



PRINCIPES

Journal of The Palm Society

July, 1964
Vol. 8, No. 3

THE PALM SOCIETY

A non-profit corporation primarily engaged in the study of the palm family in all its aspects throughout the world. Membership is open to all persons interested in the family. Dues are \$10.00 per annum payable in May. Requests for information about membership or for general information about the Society should be addressed to the Secretary.

PRESIDENT: Nat J. De Leon, 8300 S.W. 62nd Place, Miami 43, Florida.

VICE PRESIDENT: Otto Martens, 1020 El Sur Avenue, Arcadia, California.

SECRETARY: Mrs. Lucita H. Wait, 7229 S.W. 54th Avenue, Miami 43, Florida.

TREASURER: T. R. Baumgartner, 14451 N.E. 2nd Court, North Miami, Florida.

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PRINCIPES

JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms published in January, April, July and October, and sent free to members of The Palm Society.

EDITOR: HAROLD E. MOORE, JR.

EDITORIAL BOARD:

David Barry, Jr., Walter H. Hodge, Eugene D. Kitzke, Harold F. Loomis, Nixon Smiley, Dent Smith.

Manuscript for PRINCIPES, including legends for figures and photographs, must be typed double-spaced on one side of 8½ x 11 bond paper and addressed to the Editor at Bailey Hortorium, Mann Library, Cornell University, Ithaca, New York, for receipt not later than 45 days before date of publication. Authors of one page or more of print will receive six copies of the issue in which their article appears. Additional copies or reprints can be furnished only at cost and by advance arrangement.

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Cover Picture

Palms at the U. S. D. A. Plant Introduction Station, Coconut Grove, Florida. In foreground, the bottle-trunked wine palm, *Pseudo-phenix vinifera*, from Hispaniola. Photo by W. H. Hodge.

NEWS OF THE SOCIETY

Most of the Society's news this quarter appears in the reports of the officers for the biennium just ended and in the report of the fine meeting held in California in April.

We do, however, want to welcome our Editor back from his travels around the world for the past seven months, and hope that he will find time to give us an informal account of his trip.

Also, we have a report on the blooming of the Cabada palm, as requested in April PRINCIPES. Mr. H. F. Loomis, former director of the U. S. Plant Introduction Station, Chapman Field, Florida, said that a specimen at the Station produced an inflorescence at some time last summer but that no seeds were formed. Mrs. George F. Adams, Felix Parkway, South Miami, writes: "April, 1964, After calling you in great excitement to tell you my *Chrysalidocarpus Cabadae* had produced a spathe, I believe you would like to have more details. The palm was obtained at the Fairchild Tropical Garden plant distribution in March, 1955. It was planted out early in 1956. It now has five trunks, the tallest being about 16 feet to top of crown. The first spathe opened, then the inner one the following day, and the inflorescence stood free on February 25th. A second spathe then appeared in the axil of the leaf above the first inflorescence, opening up on March 15th. Mr. Robert Read, botanist at Fairchild Garden, came on April 8th to collect male flowers to make a chromosome count."

Those of you who read the *American Horticultural Magazine* will be very much interested in an article in the April, 1964, number, written by one of our members. On pages 104-106 Mr. Harrison G. Yocum, of the University of Arizona, has published "Factors Affect-

ing the Germination of Palm Seeds." This article may contain information new to some of our seed planters.

LUCITA H. WAIT

REPORT OF THE BIENNIAL MEETING April 11 - 18, 1964

The California members of The Palm Society were hosts to the fourth Biennial Meeting, which was held at the Los Angeles State and County Arboretum, Arcadia, Calif., on April 11th, 1964, at 10 a.m. About sixty members and their guests were present.

After reports from the officers (printed elsewhere in this number), the following officers were elected for the coming biennium;

President, Mr. Nat J. De Leon, Miami, Florida.

Vice-president, Mr. Otto Martens, Monrovia, California.

Treasurer, Mr. T. R. Baumgartner, Miami, Florida.

Secretary, Mrs. Lucita H. Wait, Miami, Florida.

All previous directors were re-elected, and Dr. John Popenoe, Director of Fairchild Tropical Garden, was elected to fill the vacancy left by the death of Mr. Paul Allen.

After the business meeting, the group adjourned to a seminar room, where the question of forming a Cycad Society, which might possibly be associated with the Palm Society, was discussed. It was decided to begin with an informal group, which eventually might become an organized society. Mr. Loran Whitelock showed slides of his extensive cycad collection.

Following lunch, the members were given a conducted tour of the Arboretum, with special emphasis on the palm collection, which is under the care of Mr. Charles Mozolan. Returning to the main building, the group heard a talk



40. William Hertrich, Curator Emeritus of Huntington Gardens. Photo W. Aplin.

by Mr. Dent Smith on cold damage to his palms at Daytona Beach, Florida, with before and after pictures. He reported that in many cases palms which had been given up for dead made amazing recoveries, even when their tops had been sawed off.

That evening the banquet was held at the Sportsmen's Lodge Tavern in Duarte. It was a merry group, with much animated conversation. Dr. John Popenoe was the speaker, giving an account of the work with palms going on at Fair-

child Tropical Garden — both the scientific work and the introduction of new species. He told us that this summer 256 new species will be planted on the grounds of the Garden, most of them never before grown in the United States. He showed color slides of the Garden and part of its palm collection.

On Sunday morning the Huntington Botanical Garden opened its gates for our group before the regular visiting hours. We were happy to greet Mr. William Hertrich, who has honored the So-



41. Members ambling about grounds at Huntington Gardens, San Marino. Photo W. Aplin.

ciety by being one of its directors since its beginnings. Mr. Myron Kimmach, Superintendent, welcomed us and gave a short history of the Gardens. We loitered among the gorgeous plantings until noon, enjoying not only the palms but the other great collections of plants. After lunch many members visited retail nurseries to see the palms which are now going out into the gardens of southern California residents.

Monday was Santa Barbara day. Boarding our chartered bus at the Ar-

boretum soon after eight, we sped along through walnut and lemon groves and fields ready for planting, arriving at Goleta at half past ten, where we were met by our new Vice-president, Mr. Otto Martens, with a caterer's truck offering refreshments. A walk through the Diegaard wholesale nursery opened our eyes to the fact that ornamental palms are being grown and sold by the hundred thousand, at prices which to the Floridians seemed fantastic.

A walk along the ocean cliff brought



42. *Rhopalostylis sapida* at courthouse in Santa Barbara. Photo W. Aplin.

us to the lovely garden of Mr. Jakob Dekker, on More Mesa Road. Here a tapestry of plants — mostly succulents, but with philodendrons and other semi-tropicals mixed in — caused wonder and admiration.

After lunch we visited the famous palms at the Santa Barbara County Court House. There were old and beautiful howeias, a mature New Zealand shaving brush palm, *Rhopalostylis sapida*, and other long-established palms of great height. On the opposite side of

the building, Mr. H. E. Bauernschmidt, of the county's planning board, is establishing a planting of newer species.

The day's grand finale was a tour of "Lotusland," the estate of Mme. Ganna Walska. Our hostess graciously met us at the entrance gate, framed by two enormous *Jubaea chilensis*. From garden to garden we followed her, entranced. The succulent garden, the water garden, the cactus garden, the palm garden, the patio filled with baskets of blooming epiphyllums, the bromeliad collection,



43. Refreshments were served on the lawn to Society members at the Ganna Walska estate. Photo W. Aplin.

the open-air theatre, the living clock, the topiary garden, the cycad collection, followed each other in amazing sequence. In a touching gesture of friendship, Mme. Walska called Mr. Otto Martens to her side, showing him a plaque among the palms, stating that this part of the garden was dedicated to him. There was enthusiastic applause. Passing under the tall tree ferns and along the edge of the orchard where citrus trees were in fragrant bloom, we were conducted to tables shaded by umbrellas with raffia palm

covers and served elegant refreshments of champagne punch, sandwiches and caviar, as well as beautiful cakes bearing the legend: "Welcome to Lotusland." When Madame learned that Mr. De Leon is the son-in-law of the owner of the Parrot Jungle, she said that she had been there, and also to Fairchild Tropical Garden, and graciously went to the house to bring her pet cockateel for the bird-lovers in the group to see. Many color pictures were made on this eventful day, so that those who were not present may



44. Madame Ganna Walska who conducted members on a long tour of her gardens. Photo W. Aplin.

share in some of the pleasure we had.

Tuesday was a free day. Four out-of towners, Dr. John Popenoe, Dr. Velva Rudd, Assistant Curator of the Botany Department of the Smithsonian Institution, Washington, D. C., Mr. Billings McArthur of Winter Park, Florida and Mrs. Lucita Wait visited the Rancho Santa Ana Botanical Garden to see the native California plants in a riot of bloom, and to meet some of the staff there. After a memorable morning they lunched at Padua Hills, a charming Mexican res-

taurant with good food and native Mexican singing and dancing.

Wednesday morning we boarded our fine air-conditioned bus for the trip to Indio to see the U. S. Department of Agriculture Date Field Station. Two members from San Diego — Mr. W. F. Sinjen and Mr. Jim Specht — joined us there. We were cordially received by Mr. Roy Nixon, Horticulturist in charge, who explained the work being done there. After a tour of a date packing plant we continued to Palm Springs



45. One of the many specimens of *Jubaea chilensis* at Ganna Walska estate. Photo W. Aplin.

for lunch. Then came the thrilling experience of going into Andreas and Palm Canyons to see the tremendous trees of *Washingtonia filifera* which have been growing there for many centuries. Snow-capped San Jacinto mountain nearby, the lovely clear streams, the stately palms and beautiful birds made unforgettable pictures.

On Friday we boarded the chartered bus once more and greeted the handsome agreeable young driver who, we had discovered, is an orchid collector.

Making all speed southwards, we reached Presidio Park in San Diego almost on time; we were met by a number of members who live there, who had come to spend the day showing us their sights. After a briefing by the curator of the museum at Presidio Park we went on to Balboa Park where we saw mature specimens of *Erythea Brandegeei* and *Howeia Belmoreana* as well as many other fascinating plants. After touring the park on one of their sight-seeing trains and stealing a few minutes for the tropical



46. Inside the large lath house at Balboa Park, San Diego. The more prominent palms appear to be howeias. Photo W. Aplin.

bird house we lunched at the park, then had a delightful trip around San Diego and out to Point Loma, seeing many bits of good landscaping as we passed through the residential areas. The perfect ending was a visit to Mr. W. F. Sinjen's charming small house and garden, which he has made spacious by the ingenious use of areas opening into each other. After enjoying the refreshments provided by him, we regretfully said good-bye to our hosts and to each other. Some returned to Los Angeles on the

bus, some stayed on in San Diego to go their various ways on Saturday. All, I think, could say that it had been a wonderful week.

LUCITA H. WAIT

REPORT OF THE SECRETARY 1962 - 1964

The past two years have gone by more or less serenely, with few major crises. After more than eight years of existence, the Society seems to have found its stride. My accession books show that to

date we have enrolled 930 members; some of these have remained with us only briefly, but many have been staunch supporters and helpers through the years. The four presidents we have had have carried out their duties conscientiously and with real leadership. We are very grateful to each one.

The treasurers have a great responsibility, as well as lots of work to do — I am sure all of you join me in heartfelt thanks for the fine job they have done, although two were not able to finish their terms of office. The recent treasurer, young and pretty Maria Kneale, was forced to resign on account of her husband's illness and subsequent death. She has our deepest sympathy. Mr. T. R. Baumgartner, of North Miami, very kindly consented to finish her unexpired term and to continue as our treasurer for the coming term.

Another loss to the Society was the death of one of our directors, Paul Allen. Paul was a renowned tropical botanist, having spent the greater part of his life in Central America and on world expeditions searching for tropical plants. His books and articles have contributed much to world knowledge of the tropics. We extend our sympathy to his wife, Dorothy.

Membership: At present we have members in twenty-eight countries besides the United States. In your new roster of members you will find them listed. We need more members in the great palm-growing areas of the world. I am hoping that Dr. Moore's trip around the world is alerting plant-lovers in those far-away places to the existence of the Society and that it will bring in new members. Many of these people would be glad to belong, but have great difficulty in obtaining dollars to pay their dues. If any of you have contacts in palm-growing lands, perhaps you

would like to do what several members are doing: send them gift memberships. In return, we might get seeds of some good new palms.

In the United States we have members in twenty-six states, as well as in the District of Columbia, Puerto Rico and the U. S. Virgin Islands. Florida comes first, with 225; California is next, with 108. All others combined have 92. Our members seem to have stabilized at between 425 and 450, though of course this varies constantly as new members come in and others drop out. This is not bad, for a young and specialized society, but we would like to see the numbers increase, for financial and other reasons. Many of you have done fine work in spreading the word about the Society and have brought in new members. An example is the increase in members in Hawaii since David Barry has been spending a good deal of time there. Please keep on until we reach every possible interested person. It is encouraging to note that we now have several teen-age members, some of whom are doing excellent research.

Activities: As usual, our quarterly journal *PRINCIPES*, has been our chief activity. The seven volumes which have appeared so far contain one of the most extensive bodies of information about palms to be found. Subjects covered have been varied, from the most scholarly to the simply amusing. We must reach a large and diverse audience, from the professional botanist to the backyard gardener. The libraries of 78 universities, botanical gardens and other institutions subscribe to *PRINCIPES*. They need the technical data which otherwise might not be available to their scholars and researchers. Lay members may find the technical articles rather hard going, but by carefully reading them we can acquire information of real value.

It is important that lay members contribute their experiences to the journal — even a seemingly unimportant bit of information may help someone else. Those of you who read Mulford Foster's article on moving *Serenoa repens* and William Manley's palm letters from Georgia in *PRINCIPES*, April, 1964 surely noted how enjoyable these informal discussions can be.

Checklist: Review copies of "An Annotated Checklist of Cultivated Palms" were sent to botanical and horticultural publications both here and abroad. A number of them have published reviews, and orders for one or more copies have been received from persons who are not members of the society, as well as from members who want more than one copy. Copies sent to non-members were accompanied by invitations to join, and already some have accepted.

Seed Bank: The seed bank has been in operation throughout the two years. Many hundreds of packets have been mailed to various parts of the world. Nat De Leon and I are always glad to have reports of success in germinating these and are sorry when non-success is reported. Since growing conditions vary so much in the many places in which the seeds are tried, complete success is impossible, but by continued trials we may learn to provide the conditions each species needs. We are always glad to have your comments.

Meetings: The only official meeting of the Society is the formal one, held every other year for reports, election of officers, etc. However, two local groups, one in California and one in Florida, hold informal meetings and go on field trips at irregular intervals. New members of the Society who wish to join in these activities are requested to send five postcards, addressed to themselves, to Mrs. L. M. Whitelock, 4176 York

Blvd., Los Angeles, Calif 90065 or Mrs. T. C. Buhler, 1320 S. Venetian Way, Miami, Fla. 33139, so they may be notified.

It has been my pleasure to serve as your Secretary for the past biennium.

Respectfully submitted,

LUCITA H. WAIT

NEW OFFICERS

PRESIDENT — NAT J. DE LEON

Nat J. De Leon, our newly elected President, is a native of Pennsylvania. After attending grammar and high schools there, he came to the University of Miami, Florida, from which he graduated in 1951. He has been associated with the Parrot Jungle for a number of years and his efforts have helped to turn the Jungle into an outstanding tropical show-place. For over ten years he has been importing seeds and plants with an emphasis on palms, and is responsible for the introduction of many fine species into this country.

Mr. De Leon served as Treasurer of The Palm Society in 1957-58, was elected a Director in 1958, and served as Vice-president from 1962 to 1964. He is also the originator of the Society's "seed bank," a volunteer service to its members. His portrait appeared in *Principes* 1:76. 1957.

In recent years he has travelled to Colombia and Venezuela in search of palms and bromeliads, and has returned with seeds and plants of various new species. He has been president of the Bromeliad Society of Greater Miami and has taught bromeliad culture at the Fairchild Tropical Garden.

Mr. De Leon is married to the former Eileen Scheer and is the father of three boys.

VICE-PRESIDENT — OTTO MARTENS

Elected Vice-president for the biennium 1964-1966, Otto Martens is very

REPORT OF THE TREASURER

The following is a statement of the finances of The Palm Society, Inc., of Miami, Florida, for the period from April 10, 1962 to April 10, 1964.

Receipts:

Membership contributions, 4/10/62 to 4/10/63	\$ 4,657.90	
Principes subscriptions	228.00	
Seeds (handling costs)	96.10	
Principes extra copies sold	110.43	
Principes advertising	6.00	
		\$ 5,098.43
Membership contributions, 4/10/63 to 4/10/64	4,744.65	
Principes subscriptions	472.00	
Seeds (handling costs)	180.15	
Principes extra copies sold	693.17	
Principes advertising	22.00	
Donation from California group	50.00	
		6,161.97

Total monies collected for two-year period

\$11,260.40

Disbursements:

Salary of Executive Secretary, 4/10/62 to 4/10/63	\$ 1,200.00	
Withholding and Social Security taxes	215.48	
Principes: Principes, letters, cards	2,296.51	
Postage, Principes and office	125.00	
Petty cash and miscellaneous expenses	413.20	
		\$ 4,250.19
Salary of Executive Secretary, 4/10/63 to 4/10/64	1,200.00	
Withholding and Social Security taxes	211.14	
Printing: Principes, letters, cards	4,428.68	
Postage, Principes and office	154.50	
Petty cash and miscellaneous expenses	494.99	
		\$ 6,489.31

Total disbursements for two-year period

\$10,739.50

Net Gain

520.93

Balance on hand April 10, 1962

\$ 2,032.13

Total receipts

11,260.40

Total assets cash

\$13,292.53

Less total disbursements

10,739.50

Balance on hand April 10, 1964

\$ 2,553.03

Respectfully submitted.

T. R. Baumgartner, *Treasurer*



well known among plantsmen in the Southwest.

Born in Germany, he was educated at the universities of Kiel and Hamburg. After some years in Germany as a teacher and businessman, he came to the United States in 1926, working first in Moline, Illinois, and then going to California in the winter of 1927-28. His first job there was in an orange-packing plant; in 1932, he began working for the Diegaard Nurseries where he has remained ever since. He now holds the position of Vice-president and General Manager.

Mr. Martens is on the Board of Directors of the California Nurserymen's Association, and is past president of its Los Angeles chapter. He is a member of Arboreta and Botanical Gardens Advisory Committee of the American Association of Nurserymen, and on advisory committees of horticultural and conservation groups. For the past fifteen years he has spent much time in promoting the re-introduction of palms for land-

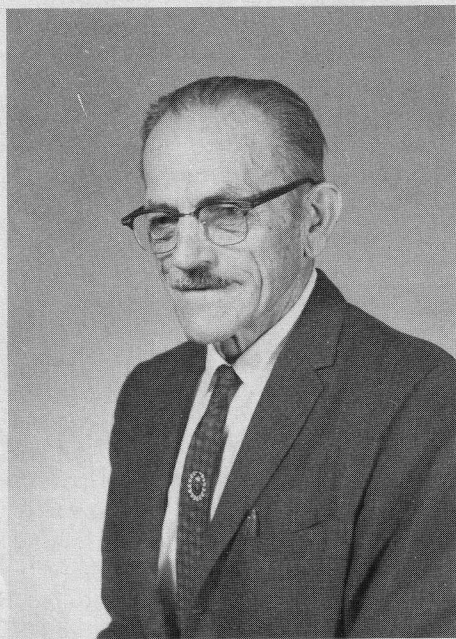
scape purposes into California, Arizona, Texas, Nevada and even as far as British Columbia. He states in a recent letter:

"Since working with palms my life really has been filled with most wonderful contacts with people here and in foreign lands, and many friendships that otherwise could never have developed have sprung up, not the least ones with my friends in The Palm Society."

With his wife Gertrude, he lives in a lovely home perched on a mountainside with a wonderful view of Los Angeles. They have one son and one daughter.

TREASURER — T. R. BAUMGARTNER

The Society's new Treasurer, T. R. Baumgartner, was born in Clinton, Indiana. He was educated in Clinton's public schools and then attended Kansas State Agricultural College from which he was graduated in 1921. He married Frances Sargent in 1920, one year before graduating.



In 1925, the young family moved to Florida and had hardly settled in when the state was hit by the 1926 hurricane, the end of the "boom" and the depression of the 1930's. With business at a standstill and jobs almost non-existent, Mr. Baumgartner had a difficult time feeding and educating his two boys and two girls. By dint of much hard work, the family survived, bought land in one of the best marl areas of greater Miami, and Tom became a true *baumgartner* (tree gardner in German). Green Acres Nursery has developed into one of the best sources of palms in southern Florida.

Mr. Baumgartner's hobbies, besides plants, are creative writing and horse-back riding, although he does not have much opportunity for the latter these days. With his wife, he is very active in the Baha'i faith. Besides being treasurer of The Palm Society, he is also treasurer of the Society's local group.

May 8, 1964 LUCITA H. WAIT

NOTES ON THE INTERNATIONAL PALM YEAR

This issue marks the end of the year in which members and others were asked to co-operate in an intensive program of the study of palm growth. Since the list of participants was published in July *PRINCIPES* (p 84), 5 more cards have been received bringing the total up to 70. These cards came from:

India — M. H. S. Murthy

Singapore — Botanic Gardens (H. M. Burkil)

South Africa — Pulick Gardens, Cape Town (A. Scheltens)

United States — Florida, Mrs. J. K. Williams

Western Samoa — B. E. V. Parham

A great deal of interest and co-operation has come from the West African Institute for Oil Palm Research, Benin

City, Nigeria. Figures from their records not only from the oil palm itself but from a variety of palms in their collection measured over the period 1953-58 have been made available and a new series of observations to coincide with the International Palm Year were begun. My attention has been drawn by Mr. C. W. S. Hartley, former Director of the Institute and his colleague, Mr. A. R. Rees, to a number of articles which deal specifically with growth of the oil palm and which are of significance to general aspects of palm growth. Attention may be drawn to two of these articles dealing with growth of palms which appeared during the Palm Year:

A. R. Rees and P. B. H. Tinker, "Dry-matter production and nutrient content of plantation oil palms in Nigeria. I Growth and dry-matter production" in *Plant and Soil*. 9 (1): 19-32, 1963 (August). A. R. Rees, "The apical organization and phyllotaxis of the oil palm". *Annals of Botany* (London), new series 28 (109): 57-69, 1964 (January).

Dr. D. H. Romney of the Research Department, Coconut Industry Board, Jamaica, has kindly offered to summarize his records of growth information of the coconut as a contribution to this scheme.

Leaving the commercially important palms, for which it is not surprising to find good records, it is hoped that participants will eventually assemble an equally significant amount of information for ornamental or non-commercial palms. Mr. Harrison G. Yocum of the University of Arizona has already sent records for 34 seedling palms watched over a period from March, 1963 to March, 1964 and is to continue these measurements for at least another year in order to obtain comparative data for studies in annual variation.

Records on a number of palms at Fairchild Tropical Garden continue to be kept.

Participants who have a year's observations are invited to send in preliminary data cards, if possible in the manner suggested in *Principes* 7:43, 1963. However, it is requested that measurements be continued for at least a fur-

ther year after the official end of the International Palm Year, if this is possible, in order that comparative data for two years becomes available. Assembling and interpreting the data is likely to take some time but it is hoped that a useful body of information will finally be available.

P. B. TOMLINSON

The West African Institute For Oil Palm Research

C. W. S. HARTLEY
Director 1956 - 1963

Palm oil has the unique distinction of being the commodity which replaced the traffic in slaves from the west coast of Africa. It was little known at the beginning of the nineteenth century and some quaint ideas were held by traders about the origin of the oil, some believing that it was drawn off from the roots. Almost immediately after the British prohibition of the slave trade in 1807 trading in palm oil from the coast became fully established.

British West Africa was slow, however, to recognize the need for research into the cultivation of its most important indigenous export crop. This may be attributed to three causes. Firstly, the products of the oil palm — palm oil and kernels — were supplied, apparently without difficulty, by a crop that grew in a semi-wild state and seemed to need no cultivation. Secondly, early British rule in West Africa was dominated by a paternal administration in which economic advance and the research that should precede or accompany it did not occupy a high place. Thirdly, in the slump of the late 1920's and early 1930's, it was expenditure on technical departments that was the first to be slashed.

The demand for vegetable oils in-

creased so rapidly from the beginning of the present century, and production from the palm groves, particularly in Eastern Nigeria and Sierra Leone, proved so great, that increased interest in the crop became inevitable after the first world war. Later, the laying down of successful plantations in the Far East and the Belgian Congo caused a sudden fear of serious competition and the West African countries were forced to consider their position. In fifteen years, exports of palm oil from Indonesia rose from a negligible quantity to around 230,000 tons per annum, not far short of double West Africa's production at that time.

In 1923, the Secretary of State for the Colonies appointed a committee to consider the best means of securing improved and increased production of oil palm products. Little came of this however and although successive West African Agricultural Conferences stressed the need both for measures to combat competition from the Far East and for research, it was not until 1939 that a research station was opened. A scheme for regionalising research on important export commodities was knocked on the head by the onset of the second world war.



47. A typical palm grove in eastern Nigeria.

It was fortunate for the future of research on the oil palm that a botanist — Mr. F. W. Toovey — had been appointed in 1935 and had worked in close conjunction with Mr. E. H. G. Smith who was the pioneer of oil palm investigations in Nigeria. Not long after the research station was opened at Benin, Mr. Toovey was sent to take charge and he was responsible both for the physical development of the station and the planning of future work. During the war little could be done, though a good deal of useful planting material was accumu-

lated and a few important field experiments were laid down. After the war, however, consideration was given to the recruitment of a suitable body of scientists at Benin, the incorporation of an inter-territorial institute to serve Ghana and Sierra Leone as well as Nigeria, and the financing of the necessary capital and recurrent expenditure. And so it came about that The West African Institute for Oil Palm Research was brought into being by the enactment in Nigeria of Ordinance No. 20 of 1951, which took effect on 27th September of



48. Harvester climbing a wild palm with two ropes.

that year.

For all practical purposes the Institute came into being on April 1st, 1952, at the beginning of its first financial year. It took over, as its Main Station with offices, library and laboratories, the Oil Palm Research Station 18 miles north of Benin, and it developed (near Abak) a Sub-station in the heart of the palm belt of Eastern Nigeria and opened a further Sub-station at Njala in Sierra Leone. It was governed, according to

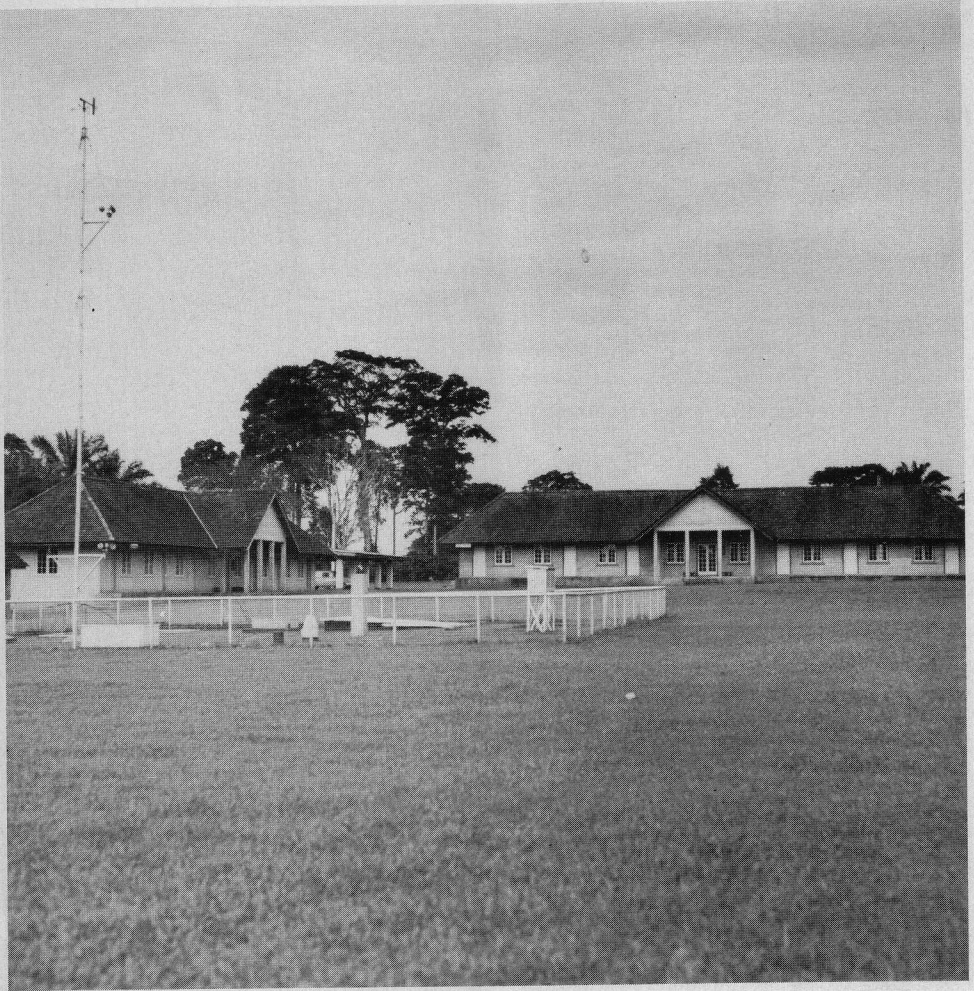
ordinance, by a Managing Committee appointed by the governments of the three territories — Nigeria, Ghana, and Sierra Leone — which, in proportion to the size of their oil palm industries, provided it with funds. It is always sound policy for an industry to support its own research. In the case of W.A.I.F.O.R., the funds, for the most part, came indirectly from the sale of palm products through the Marketing Boards operating in the countries concerned.



49. Road through the Institute's Main Station. Palms on left are 19 years old, those on right 5 years old.

The improving of the oil palm industry in West Africa bristled with problems. While many of these might be solved by simple field experiments, it was clear that many others would require investigation by specialists with up-to-date equipment at their command. Plans were therefore made well before the inauguration of W.A.I.F.O.R. to recruit research workers and equip laboratories for divisions of Agronomy, Plant Breeding, Physiology, Pathology, Soils, and later Nutrition and Process

Engineering. Meanwhile, however, a number of urgent agronomic problems presented themselves. In the first place, was the industry to depend on the groves, or did "improvement" imply the wholesale replanting of the groves, and the establishment of planted holdings large or small? Early grove replanting trials had not been very successful and yields compared very unfavorably with those from plantations in the Far East. Clearly all was not well with planting methods and plantation maintenance, and the



50. Agronomy and Plant Breeding buildings at the West African Institute for Oil Palm Research. Meteorological compound in foreground.

simple question "how should the palm be planted" needed to be answered.

Two courses of action were therefore taken. Firstly, several studies of the palm groves were started together with palm grove replacement trials; secondly, experiments on germination, nursery practice, transplanting, pruning and manuring were rapidly put in hand. At the same time, further collections of planting materials were being made.

Much of this early work, though of considerable value, failed fully to solve the problems of oil palm planting in West Africa, and the wisdom of allowing for the establishment of the more specialized divisions became apparent. Satisfactory germination techniques were not discovered until work on the physiology of germination had been undertaken over a period of many years. Nursery practices were shown to need far more detailed study than had been contemplated



51. Pre-nursery raised concrete trays with seedlings spaced at 3 inches apart being watered from an overhead spray line giving a fine mist spray.

and the co-operation of the Agronomy, Plant Pathology and Physiology divisions was needed. Further considerable improvements were made in transplanting techniques. As to manuring, it was found that, although West Africa was the home of the oil palm, the planted palm almost everywhere suffered from nutrient deficiency diseases, while the incidence of pathogenic diseases was seen to be connected both with levels of nutrition and genetic constitution.

Germination

Prior to 1952, various types of heated germinator had been designed and the seed was germinated in charcoal-filled boxes. Germination was erratic and often continued for a period of nine months. Fundamental research was then undertaken on the physiology of germination and the effects of temperature, moisture content and oxygen supply were determined. From the knowledge obtained, a new method was developed.



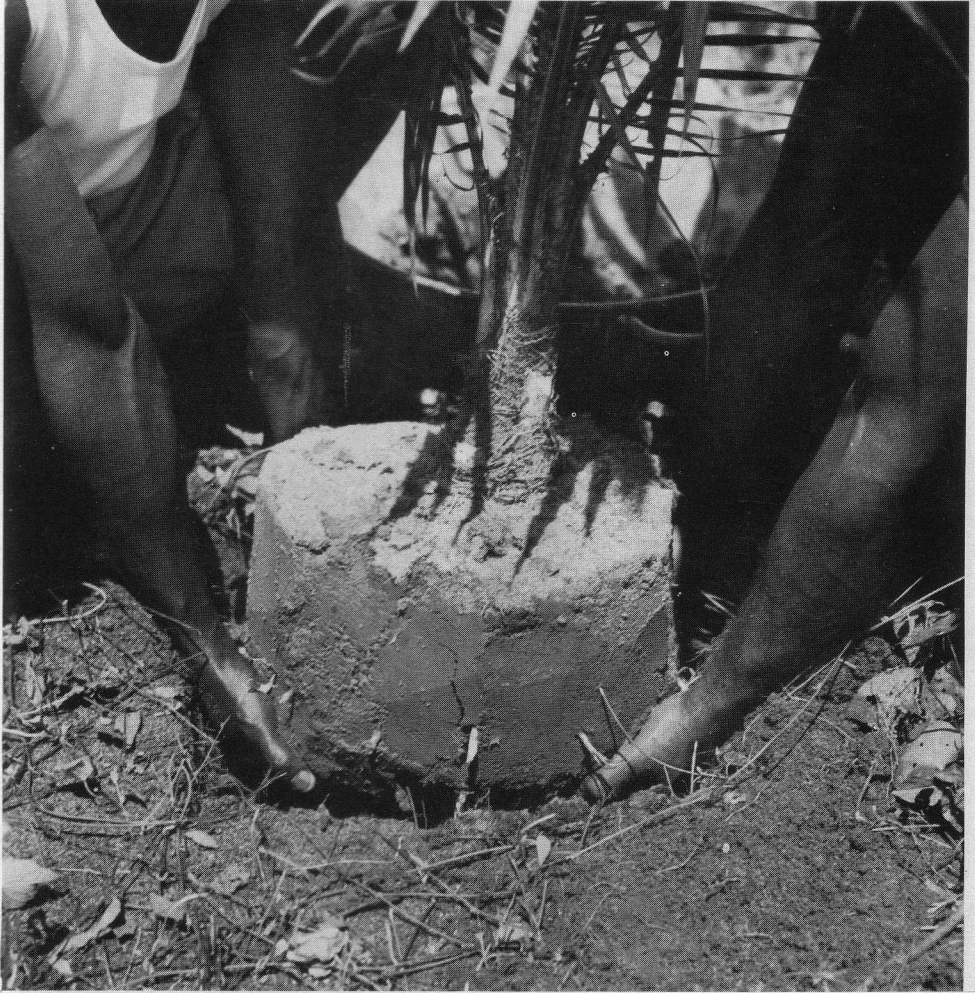
52. Young nursery seedlings mulched with bunch refuse and irrigated.

Dry seed is pre-heated at 39.5°C in polythene bags for 80 days and then cooled and brought to the correct moisture content. Germination then takes place over a period of about two weeks and leads to the production of large quantities of uniform seedlings.

Nursery techniques

The raising of oil palm seedlings in pre-nurseries and nurseries was an uncertain undertaking. Deaths from anthracnose at the beginning of the nursery season were common while blast

disease took its toll at a later stage. Plants were unthrifty and often appeared to stand still in the middle of the rains. Exhaustive experiments were undertaken which covered cultural practices, manuring, irrigation and disease control. The causes of blast were diagnosed and its relation to climatic factors established; leaf diseases were brought under control. As a result, large and robust transplantable seedlings became available two months earlier than hitherto and a special "dry-season" nursery was developed which provided seedlings in a shorter



53. Planting a one-year-old palm seedling in the field.

period though later in the planting season.

Planting in the field

In transplanting an oil palm seedling to the field, a large ball of earth has to go with it. It has been shown that if root cutting about one foot around the seedling is done four to five weeks before transplanting, not only does the plant get a better start in the field but the ball of earth is held together by the mass of roots which develop within the

ball as a result of the cutting. Plants treated in this manner develop more rapidly after planting.

Maintenance of a plantation

Maintenance is usually carried out by hand labour and consists, in West Africa, of a close "ring cutlassing" around the palms and a slashing of the undergrowth to about one foot above ground level between the rows of palms. This is expensive work and efforts have been made to substitute control by me-



54. A field of uniform 4½-year-old palms at W.A.I.F.O.R.

chanical means or by weed-killers or by a combination of the two. This work is in its early days. With mechanization, a number of difficulties have to be overcome. In the first place, for mechanical maintenance to be successfully practiced the plantation needs to be on flat or gently undulating land and this land must first be cleared of timber and the majority of stumps; secondly, for the years when the palm leaves meet but are not yet high off the ground, a tractor cannot move easily through the field. A

specially protected tractor has been designed for this work.

Pruning and harvesting are operations which can be considered together. If, on the one hand, a palm is not pruned, harvesting becomes difficult and expensive; on the other hand if a palm is over-pruned, bunch yield is reduced. Several pruning experiments have shown the danger of over-pruning and the minimum pruning of leaves during harvesting of bunches combined with one or two rounds a year of pruning withered leaves is recommended.



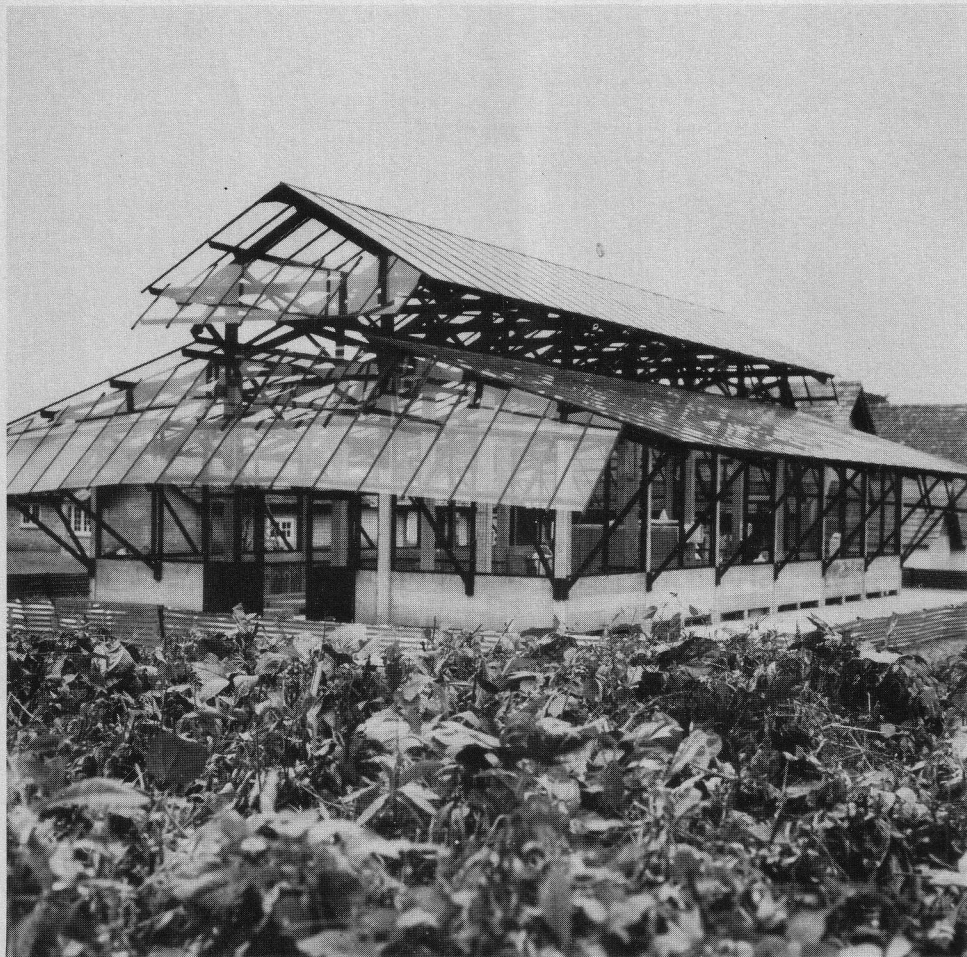
55. Prototype of specially equipped tractor for inter-row cultivation.

Oil Palm Nutrition

The Institute set up a special Nutrition Laboratory for the study of deficiency symptoms and the carrying out of leaf analysis. Leaf analysis in the oil palm presents several problems and needs to be carried on in conjunction with fertilizer experiments. The Institute's Agronomy division has a very extensive programme of fertilizer experiments on the main soil types of West Africa, and responses to potassium, nitrogen, magnesium, and phosphorus have been obtained. Of particular interest in

oil palm nutrition are the potassium/magnesium antagonism and the positive interaction often obtained between potassium and phosphorus, and potassium and nitrogen. The study of soil analysis in conjunction with fertilizer experiments has also been fruitful on the acid sand soils of southern Nigeria.

All this work has shown that the use of fertilizers in the right proportions is essential for the profitable cultivation of the oil palm in West Africa and that economic responses are easily obtained. The present large series of experiments



56. The Nutrition Division glasshouse at W.A.I.F.O.R. A special design for tropical use developed in Malaya.

is designed not only to determine interactions between nutrients but also to find the most economic rates of application and the best time to apply. Trace elements are included in the design of some of these experiments.

Selection and Breeding

Serious breeding for production in the oil palm dates from the discovery, by Belgian workers, that the thin-shelled *tenera* fruit form is a hybrid of the thick-shelled *dura* and the shell-less

pisifera forms. Until recent years the Institute's seed production contained *dura* × *dura* and *dura* × *tenera* seed as well as the *tenera*-producing *dura* × *pisifera* seed. For about five years, however, only the latter seed has been produced and production has been stepped up from around three million to eight million seed annually.

Breeding for the production of high yielding and good-quality hybrids is a slow and complicated process, a description of which would need much more



57. A well developed and productive four-year-old palm.

space than is available here. A paper outlining the W.A.I.F.O.R. programme and describing breeding in other parts of the world is now in the press. Briefly the aim is to breed *dura* and *pisifera* palms which when crossed will provide *tenera* progeny of good fruit quality and high bunch yield. Quality is indicated by bunch composition, i. e. the ratio of mesocarp, palm oil, shell and kernels to bunch. Palm oil is borne in the mesocarp and the proportion of oil to mesocarp itself varies and is a selection criterion. Moreover it is possible to select

for high kernel at the expense of mesocarp or vice versa, low shell content being of course a desideratum in either case.

Breeding for seed production has hitherto been from individual *dura* of good performance and quality and from *pisifera* of unknown potentiality. Increasingly, however, seed is being produced by parent palms, whether *dura* or *pisifera*, proved by their progenies' performance or chosen from within good progenies. In this way higher grades of extension work seed, as it is called, have been produced and issued.



58. Seedlings from "extension work seed" ready for planting out.

Growth, Development and Flowering of the Oil Palm

The growth and development of the oil palm and its flowering habits vary very greatly from one locality to another and one progeny to another. Rapid growth means early production, while flowering habits will largely determine single factor in the latter is sex ratio — the proportion of female to total inflorescences. Physiologists, Agronomists and Plant Breeders at the Institute have been studying growth and flowering in re-

cent years. Much new knowledge has been gained. In the first place it has been shown by growth analysis that the palm's net assimilation rate is surprisingly low. Secondly the effect of climatic factors on sex-ratio and annual yield have been studied and the concept of "effective sunshine" has been developed from rainfall-sunshine yield studies. This leaves little doubt that the large yield differences between the Far East and West Africa are mainly due to differences of climate.



59. Young palms growing between lines of yams (*Dioscorea*)

Studies of the Natural Palm Groves, and their Replacement

The research work of the Institute, as briefly described above, will be of little value to West Africa if a serious attempt is not made to modernize oil palm planting and production. Detailed studies have been carried out on the groves, their development, production, economy, etc. The story of the groves has so far only been partially related and much more information will shortly be available. The conversion of the

groves into stable economic plantations efficiently controlled by the agrarian population will be a formidable task beset with social and political as well as economic difficulties. The Institute is assisting firstly by providing the high quality seed required and secondly by carrying out, after experiment, the replanting of its own and leased groves. At the same time, trials of the planting of oil palms in combination with the growing of food crops or the raising of livestock are in progress on the Insti-



60. Nsama cattle grazing on elephant grass (*Pennisetum purpureum*) between rows of palms.

tute's stations. These lines of work should be of special appeal to a peasant community. Food crops can be grown between the palm rows in the early years without detriment to the palms if certain precautions are taken. Cattle have been successfully grazed on elephant grass between widely spaced rows of palms.

Processing

Processing of fruit bunches entails the removal of fruit from the bunch, ex-

pression of oil from the mesocarp and extraction of kernels from the nuts. In peasant areas, the means used for removal of fruit from the bunch is hand picking after storage for a few days; for expression of oil, the fruit is boiled, mashed in a mortar and the oil is skimmed off after the mashed mesocarp has been boiled in water; for extraction of kernels, the nuts are hand-cracked one by one by women. A hand-operated curb type or screw-press was successfully introduced into the palm grove areas,

but this only increased the efficiency of oil extraction from around 45 per cent to less than 65 per cent of the available oil. A cheap type of mechanical mill — the Pioneer mill — has also been introduced but this has, for a number of reasons, proved an economic failure. Recently, an hydraulic handpress has been devised as a substitute for the screw-press, but it is too early to say how successful it will prove. While the hydraulic press gives a higher extraction rate than the curb-press it must be operated with a set of equipment which has been specially devised at the Institute. There is little doubt that the system can be operated very efficiently, but it remains to be seen whether it will take on in the villages.

For cracking nuts, a number of small crackers driven by petrol engines have been put on the market, but they have not been adopted in great numbers.

The poor bleachability of oil from West Africa has given cause for concern in recent years and the factors respon-

sible for this are under active investigation.

The history of W.A.I.F.O.R. and a brief outline of the problems it has been tackling have been given above. It is disappointing to have to report that, following the attainment of self-government by the three territories served, it proved impossible to obtain agreement on the running of W.A.I.F.O.R. as a joint enterprise. The Main Station near Benin has thus reverted to Nigeria and the Sub-station in Sierra Leone has been taken over by the government of that country. The international character of the Institute has disappeared and, as a result, there will once more be staffing difficulties for a period of time. There is every hope, however, that the Nigerian portion of the Institute will be rebuilt on a sure foundation and that its vital work for the principle crop of the country will continue.

The results of the Institute's work have been faithfully recorded in its own Journal, the fourth volume of which is now in process of publication.

On The Etymology Of The Word Cocos

C. X. FURTADO

Singapore

Many explanations are given to account for the etymology of both the Portuguese word *coco* meaning "coconut" and the botanical name *Cocos* L. denoting a palm genus. The view widely current is that the root of both these words is the same and that the Portuguese who applied "*coco*" to the coconut, certainly did not derive it from the Latin *cocum* or *coccus* or the Greek *kokkos*. But De Candolle (1855) disagreed with this view. He regarded these two names as having two distinct roots; and what-

ever may be the origin of the *coco* in Portuguese (and he admitted the possibility of its having come from a Mexican word), De Candolle maintained that it is unrelated to *Cocos* L., which he derived from the Latin *coccus*. In support of this contention, he gave two mid-Seventeenth Century quotations where "*palma indica coccifera*" and "*palma coccus ferens*" occur. Beeler (1960), on the other hand, made *Cocos* L. to come directly from the Portuguese and Spanish word *coco*, but he derived the

latter from the classical Greek and Latin words mentioned above; and though the Portuguese and Spaniards applied *coco* to the fruit only, Beeler stated that they applied it to the palm-tree. Cook (1901 & 1910), who advanced a plea for the American origin of the coconut, made the word *coco* Amerindian in origin, brought from America to Europe by the Spaniards for its adoption finally into the systematic botany as *cocos*. A brief survey of the problem of the etymology of the word *coco* and *cocos* might not be without interest to the readers of PRINCIPES.

Early Arab traders in India and other visitors were attracted to the coconut (fruit) not only because of its many uses, but probably because of the refreshing and uncontaminated drink it furnished the weary travellers, and also its important value in its ripe state to the sailors of long distances as food and water in emergency. They wrote about the palm in detail, but they referred to it merely as the tree that produced "the Nut of India" in their own language or adopted some variants of *narel* or *nariel* as used to denote the fruit on the Konkan coast of India.

There was an abrupt change among the Europeans, however, when the Portuguese came to India and began to call the "Nut of India" *coco*, a name soon passed on to the Spaniards and later to other nations in Europe and elsewhere.

The first use of the word in this sense has been traced to the *Roteiro* (1498-1499), the Logbook of Vasco da Gama's first voyage to India. While returning from Calicut, De Gama's party met, near the island of Angediva off Goa, an Arab boat which they seized. It contained, among other things, the palm "*coquos*", a term plural in form with its singular as *coquo*, spelt also as *quoquo* but more elegantly as *coco*. Da Gama's *Roteiro*

did not explain the reason for using this word or give its etymology; and the name did not agree with any of the words used in Malabar either by the indigenous peoples or by the Arab traders. But Da Gama's sailors must have given the reasons verbally to the people on their return to Lisbon where they had taken many samples of coconuts with them; for soon the Portuguese merchants and officials who came to the East began to use the word in their writings and letters as if it were a common term in the language. Etymological explanations then followed in Portuguese and other languages in Europe as to why the word *coco* was adopted to denote the "Nut of India." Thus Barros (1553), who in his *Decadas Asiaticas* wrote digests of the information gathered about Asia, gave the following explanation:

"This peel . . . is somewhat acute making it look like a nose placed between the two round eyes through which the sprouts come out on germination; because of this semblance of a face, even though it was not a real one, our men gave it [the fruit] the name of *coco*, this being a term applied by our women to anything with which they try to frighten children; and this name stuck, because nobody knew any other, though its proper name is *tenga* among the Malabarese and *narle* among the Kanarese [Goans]."

However, it appears that previous to its use by the Portuguese for the coconut, *coco* meaning "ape" had not become a dignified word in Spain or Portugal so as to be included in literature and dictionaries, a reason why it has not been found recorded in the books of those times. Covarruvias (1611) explains in his glossary of the Spanish language, that the name *coco* is given to the ape by the common people, because, when disturbed, it makes guttural sounds

koko, from which came the name *coco* and the verb *cocar*.

The etymology of the word *coco* given by the Portuguese was, with one exception, widely accepted for over three hundred years, and it was also explained in some languages of Europe. Unfortunately, the Portuguese and the Spanish medical men who gathered a good deal of information on the medicinal plants of India and America, wrote their accounts in either Spanish or Portuguese, so that their works were not easily accessible to the medical men of other countries in Europe when the Latin was the language of the educated. These works were therefore abridged and translated into Latin by people from other countries and in so doing the word *coco* was generally latinized as *coccus*. Some botanists of the mid Seventeenth Century who wished to systematize knowledge about plants, adopted therefore the word *coccus* and "palma cocoifera" without being aware that the correct spelling should have been *cocus* or *cocos* and the palm might have been better described as "palma nucifera" as J. Bauhin (1650) had already done. The word *coccus* was also adopted in some accounts in Latin but rarely *cocus*.

In 1741 Rumphius, who wrote an extensive account on coconut and its uses and varieties, condemned the use of *coccus* and implicitly also *cocos*, in place of *cocus* for the *coco*. He showed that *cucus*, *cucas*, and their variants adopted to indicate the fruits of the Ethiopian and Egyptian palm called by Pliny and Theophrastus as *Cuciferus* and *Cuciophorus* respectively, were totally different from the *coco*. But curiously enough he maintained that the Turks called the coconut *cock-indi* and that this word passed through the peoples of North Africa and Spain to Portugal to become *coco*.

Yet he must have been aware of the fact that the coconut was hardly known even in commerce, much less in cultivation, to the people in Turkey and the peoples of North Africa and the Iberian Peninsula. Philologists, too, have been unable to find a Turkish word corresponding to *cock-indi* (vide Yule, 1886, and Conde de Ficalho, 1891). It is probable that the Turks who furnished the information to Rumphius were already influenced through the writings of the Italians, Portuguese or others who had adopted the word *coco* for the "Indian Nut." Moreover none of Vasco da Gama's party could name coconuts when, on their route to India, they found the palm and its fruits in Melinde on the east coast of Africa. They recognized the tree as of the palm category, but being totally unfamiliar with the fruit, they described its large size and the peculiar taste of its kernel without naming it. Had Rumphius' views regarding the origin of the word *coco* been correct, the nut could have been merely named in the *Roteiro* without any description, and not left unnamed after giving its description.

In fact there is no evidence whatsoever that the Spaniards knew of the word *coco* palm or fruit of India before Vasco da Gama's party had taken the coconuts to Europe in 1499. Further, all the early Spanish writers are unanimous that the Portuguese gave the name *coco* in India and brought it to Europe. This therefore disposes of Cook's theory that the word *coco* was first brought by the Spaniards to Europe from America, and also goes to add a further weight to the refutation that the *coco* had come to Portugal from Turkey via Egypt and Spain.

Linnaeus, who only in 1753 was able to consult Rumphius' *Herbarium Amboinense* (Richter, 1840), was evidently provoked to consider the question of the

correct form of latinizing the Portuguese *coco*. No doubt Clusius (1574 & 1582), when latinizing *coco* into *coccus*, had not omitted, in his translations, to give the etymology of the term as stated by Da Orta (1563) and Da Costa (1578). Despite this, however, *coccus* was a homonym of the earlier *cocum* and its variant *coccus*. The last terms, though originally taken from the Greek *kokkos* meaning berry, were applied by the early Romans not to any kind of berries, for which they had other adequate terms, but only to the "scarlet berries" producing "scarlet dye," which eventually were identified to be "kermes insects." As such *cocum* gave rise to the adjectives *coccineus - a - um* and *cocciferus - a - um* meaning "scarlet" and "carrying or bearing kermes insects" respectively. Thus *Ilex coccifera* of Camerarius (1586) and *Quercus coccifera* L. (1753) meant that these plants bore on them the "kermes insects," a fact that could have been also expressed in Latin as *Ilex* or *Quercus* "coccus ferens." On the other hand, when *coccifera* and "coccus ferens" were applied to describe a palm in the Seventeenth and Eighteenth Centuries these expressions did not refer to the kermes insects or scarlet colour, but meant that the palm produced nuts called *coco* in Portuguese only.

Linnaeus, therefore, had to admit that Rumphius had good grounds for objecting to the use of *coccus* for the Portuguese *coco* if ambiguities were to be avoided. However, *cocus*, preferred by Rumphius, was in no way better, since it might mislead some to connect the Portuguese *coco* and *coquo* with the Latin *cocus* and *coquus* meaning "a cook." In face of such difficulties Linnaeus eliminated the equivocation both by rejecting *cocus* and *coccus*, although he had employed the latter in his several books issued between 1736 and 1752,

and by adopting *Cocos*, the Greco-Latin form of the Portuguese *coco*, to denote not the fruit but the tree and so feminine in gender, with *Cocos nucifera* as the type-species. Thus the gender, the meaning and the spelling, all stress the fact that *cocos* has no etymological relationship with any classical word in Greek or Latin as its earlier synonyms might have suggested.

It is evident therefore that De Candolle (1855) did not consider the problem adequately and so he erred in upholding the classical derivation for *Cocos* L. (1753), when that derivation could not be sustained even for *coccus* as employed previously to denote the coconut.

Bartlett (1927), after a visit to the Indonesian islands, propounded a new hypothesis based partly on unsupported assumptions and partly on anachronistic arguments. The Dutch had found that the word *kokur* (spelled in Dutch as *kokoer*) denoted coconut in Sumba, an island south of Flores and west of Timor, in both of which places there are communities that speak Portuguese in the patois form. Though the Dutch scholar Heyligers (1889) marveled at the unique and widespread influence of the Portuguese on the main Indonesian languages so as to reveal numerous vestiges even in his days, Bartlett did not hesitate to discount that *kokur* is an adaption of any "europeanized" word. However, he assumed readily that it might be either a pure Arabic word established there by the Arab traders, or an Arabic word transformed by the peculiar phonetic system of the Indonesians to become *kokur* or *coco*. In other words, he believed that it was not a native but "naturalized" word. It is to be noted that this word *kokur* is found only in Sumba and Bartlett did not mention any other place in the vast Indo-

nesian archipelagos where this word or its variant occurred to denote the coconut. From this assumption he argued so skillfully that the flaws are not easily detected unless one sees in these arguments two distinct but alternative hypotheses. It is worth re-stating Bartlett's arguments in a simpler form to judge their invalidity:

1). If *kokur* or *coco* is a pure Arabic word, then the Arab traders must have carried the word along their trade routes also to India and Africa; and so "Vasco da Gama must have had the word from the Arabs, whose trade routes he followed." But Bartlett failed to show that any word like *coco* was in fact being used by Arab traders in Africa and India, or even in Indonesia. And this is a serious flaw in the theory, since many investigators previous to Bartlett, including Rumphius quoted by him, had failed to find any such word used by the Arab traders in Asia and in their own native Arabia.

2). The other argument is that the Arabic word like *jauz* or another might have been transformed by the Indonesians to become *coco*. When the Portuguese visited these islands (i.e. Timor, Flores and Sumba) in 1511, "this (word) the Portuguese might have seized upon, from among many names for *coco* they certainly heard, because of its coincidence with their name for monkey face." Yet he quoted evidence to show that *coco* was already recorded in the *Roteiro*, the Logbook of Vasco da Gama's first voyage to India for the year 1498-1499!

In the first alternative the factual evidence is against the theory, and the second is vitiated by an anachronism. In the second alternative there was no need to assume that the word was of Arabic origin evolved by the Indonesian phonetic system, for had it not been for the

anachronistic disparity, the theory could have been validly advanced even if the word were purely indigenous.

The Portuguese could have coined the word in India from the Latin or Greek root though Beeler himself had not brought anything in support of his view. However, such assumption seems contrary to the practice generally followed by the Portuguese discoverers of the Fifteenth and Sixteenth Centuries. Usually they adopted names with some variations to suit the Portuguese phonetic system. Thus we have *ananas*, *papaya* and *caju* from America and *manga*, *jaca*, *areca* and *jambo* from the East. In some other cases they adopted the Portuguese names to designate what appeared to them a special form of fruits or condiments already known in Europe; and so they have *figo da India* (Indian fig) for banana, *pera da India* (Indian pear) for *guyaba* or *guava* of Mexico, *assafrão da India* (Indian saffron) for turmeric. It is difficult to find a word created by the Portuguese discoverers by resorting to the classical language. Further, as Conde de Ficalho (1891) remarks, it seems very unlikely that the rough companions of Vasco da Gama would have resorted to the classical language in order to produce a new name for a palm which had already widely current local names. And would they reject a widely current name in the locality for an Arabic or Arabo-Indonesian one unless there were special reasons for doing so? In the case of *tamarinho* or *tamarindo* (tamarind from *tamara-ind*) even the Portuguese must have been deceived into thinking that it was a date (*tamara* in Portuguese, Arabic and Persian) only to be disappointed by its sour taste; besides the word was already current in Europe even before Vasco da Gama's first voyage to India, since tamarind was administered by the apothecaries

and shippers in Europe as a laxative or purgative.

The exception in using *coco* in place of the local names was obviously involuntary. The peculiar resemblance of the husked coconut to a face of an animal must have astonished Da Cama's sailors and induced them to bring to the ships the husked nuts to be introduced to their companions jokingly as something to be scared of — *coco*. Through repeated jests the word would become current among them and so it would be easier to use it everyday, and more expressive too, to indicate the coconuts than the Malabar *tenga* which was also new to them.

In short there are strong reasons to support the widely current derivation given to the word *coco* by the early Portuguese and Spanish writers who were contemporaries of Vasco da Gama. This means that the word *coco* as applied to coconut has to be accepted as of Portuguese origin meaning an ape or bugbear, that it was applied first by the sailors of Vasco da Gama to the coconut (fruit) and that, in deference to this etymology, Linnaeus rejected his own misleading *coccus* and adopted *cocos* as the generic name for the palm, making it differ widely in spelling and gender and meaning from the former.

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