservation. Spreading techniques on propagation is important, but presenting a coherent understanding of the threats of cycads is needed as well. A clear perspective of the problems that cycads now face is needed if the solution to them are to be found.

3) Establish a seed bank to make seeds widely available to individual collectors and nurserymen who want to grow them, both domestically and internationally. This will reduce demand for the collecting of wild cycads, both within the country and overseas.

4) Establish a pollen bank to facilitate the exchange of pollen among people who wish to propagate these plants. If only a small fraction of cultivated plants are propagated, much of the horticultural demand for cycads can be satisfied without resort to wild populations.

I am in the process of organizing the cycad resources in Fairchild Tropical Garden to promote cycad conservation along the four points outlined above. Much of Fairchild's capacity to propagate its cycads is unrealized. After a few calculations, I estimate that this one botanic garden can produce 20 to 25 thousand cycad seeds a year - more than enough to make a dent in the international trade which by official figures ranges from 40 000 to 150 000 plants per year. With

relatively minor effort, I pollinated seven cones of Ceratozamia mexicana last spring. This resulted in some 4 000 seed this year, most of which were sent to the Cycad Society (International) Seed Bank. I can't help to think that, as a result, several hundred people will opt not to buy field-collected Ceratozamia in favour of seed-grown plants! If a few more private or public gardens get involved, the cycad trade can become fairly self-sufficient on propagated material.

REFERENCES

GILBERT, S. 1984. Cycads: Status, Trade, Exploitation, and Protection 1977-82. TRAFFIC(U.S.A.).

VOVOIDES, A.P. and J.D. REES. 1983. Ceratozamia microstrobila (Zamiaceae), a new species from San Luis Potosi, Mexico. Madroño 30 : 39-42.

ANON. 1985. Plants Traded to Extinction. World Wildlife Fund pamphlet.

THE CANDIDATES

According to the Society's new constitu=tion, which was approved by the members recently, a President and two members of the Executive Committee must be elected directly by the members. In addition, each constituted region of the Society elects a representative to the Executive Committee. The regional representatives have already been elected and are: Frank Marx (Eastern Cape) and Danie Nel (Natal). These five members of the Executive Committee have the power to co-opt addi=tional members for specific purposes. Such co-opted members do not have voting powers on the Executive Committee.

The names of persons who have been nomi=nated for the position of President and members of the Executive Committee appear below. A ballot paper is enclosed with copies of this edition of ENCEPHALARTOS which are mailed to members. Please vote on the ballot paper and mail it to Dr P. Vorster, Department of Botany, University of Stellenbosch, Stellenbosch, 7600; to reach him not later than 8 Jan=uary 1986.

Full particulars and photographs of the new Committee will be published in ENCEPHALARTOS no. 5 (March 1986).

DIE KANDIDATE

Volgens die Vereniging se nuwe grondwet, wat onlangs deur die lede aanvaar is, moet 'n President en twee lede van die Uitvoerende Komitee direk deur die lede van die Vereniging verkies word. Elke gekonstitueerde streek van die Vereniging verkies daarby 'n verteenwoordiger tot die Uitvoerende Komitee. Die streeksverteen=woordigers is reeds verkies en is: Frank Marx (Oos-Kaap) en Danie Nel (Natal). Hierdie vyf lede van die Uitvoerende Komitee het die mag om bykomende lede vir spesifieke doeleindes te koöpteer. Sulke gekoöpteerde lede het nie stemreg op die Uitvoerende Komitee nie.

Hieronder volg die name van die persone wat genomineer is vir die posisies van President en lede van die Uitvoerende Komitee. 'n Stembriefie word ingevoeg by kopieë van hierdie uitgawe van ENCEPHALARTOS wat na lede gepos word. Stem asseblief op die stembriefie en pos dit aan Dr. P. Vorster, Departement Plantkunde, Universiteit Stellenbosch, Stellenbosch, 7600; om hom nie later as 8 Januarie 1986 te bereik nie.

Volledige besonderhede en foto's van die nuwe Komitee sal in ENCEPHALARTOS no. 5 (Maart 1986) gepubliseer word.

PRESIDENT

- Mr Roy Osborne - unopposed

MEMBERS OF EXECUTIVE COMMITTEE
(two to be elected)

- Mrs Cherryl Burger

Proposer: Mr L.E. Burger

Particulars supplied by proposer:
Lives at Dendron, Transvaal. Collec=ting cycads since 1983. Possesses 28 species, all indigenous, including E. woodii.

- Mrs Marion Debruyne

Proposers: Mr Roy Osborne,
Mrs Ita van der Walt

Particulars supplied:
Lives at Phalaborwa, Transvaal. Col=lects cycads since 1978. Interested in local as well as foreign species. Presently concentrating on Australian species. Enjoys cultivating plants from seed. Keen gardener. Currently a member of the steering committee of the Cycad Society, as membership officer.

- Dr Piet Vorster

Proposers: Mr Roy Osborne,
Mr Maans Kemp

Particulars supplied:
Lives at Stellenbosch, Cape Province. Lecturer in Botany at University. In=terested in cycads for the past 20 years. Has collection of approximately 150 species from all over the world; many cultivated from seed by himself. Interested in taxonomy and hibridisa=tion of cycads. Currently a member of the steering committee of the Cycad Society. Was responsible for compiling the constitution.

PRESIDENT

-Mnr Roy Osborne - onbestrede

LEDE VAN UITVOERENDE KOMITEE
(twee moet verkies word)

- Mev. Cherryl Burger

Voorsteller: Mnr. L.E. Burger

Besonderhede deur voorsteller verstrek:
Woon te Dendron, Transvaal. Versamel broodbome sedert 1983. Besit 28 spe=sies, almal inheems, insluitend E.woodii.

- Mev. Marion Debruyne

Voorstellers: Mnr. Roy Osborne,
Mev. Ita van der Walt

Besonderhede verstrek:
Woon te Phalaborwa, Transvaal. Versa=mel broodbome sedert 1978. Geintere=sseerd in plaaslike sowel as uitheemse spesies. Konsentreer tans op Austra=liese soorte. Hou daarvan om plante van saad te kweek. Ywerige tuinier. Tans lid van loodskomitee van Brood=boomvereniging, as Lidmaatskapbeampte.

- Dr. Piet Vorster

Voorstellers: Mnr. Roy Osborne,
Mnr. Maans Kemp

Besonderhede verstrek:
Woon te Stellenbosch, Kaapprovinsie. Dosent in Plantkunde aan Universiteit. Vir die afgelope 20 jaar geinteresseerd in broodbome. Het versameling van ongeveer 150 soorte van oor die hele wêreld; baie self van saad gekweek. Geinteresseerd in taksonomie en hibri=disering van broodbome. Tans lid van loodskomitee van Broodboomvereniging. Was verantwoordelik vir opstel van grondwet.

GIVE AND TAKE GEE EN NEEM

The exchange of plants is illegal in terms of the Plant Improvement Act. This act has however no bearing on the exchange of pollen and seeds and the unconditional donation of plants. Members are invited to use this column for offer's and requests in this connection.

The Nature Conservation Ordinances of the various provinces may however control the exchange and donation of seeds and plants and members are advised to contact their local provincial nature conservation office for information, permits, etc.

Persons who want to arrange overseas exchanges should consult the Department of Agriculture, Division of Plant and Seed Control. In this case import and export permits are usually required and a phytosanitary certificate is generally necessary.

The 'Give and Take' column is also available for requests concerning any other items of interest to members, e.g. books, photographs, etc.

Die ruil van plante is onwettig in terme van die Plantverbeteringswet. Hierdie wet het egter geen betrekking op die ruil van stuifmeel en saad en die onvoorwaardelike skenking van plante nie. Lede word genooi om hierdie kolom te gebruik vir aanbiedings en versoeke in hierdie verband.

Die Natuurbewarings-ordonnansies van die verskillende provinsies mag egter die ruil en skenking van saad en plante beheer en lede word aangeraai om met hulle plaaslike provinsiale natuurbewaringskantoor in verbinding te tree t.o.v. inligting, permitte, ens.

Persone wat oorsese ruilings wil reël moet met die Departement van Landbou, Afdeling Plant- en Saadbeheer in verbinding tree. In hierdie geval is invoer- en uitvoerpermitte gewoonlik nodig en 'n phytosanitêre sertifikaat word algemeen vereis.

Die 'Gee en Neem'-kolom is ook beskikbaar vir versoeke t.o.v. enige ander items wat vir lede van belang mag wees, bv. boeke, foto's, ens.

-John Hendricks (110 Brookemeade Drive, Statesville NC 28677, USA) is currently working on cycad seed morphology, and would like to make urgent contact with anyone who can supply a small quantity of seed of Cycas pectinata and Cycas beddomei.

-Mr Rolf Kyburz (K-Palms Nursery, PO Box 90, Salisbury, 4107, Queensland, Australia), who recently visited South Africa, would like to make contact with anyone in a position to supply seeds of Encephalartos en Stangeria species. He would also like to advise readers of his currently-available seed species at prices as detailed below:

Species	Price/ 1000	Price/ 10000	Harvest month
Bowenia serrulata	$180	$1500	7-9
Cycas cairnsiana	$160	$1350	6-9
C.media	$150	$1200	5-9
C.revoluta	$220	$1800	2-5
Dion edule	$130	$980	2-5
D.spinulosum	$195	$1720	8-12
Macrozamia communis	$180	$1570	2-6
M.miquellii	$165	$1350	7-9
M.moorei	$190	$1650	3-6
Zamia fischeri	$120	$870	5-9
Z.floridana	$185	$1450	2-5
Z.furfuracea	$130	$980	2-5
Z.loddigesii	$120	$870	1-8

-Here's a Christmas gift suggestion with a difference! Members are offered the chance to obtain one or both types of the few remaining four-colour silk-screen, limited edition cycad prints by artist Douglas Goode of the Durban Museum. Featuring striking and accurate representations of Encephalartos friderici-guilielmi in one case and E. lebomboensis in the other, these fine works measure 52 x 45 cm and are handpressed on semi-handcrafted paper. The price is R40,00 each and the artist has agreed to make a donation of R4,00 to the Cycad Society for each print ordered through the Society. Enquiries must be made to the Chairman, Roy Osborne, at 20 Maryvale Road, Westville 3630.

-Piet Vorster (34 Brandwag Street, Stellenbosch, 7600; tel.no. 02231-78909-home-) would like to acquire Cycas seemannii and Cycas wadei. Can anyone help?

-Mr Fadjar Marta, (P.T. Indoparts Utama, Jl. Laksda. Yos Sudarso - Sunter II, P.O. Box 3061, Jakarta 10002, Indonesia) offers seeds of Cycas rumphii, and would like seeds of Stangeria eriopus, Encephalartos horridus, E.arenarius, and/or E.lehmanii in exchange. Mr Marta is liaising with the Bogor Botanic Garden to assist them expand their cycad collection and tells us that they have only a limited number of Encephalartos species, including E.laurentianus and E.altensteinii.

-Danie Nel (Bowkerweg 120, Escombe, 4093; tel. no. 031-442505) het die volgende sade om te verruil vir ander spesies of vir kontantdonasies aan die Vereniging: E. natalensis, E. villosus, E. lebomboensis. 'n Klein hoeveelheid Lepidozamia hopei, Bowenia serrulata en Macrozamia miquelii is ook beskikbaar.

-David Tuvel of Deerfield Beach, Florida, USA writes:

"I am pleased to advise you that cycad seeds are being made available by a seed supplier and seed collector whom I can personally recommend as one of the very best, based on my results, as well as others known to me, with her seeds over a period of more than three years:

Christa's Cactus, 529 W. Pima, Coolidge, Arizona 85228, USA.

Item 930	Zamia furfuracea	5 @ 90c
		25 @ $3.60
Item 999	Dioon edule	6 @ $1.25
		50 @ $9.00

Mrs Roberts specifies:

Prices are quoted in Dollar US. Please pay by 1. International Postal Money Order OR 2. Cheque drawn on US Bank.

Please add $2 for postage and handling."

-Roy Osborne (Durban, tel. no. 031-866953) would be very grateful for a few seeds of the Transvaal species E.cupidus, E.humilis, E.laevifolius and E. eugene-maraisii.

-Wim en Annelise Loots (Berg-Kwekery, Posbus 2710, Nelspruit, 1200; tel.no. 01311-22883) soek saad van enige broodboomspesies. Hulle sal ook plante uitruil, waar moontlik.

-Hannes Louw (Posbus 1795, Port Shepstone, 4240) is 'n beginner en sal graag saad ontvang van enige broodboomspesie, as daar iemand is wat bereid is om hom te help.

-Roy Clemence (21 Ralston Road, Fernglen, Port Elizabeth, 6045; tel. no. 041-311673) has a set of three books, "Handbook of Succulent Plants", by Herman Jacobsen, for sale.

CYCADS AND THE LAW

by Roy Osborne

From the response to the first three issues of ENCEPHALARTOS it is evident that a number of members are interested in sending cycad seed outside their home province or importing seed into their own province. There has also been an increase in the number of seeds being offered or requested by overseas cycad enthusiasts and dealers. The Society would like to draw the attention of members to the legislation governing such transactions; the following notes summarise the position as we understand it.

IMPORT OF EXOTIC CYCAD SEED FROM OVERSEAS

The legislation of concern is laid down by the Agricultural Pests Act (Act 36 of 1983).

Application must be made in advance to the Department of Agricultural Economics and Marketing, Division of Plant and Seed Control, Private Bag X179, Pretoria, for a permit to import cycad seed from any source outside the Republic. Applications must be submitted in triplicate on a prescribed form available from the Department. The permit, when issued, will specify the details which have to be provided over and above the standard phytosanitary certificate which must be obtained by the supplier abroad.

EXPORT OF INDIGENOUS CYCAD SEED FROM THE REPUBLIC

The Republic is a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), implemented in 1975. Each of the Provincial Nature Conservation authorities has the responsibility of applying the terms of the Convention locally. Application for a permit to send cycad seed overseas will be considered only for non-habitat seed, and must be submitted to the relevant provincial authority.

Natal: Natal Parks, Game and Fish Preservation Board, PO Box 662, Pietermaritzburg 3200
Transvaal: Division of Nature Conservation, Private Bag X209, Pretoria 0001
Cape: Department of Nature and Environmental Conservation, Private Bag X9086, Cape Town 8000

Full details as to the quality, species, origin, applicant and beneficiary are required on the application.

In addition, the importing country will usually require that a phytosanitary certificate is issued for any seed being sent into their country. The issue of this document requires inspection by an officer of the Department of Agriculture who will require that the seed is properly treated with an appropriate fungicide and insecticide. The Department has offices in most major centres. A charge is made for the inspection and documentation service.

IMPORT OF INDIGENOUS CYCAD SEEDS FROM ANOTHER PROVINCE

Seed being imported into a province usually requires that an import permit is obtained from the relevant provincial authority as detailed above. Such permit will normally be issued only when the applicant can submit proof that an export permit has been issued by the province from which the seed originates.

EXPORT OF INDIGENOUS CYCAD SEED FROM ONE PROVINCE TO ANOTHER

Application must be made for an export permit to the relevant provincial authorities as detailed above and full details as to the quantity, species, origin, applicant and beneficiary are again required.

In the case of any doubts as to the procedures to be followed, members should contact their local nature conservation authorities and Department of Agriculture representatives. These people are knowledgeable of the current requirements, which do change from time to time, and any reasonable request will be dealth with sympathetically.