est climate of any city in Idaho in spite of its location in the northern part of the state. The elevation is only about 750 feet above sea level. It is jokingly referred to as the 'Banana Belt' by students at the University of Idaho in Moscow (at about 3,000 feet), but it still has a great deal of cold weather for palm growing. It gets down to −15° F. often enough that this is not considered unusual."

* * *

On the evening of January 23rd members of the Palm Society living in Greater Miami and members of Fairchild Tropical Garden had the great privilege of hearing Dr. H. E. Moore, Jr., Director of the L. H. Bailey Hortorium, Cornell University, and editor of PRINCIPES, describe, with exciting slides, his recent search in many lands for new and/or little-known palms. Visits to Madagascar, Borneo, New Guinea, northern Australia, Fiji, New Caledonia and other places yielded a number of new or "lost" palms, about which very little has been known. Now that their pictures have been taken, their pollen gathered for chromosome study, herbarium specimens made, structure studied and in some cases seeds gathered and germinated, they eventually will become better known. Dr. Moore paid dearly for these palms, with a severe leg infection and a bout of malaria. We are most grateful to him for his work, and for sharing his experiences with us.

* * *

Early numbers of PRINCIPES are either out of print or rapidly becoming so. Libraries of universities and botanical institutions, as well as individuals, often want to complete their sets, and it is distressing to have to tell them this is no longer possible. Once in a long while a precious back number or two comes in, and a need is met. I have placed a note in my complete set of PRINCIPES, asking that if anything should happen to me the set should be turned over to The Palm Society, for use by some library or qualified person. Perhaps some of you fellow-members might care to do the same.

LUCITA H. WAIT

Palm Chromosomes by Air Mail*

ROBERT W. READ

Botanist, Fairchild Tropical Garden, Miami, Florida

Chromosome numbers have previously been determined from root-tip cells, from certain other meristematic regions of the plant, from microsporogenesis, or from cells cultured in artificial media. Thus work was usually limited to the availability of seedlings or mature specimens growing in a botanical garden or arboretum collection. Because of the limited number of palm species available in cultivation (the 410-450 species of palms at the Fairchild Tropical Garren represent 17 per cent of the palm family or less), and because a technique for studying palm chromosomes at pollen tube mitosis has been successful (Read, 1964), an attempt was made to utilize pollen sent from distant parts of the world for processing in the laboratory at the Fairchild Tropical Garden. The tropical habitat of most palms and their special growth requirements have heretofore limited the study of palm chromosomes on a large scale.

The first success was achieved by us-

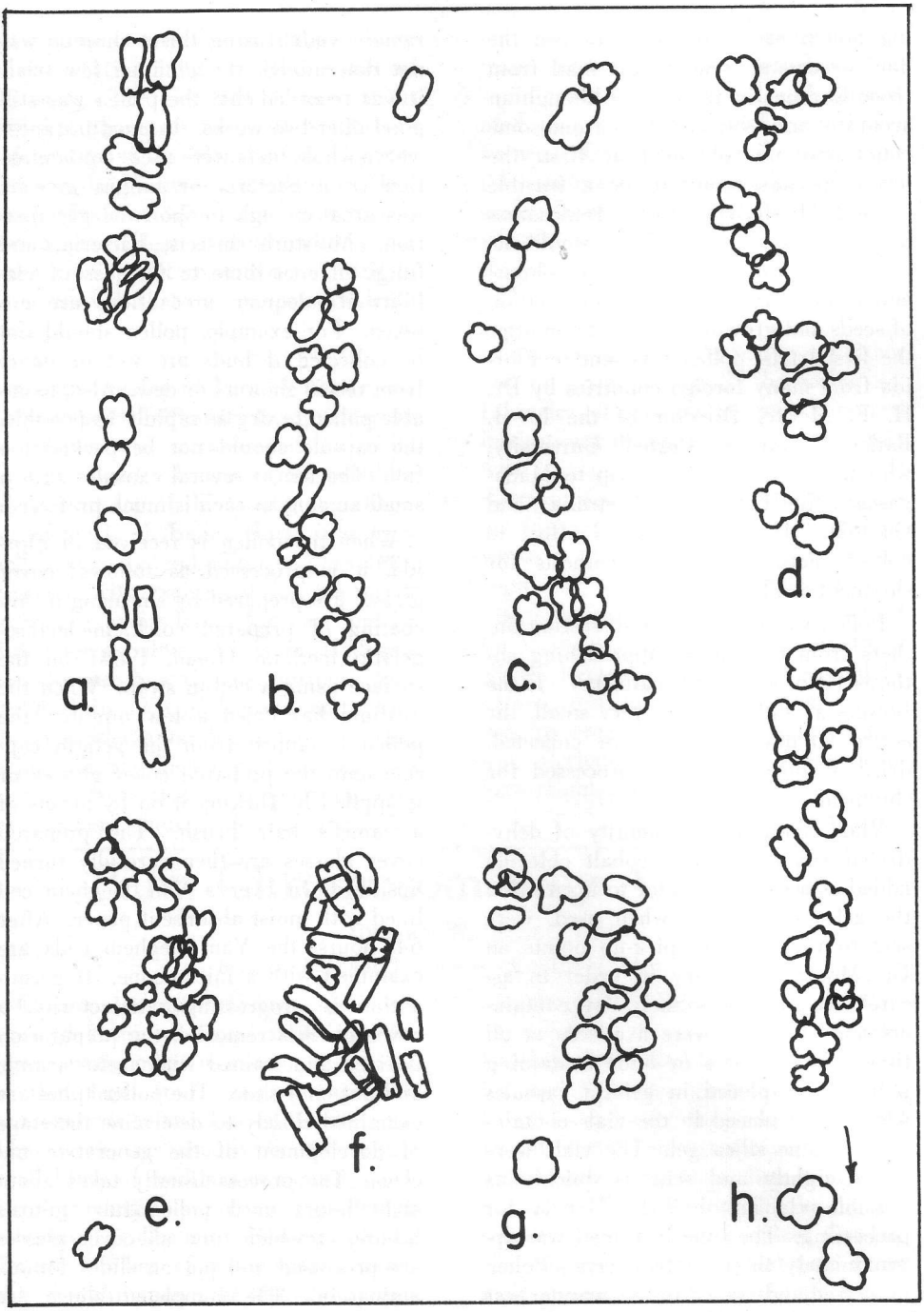
*From work related to a project supported by National Science Foundation Grant number GB-1354.

ing pollen of *Lodoicea maldivica*, the double coconut, sent by air mail from Hope Gardens in Jamaica. Although an accurate and satisfactory chromosome count was not obtained at first, the technique was found to be a feasible method of studying the chromosomes of palms growing where they would ordinarily be inaccessible to the cytologist and without waiting for the germination of seeds and growth of roots. Soon after the first trials, pollen was sent to Florida from many foreign countries by Dr. H. E. Moore, Director of the L. H. Bailey Hortorium, Cornell University, who was on a collecting trip to Madagascar, the Far East, Australia, and Oceania. He made a special effort to collect mature pollen at anthesis for shipment to Florida .

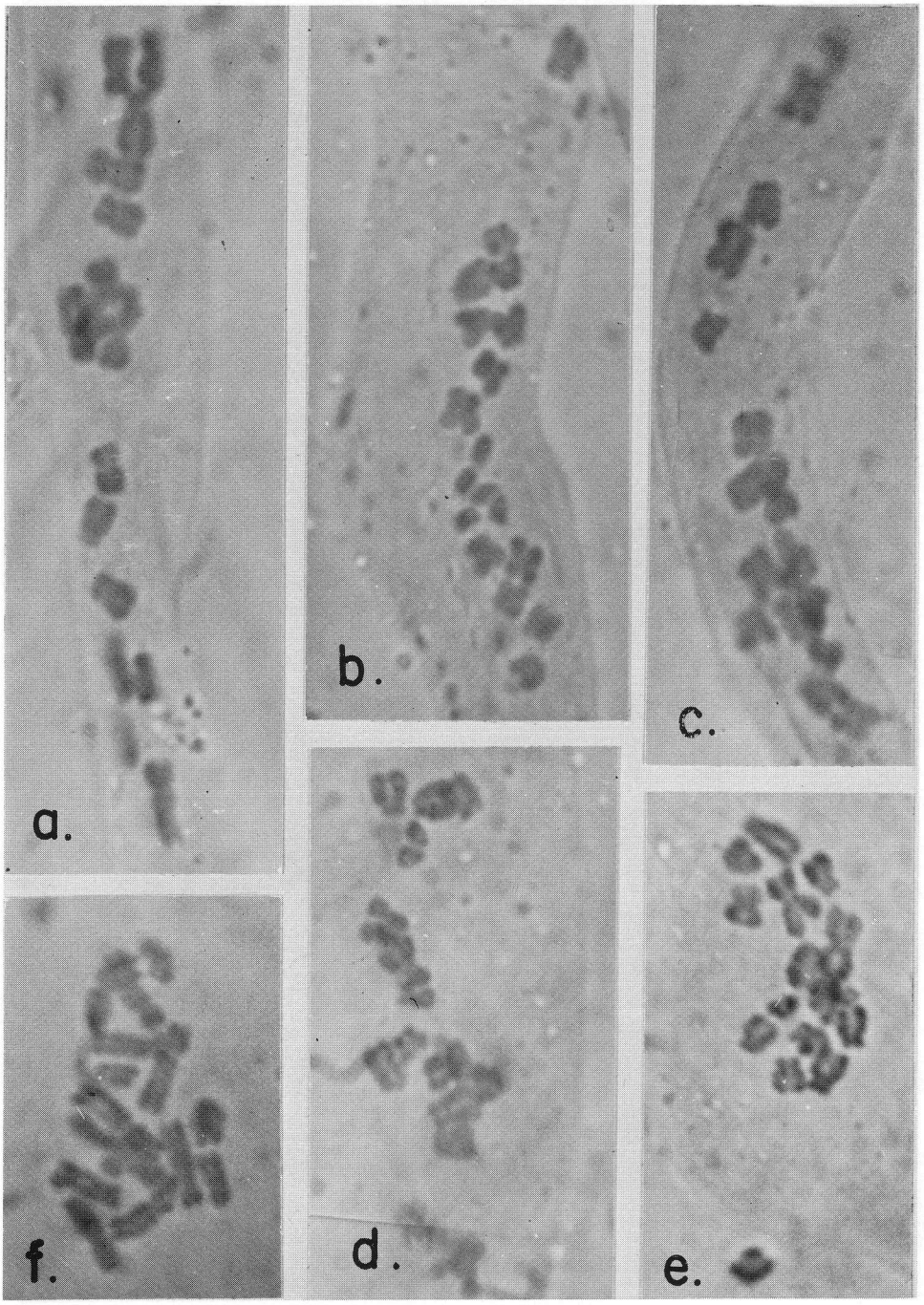
Pollen was collected by dissecting anthers from buds at or approaching anthesis (if of sufficient maturity). If the flowers at anthesis were very small, the entire staminate buds were collected, dried a short time, and processed for shipment.

Vials containing a quantity of dehydrated silica gel, with cobalt chloride added as a color indicator to insure that the gel was still dry when used, were sent to various mail pick-up points on Dr. Moore's itinerary in order to assure that fresh, absolutely dry containers and silica gel were available at all times. The anthers or buds containing pollen were placed in gelatin capsules which were placed in the vials containing the blue silica gel. The vials were sealed tightly and sent as quickly as possible via air mail to Florida for processing. The time in transit was approximately three to five days. Pollen processed and mailed in this manner was found to be viable and to germinate readily, producing excellent results. The maximum length of time that pollen will remain viable using this technique was not determined, though in a few trials it was recorded that the pollen was still good after two weeks. In most instances where whole buds were used, contamination from bacteria or fungus mycelia was great enough to spoil the germination. Moisture, insects, bacteria, and fungi all contribute to the loss of viability if adequate precautions are not taken. For example, pollen should not be collected if buds are wet or damp from recent showers or dew. Also, to enable pollen to dry as rapidly as possible, the capsule should not be packed too full. The use of several capsules with a small amount in each is much preferred.

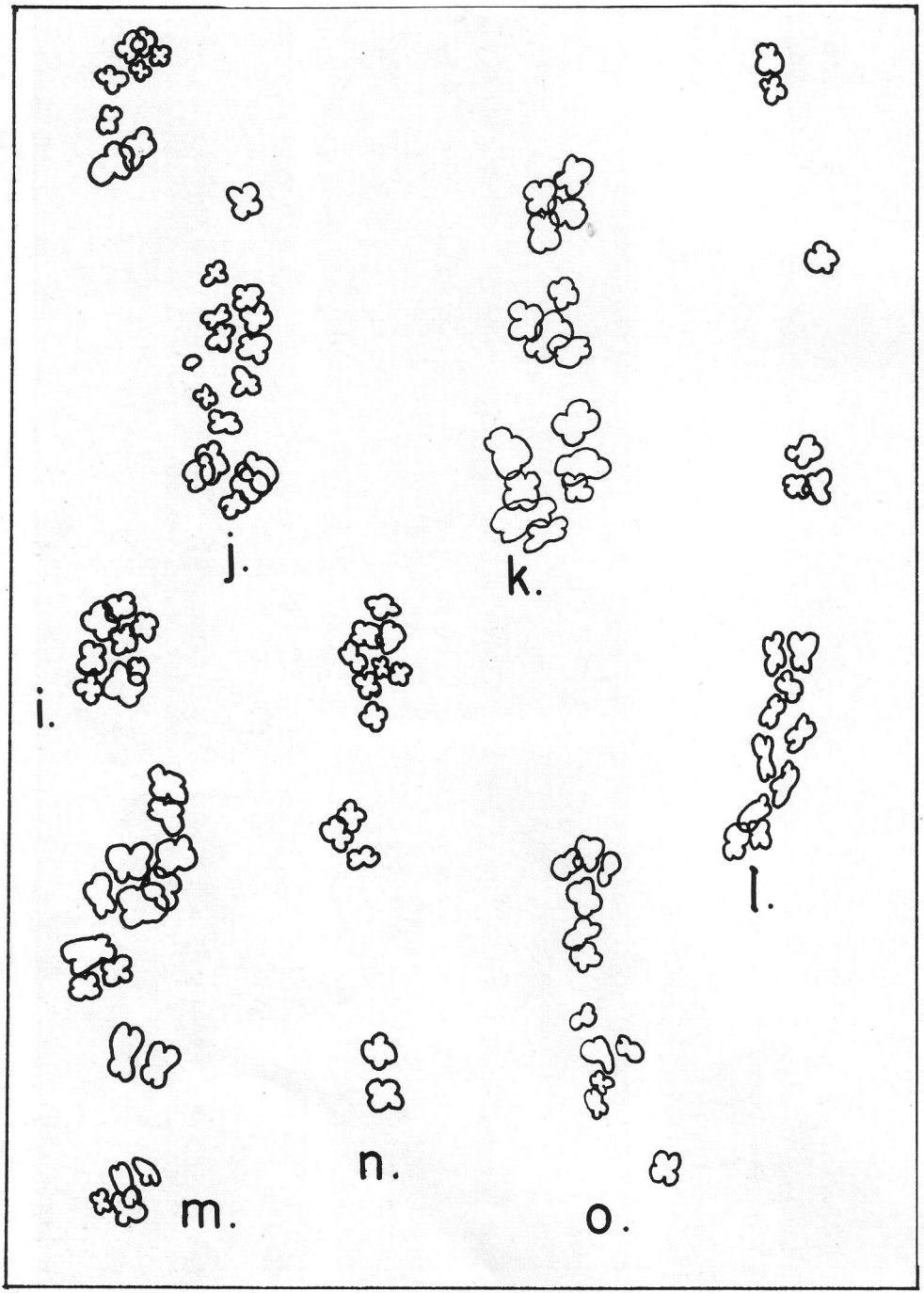
When the pollen is received in Florida, it is processed as follows: cover glasses are prepared by smearing a thin coating of prepared colchicine-lactose-gelatin medium (Read, 1964) on the surface using a cotton swab. When the medium has dried a few minutes, the pollen is tapped from the gelatin capsule onto the prepared cover glasses or is applied by flicking it on by means of a camel's hair brush. The prepared cover glasses are then carefully turned upside down over a Van Tieghem cell lined with moist absorbent paper. After 6-8 hours, the Van Tieghem cells are examined with a microscope. If germination is progressing satisfactorily, a cover glass is removed, the preparation is fixed and stained with aceto-carmine and put on a slide. The pollen tubes are examined closely to determine the stage of development of the generative nucleus. The process usually takes about eight hours until pollen tube mitosis occurs, at which time all cover glasses are processed and put on slides for examination. The completed slides are made permanent by means of a vapor transfer method described in an earlier paper (Read, 1964).



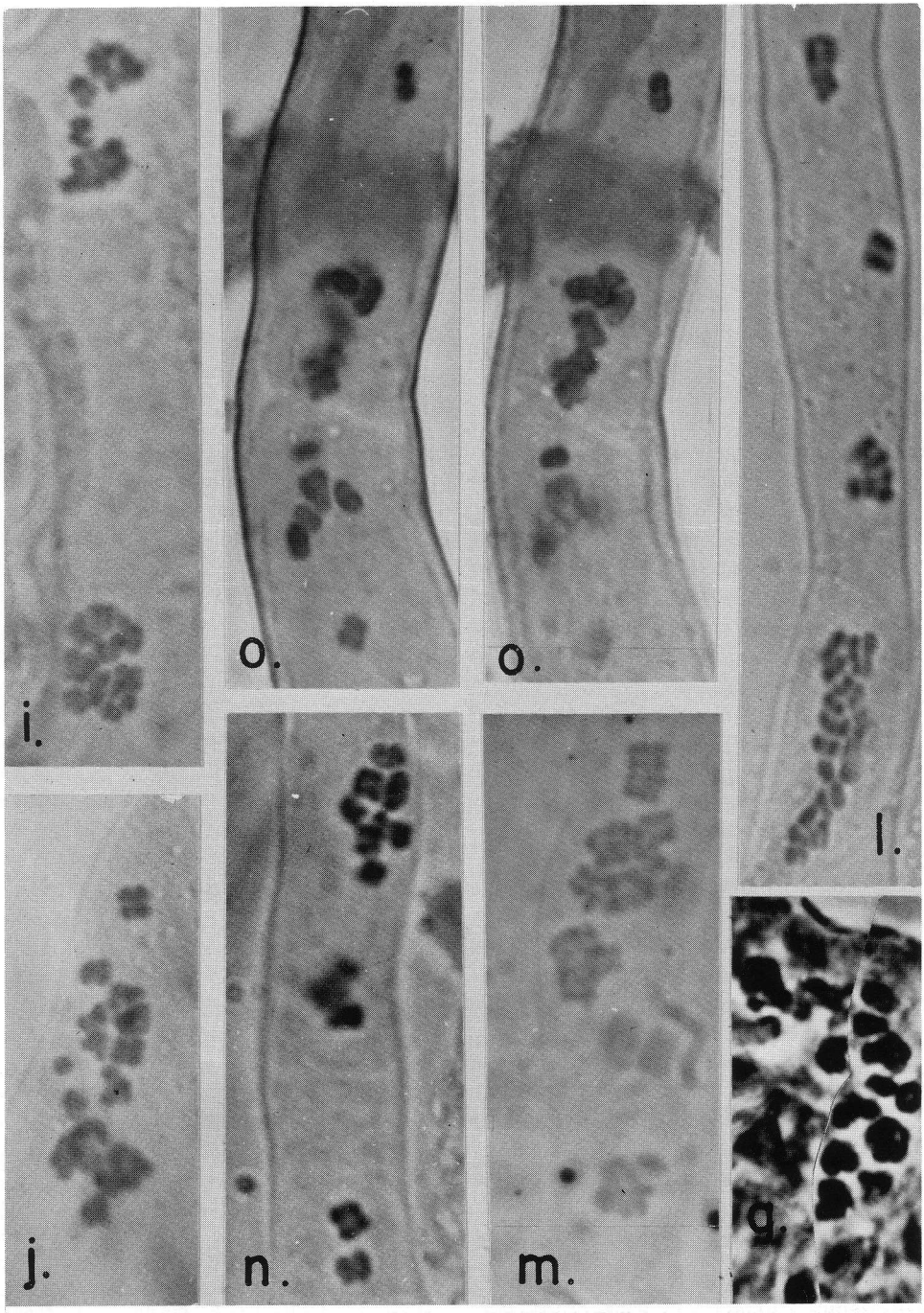
1. Camera-lucida drawings of chromosomes at pollen-tube mitosis enlarged approximately 2,700 times: a, *Rhopaloblaste ceramica*; b, *Carpentaria acuminata*; c, *Laccospadix australasica*; d, *Ptychococcus lepidotus*; e, *Archontophoenix Alexandrae*; f, *Ptychosperma elegans*; g, *Veitchia sessilifolia*; h, *Veitchia vitiensis* var. *Parhamiorum*.



2. Photomicrographs of palm chromosomes corresponding to the camera-lucida drawings in figure 1.



3. Camera-lucida drawings of chromosomes at pollen-tube mitosis enlarged approximately 2,700 times: i, *Gulubia Hombronii*: j, *Gulubia costata*: k, *Taveunia trichospadix*: l. *Heterospathe humilis ?*; m, *Wallichia densiflora*; n, *Calamus caryotoides*; o, *Calamus Muelleri.*



4. Photomicrographs of palm chromosomes corresponding to the camera-lucida drawings in figure 3: o photographed at two levels of focus: g corresponds with camera-lucida drawing in figure 1 and was photographed with phase-contrast equipment.

The Coconut Industry Board of Jamaica has been shipping pollen from distant places for their work on the hybridization of coconut varieties (Whitehead, 1962). They report that they are using a freeze-drying technique which permits long-term storage of the viable pollen in quantity. However, for the purpose outlined in the present paper, the equipment and skill needed seem unnecessary in collecting pollen from palms while in the jungle many miles from civilization. The technique described herein requires only a few small air-tight "pill" vials containing pre-dried silica gel and gelatin capsules. The results obtained from pollen sent in by Dr. Moore are tabulated in Table I and documented in figures 1-4.

Literature Cited

Read, R. W. 1964. Palm chromosome studies facilitated by pollen culture on a colchicine-lactose medium. Stain Technology 39: 99-106.

Whitehead, R. A. 1962. Room-temperature storage of coconut pollen. Nature 196: 190.

	Haploid number	place of origin	Moore voucher
Arecoideae			
a. *Rhopaloblaste ceramica*	n = 16	Cultivated at Singapore	9077
b. *Carpentaria acuminata*	n = 16	Australia	9228
c. *Laccospadix australasica*	n = 16	Australia	9240
d. *Ptychococcus lepidotus*	n = 16	New Guinea	9259
e. *Archontophoenix Alexandrae*	n = 16	Australia	9249
f. *Ptychosperma elegans*	n = 16	Australia	9245
g. *Veitchia sessilifolia*	n = 16	Fiji Islands	9348
h. *Veitchia vitiensis* var. *Parhamiorum*	n = 16	Fiji Islands	9358
i. *Gulubia Hombronii*	n = 16	Solomon Islands	9296
j. *Gulubia costata*	n = 16	New Guinea	9273
k. *Taveunia trichospadix*	n = 16	Fiji Islands	9345
l. *Heterospathe humilis ?*	n = 16	New Guinea	9289
Caryotoideae			
m. *Wallichia densiflora*	n = 16	Cultivated in Australia	9256
Lepidocaryoideae			
n. *Calamus caryotoides*	n = 13	Australia	9241
o. *Calamus Muelleri*	n = 13	Australia	9230

Table I. Chromosome counts of palms obtained from pollen-tube mitotic studies of air-mailed pollen. Voucher specimens are on deposit at the L. H. Bailey Hortorium, Cornell University, Ithaca, New York.

Ptychococcus lepidotus — A New Species from New Guinea

HAROLD E. MOORE, JR.

The genus *Ptychococcus* is related to *Ptychosperma* in the tribe Ptychospermeae of the subfamily Arecoideae. Few of the species have been adequately described. The original species, *P. paradoxus*, has been grown in botanic gardens for many years but most of the others are known only from incomplete specimens in herbaria. Two of the seven validly described species — *P. Guppy-*