PLANT LIFE, VOL. 12, NO. 1, JANUARY, 1956

HERBERTIA

1956

H.P.T.

THE AMERICAN PLANT LIFE SOCIETY

THE AMERICAN PLANT LIFE SOCIETY is organized for the "increase and diffusion of knowledge concerning plant life," and to carry out its objectives the main emphasis is placed on the publication of PLANT LIFE, the periodical devoted to plant life, incl., HERBERTIA, the yearbook devoted exclusively to the amaryllids, sponsored by the affiliated AMERICAN AMARYLLIS SOCIETY. The publications are international in scope. All paid up members are privileged to receive the current issues of PLANT LIFE, incl., HERBERTIA.

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All persons and organizations interested in amaryllids, and other plants are invited to become members. The annual dues vary from $3.00 to $5.00 (foreign, $4.00 to $6.00) depending on the publishing costs. At present they are $3.50 (foreign, $4.50) in advance which should be sent to:

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Box 150, La Jolla, California

PLANT LIFE

VOLUME 12

[Nos. 1-4, Jan., Apr., Jul. & Oct.]

1956

EDITED BY
HAMILTON P. TRAUB
HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY
Box 150, La Jolla, California

Printed in the United States of America

Citations to this issue of PLANT LIFE should read as follows: PLANT LIFE *12:* —— — ——, *1956.*

Address correspondence and send membership dues to:
Dr. Thomas W. Whitaker, Executive Secretary,
The American Plant Life Society,
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TABLE OF CONTENTS

Cover design by Hamilton P. Traub based on *Amaryllis belladonna* var. *major*, the Large-flowered Belladonna Lily.

PLANT LIFE, VOLUME 12, NO. 1. 1956—HERBERTIA GENERAL AMARYLLID EDITION

PLANT LIFE, VOLUME 12, NOS. 2—4, INCL. 1956—GENERAL EDITION

ILLUSTRATIONS

PLATES

TEXT FIGURES

PLANT LIFE, VOL. 12, NO. 1, JANUARY, 1956

HERBERTIA

1956

Year Book of
The American Amaryllis Society
22nd issue

GENERAL AMARYLLID EDITION

EDITED BY
HAMILTON P. TRAUB
HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY
Box 150, La Jolla, California

THE AMERICAN PLANT LIFE SOCIETY

For the roster of the general officers of the Society, the reader is referred to the inside front cover of this volume.

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[THE AMERICAN AMARYLLIS SOCIETY—continued on page 153.]

PREFACE

The 22nd issue of HERBERTIA, the yearbook of the AMERICAN AMARYLLIS SOCIETY, is dedicated to Mr. Edwin Owen Orpet, who received the 1956 HERBERT MEDAL AWARD for his outstanding service toward the advancement of the amaryllids, particularly for introducing the pure white *Brunsvigia* x *multiflora* hybrids, commonly called Hybrid Cape Belladonna lilies, from Australia. These are hybrids between the Cape Belladonna, *Brunsvigia rosea* and other *Brunsvigia* species. Mr. Orpet has also been foremost in popularizing these fine plants in America. Mr. Orpet's work with other amaryllids has also served as an inspiration to those interested in this group of plants. A charming biography of Mr. Orpet with portrait is contributed by Mrs. Mildred Orpet.

Articles on amaryllis in the present issue include pure white and double amaryllis, and rooting problems by Wyndham Hayward, Report of Amaryllis Committee Chairman, by Dr. Thornburgh, Amaryllis in Dallas by Mrs. Seale, Amaryllis breeding and culture by J. F. Stewart and Chas. Snyder, greenhouse culture by Mrs. Morton, and an Andean *Amaryllis* species by Mrs. Strout, Mrs. Kane and Mr. Hannibal.

There are articles on exploring for amaryllids in Mexico, and for *Amaryllis* in South America by Prof. Nelson and Miss Henry; *Zephyranthes flammea* by Mrs. Clint, *Haemanthus zambesiacus* by Hannibal, *Narcissus* breeding by Dr. Cooley, *Eurycles sylvestris* and *Pancratium zeylanicum* by Mr. Hayward, Amaryllids by Mr. Harradine, Survey of Pancratieae by Mr. Woelfle, *Pseudostenomesson vargasii* by Mrs. Strout, New Daylilies and daylily performance by Dr. Corliss, breeding daylilies by Prof. Saxton and Mr. Gilmer, *Bloomeria humilis* notes by Dr. Hoover, Amaryllis Round Robin notes by Mrs. Strout.

There are articles on *Rhodophiala, Hymenocallis* species, *Lycoris straminea,* the New Orleans and Greater Gulf Coast (Mobile) amaryllis shows, and various other items.

The Amaryllis fraternity has suffered serious losses in the passing of Hermon Brown, La Forest Morton, David J. W. Chandler and Albert Pam. In memoriam notices for these are included in the present edition.

The 1957 HERBERTIA, the 23rd issue of the yearbook of the AMERICAN AMARYLLIS SOCIETY, will be dedicated to Mrs. Morris Clint of Brownsville, Texas, for her outstanding contributions in collecting various amaryllids, particularly *Zephyranthes* and *Hymenocallis* species in the United States and Mexico.

Contributors to the 1957 issue are requested to send in their articles by August 1, 1956 in order to insure publication of this edition in early January, 1957. Time of publication depends entirely on the receipt of

the articles and the cooperation of all towards early publication will be greatly appreciated.

December 15, 1955,
5804 Camino de la Costa,
La Jolla, California

Hamilton P. Traub
Harold N. Moldenke

CORRIGENDA

PLANT LIFE, VOL. 11, 1955

Page 63, 1st paragraph, last line, change "*Brodieae*" to "*Brodiaea*".
Page 124,
1st paragraph, last line, change "*serphyllum*" to "*serpyllum*".
2nd paragraph, 5th line, change "*serphyllum*" to "*serpyllum*".
4th paragraph, 1st line, change "*serphyllum*" to "*serpyllum*".
Page 125, 2nd paragraph, 3rd line, change "Sect. *Uniflora*" to "Sect. *Uniflorum*".
6th line from bottom, change "2b" to "1b".
8th line from bottom, change "2a" to "1a".
Page 128, under species 12, change "*patagonica*" to "*patagonicum*".

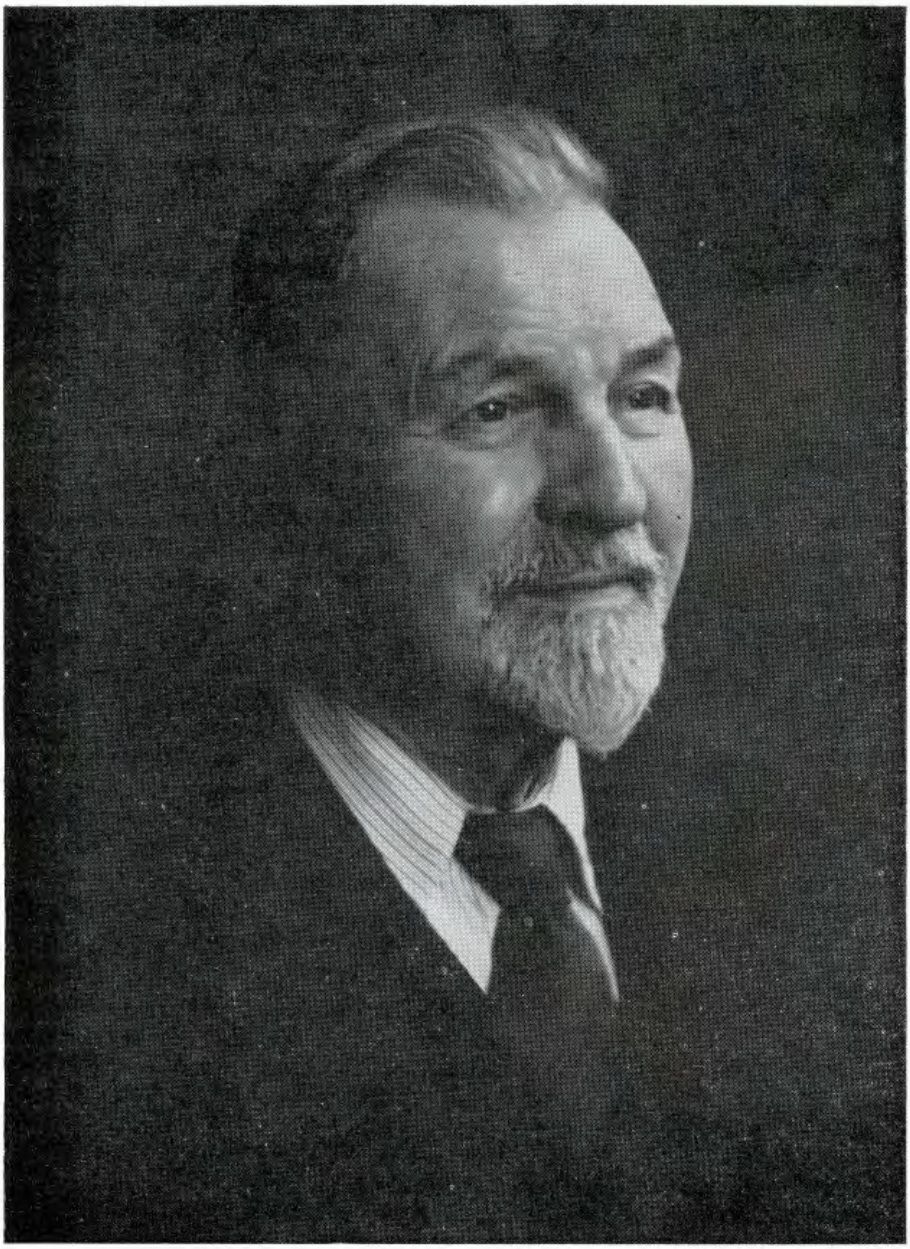
[PLANT LIFE LIBRARY, continued from page 162.]

SOIL WARMING BY ELECTRICITY, by R. H. Coombes. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 116. Illus. $4.75. In Part I of this little book, chapters are devoted to the history of the subject; early experiments; installation of soil warming equipment for greenhouses, cold-frame and cloche; costs, and the relation of soil fertility to soil warming. Part II is devoted to soil warming in relation to the crops—vegetables, fruits and flowers; to inter-cropping, and the extension of soil warming to crops as yet untried. Highly recommended to all who are interested in this subject.

MICROBIOLOGY, by E. A. Gray. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 175. Illus. $3.75. This little book is designed as an introduction to microbiology. The author shows how organisms are intimately associated in nature, and by stressing the historical background, he shows that microbiology has been studied under another name for three centuries. This concise, easily readable text is highly recommended.

[PLANT LIFE LIBRARY, continued on page 84.]

Dedicated to
Edwin Owen Orpet



Herbert Medalist — Edwin Owen Orpet

Plate 1

EDWIN OWEN ORPET — A BIOGRAPHY

MILDRED ORPET, *California*

On the eleventh of February, 1863, in the old Roman outpost of Cirencester in the Cotswolds, Edwin Owen Orpet was born, the first child of Owen and Mary Emery Orpet. Cirencester is not only a famous old historic city, but the site of the first agricultural college in England and a center of interest in plant improvement. Owen Orpet was a gardener of no mean attainment, employed by Mr. Elwes whose name became famous for his work in hybridizing Nerines. From its inception he subscribed to the English Gardener's Chronicle—a journal read by his son even today. Young Orpet's formal schooling came to an end with his eleventh year, when he served as office boy to a local lawyer,—from there he went to a job in the Royal Agricultural College and at fourteen he was sent to be a garden apprentice at Lockerly Hall in Hampshire, a hundred miles from home. Here he was trained in all branches of greenhouse and conservatory plant culture for five years, and on his own initiative he made an extensive collection of ferns, adding through his life to his herbarium until in California it fell into the hands of visiting grandchildren and forthwith perished. At the time of his apprenticeship also he acquired a copy of The Gardener's Assistant (a book three inches thick of fine print) which was a scientific and practical handbook and one he studied with care, and later supplemented with Nicholson's Illustrated Dictionary of Gardening from which he memorized the botanical names of plants with their meanings; this study laid the foundation for his remarkable store of knowledge of plant names, characteristics and habitats,—a store to which he is still adding with undiminished zest. A few years ago when the new 4-volume edition of Nicholson's Dictionary of Gardening appeared, he read carefully through all four volumes with the most intense and concentrated interest.

During this first period of apprenticeship he was much intrigued with a plant of *Bomarea carderi* climbing in one of the glass houses. This plant is figured in Nicholson, and has never been re-introduced although Mr. Orpet has been at great pains to try to procure it ever since he has lived in California. *B. caldasiana* grows here easily under lath, flowers and seeds well, but it is the only one he has grown freely.

After five years at Lockerly Hall, he went to Trentham, the seat of the Duke of Sutherland in Straffordshire, for further training and when he had mastered the course offered there he went to a nursery in Chester where he was put in charge of the greenhouses. He was just turned twenty at the time, and to conceal his youth he cultivated side whiskers, graduated to a foreman's job in New Ferry, and then got the post of foreman in the Marquis of Headfort's gardens in Ireland where he was able to make an intensive study of outdoor planting including that of a

 Vol. 12, No. 1, January 1956

famous old herbaceous border. This garden was in the charge of a man who probably knew as much as any man living about herbaceous material. While this was not his first experience with Amaryllids, to experience the sight of thousands of naturalized *Narcissus* must have given him an impetus toward the study of that family of plants. Indeed, his first article published in Garden and Forest in 1889 was on the subject of *Narcissus cyclamineus* and I well remember the joy with which he showed me the first bloom I had ever seen of *N. bulbocodium* which he had planted in our garden some months previously. Alas that type of *Narcissus* is not persistent in this section,—three seasons at most and out it goes.

In 1887 when he was twenty-four he came to the United States and was in charge of the Woolson Nursery in Passaic, New Jersey. They were growing and introducing, also exporting to England, native American plants, notably California lilies at that time being collected by the late Carl Purdy. In 1888 he compiled a hundred-page list of hardy perennial plants which served as a descriptive catalog for the nursery. It is interesting to note that he listed three varieties of Alstroemerias,—*A. aurantiaca, A. chilensis* and *A. peruviana* which from its description sounds like the one we know as *A. psittacina.* He also listed eight Day lilies, all of them species. During the three years of his work in New Jersey he lived in the same house with Dr. Thurber, one of our old botanists and plant writers of eminence, who was at great pains to instruct and tutor young Orpet and who taught him much which he would never otherwise have learned. He says that "Old Doc Thurber tried to make a botanist out of me, but he never succeeded." It was at this time that he originated a method of grafting *Clematis paniculata* onto our native clematis "as thick as a broom straw" and arranged for its first distribution in New England gardens.

After leaving New Jersey Mr. Orpet went to South Lancaster, Massachusetts, to be in charge of the 300 acre estate of Mr. E. V. R. Thayer. He stayed there for twenty years, until after Mr. Thayer died. It was a full life there,—he married and two sons were born there; he hybridized, raised and showed the first collection of hybrid *Cattleya* flowers ever originated in this country, working entirely from species collected in the wilds and bought at auctions, with no information to guide the grower in the way of native locale, because collectors were so jealous of their hunting grounds that they lied about where they were. Beginning with nothing but a few plants, in the course of those twenty years he had six greenhouses full of orchids, as well as extensive vegetable and flower gardens and magnificent grounds. His work with orchids is well known even to this generation through the articles he contributed on their culture to Bailey's Encyclopedia of Horticulture,—the outstanding thing about it is that he pioneered alone all along the way, devising means of crossing, germinating and raising to the successful flowering of his orchids. He experimented also with other types of plants, including *Amaryllis* L. (syn.-*Hippeastrum* Herb.). By sending seedling orchids for exchange with English growers, he obtained about 200 seeds of the famous Holford collection in Westonbirt, raised them

in pots for winter flowering and also shipped them in bud for use as cut flowers. He also did some experimental work with Nerines, and got his stock from Professor Sargent of the Arnold Arboretum. Incidentally he brought his Nerines to California and later gave them to Richard Diener for his experimental garden in Oxnard.

From Massachusetts Mr. Orpet went to take charge of Walden, Mr. Cyrus McCormick's great estate in Illinois. Mr. McCormick's great interest was in trees, and in developing "all outdoors" so for this purpose Mr. Orpet made a wide but intensive study of available native flora in that section, going as far as Michigan and Wisconsin woods for material which he shipped back and planted by the carload. He was famous for his herbaceous borders. At this task he spent nearly eight years, going from there to California to be senior propagator for the plant introduction section of the U. S. Dept. of Agriculture at Chico. He was fascinated by the problems presented in raising seeds sent in by explorers like Meyer in China, and in learning all he could about Pacific Coast plants and growing conditions. He worked with Dr. David Griffiths in his experiments with narcissus, iris, lilies and opuntias; at the same time he studied the big planting of persimmons (over fifty kinds) and grapes at that station. When the war was over he came to Santa Barbara, bought acreage, planted persimmons and grafted the wild Chinese stock with the best varieties he could find, and although he had planned to retire, he found a position greatly to his liking in the park system and was made superintendent. This position gave him further opportunity for experiments with exotic materials suitable to local growing conditions, and he increased the beauty of park and tree planting notably during the ten years of his incumbency. That, however, was not enough to sate his appetite for new plants and he experimented at home with cacti and succulents introducing many new Aloes and Aeoniums all of which he grew from seed collected in the wilds where they grew, flowering *Eucalyptus mallees,* Bromeliads, rare shrubs, vines and finally bulbs. He left the park work in 1930 owing to his wife's illness, but lost her, after forty-two years, in 1931.

Most of the bulbs belonged to the *Amaryllidaceae,* although he also did a good deal of work with Iris. He had been greatly taken with the first white Hybrid Brunsvigia he had ever seen in the collection of the late Mrs. Bullard (of Watsonia fame). The hybrid Brunsvigias are the result of crosses between the Cape Belladonna, *Brunsvigia rosea* (Lam). Hann. (syn.-*Amaryllis belladonna* Herb., auct. non Linn.), and other *Brunsvigia* species. After Mrs. Bullard's death he acquired a bulb, and casting about for more he discovered a source in Australia. In December of 1935 he ordered *Brunsvigia* x *multiflora* bulbs as follows. *B.* x *multiflora alba; Intermedia; Baptisti;* 'Hathor'; 'Harbord' and *B.* x *multiflora rosea.* Eighteen months passed before we saw a bloom because two rest periods came together owing to the transfer from a land "down under." Of these only three varieties persisted;—*Brunsvigia* x *multiflora alba,* 'Hathor', and *B.* x *multiflora rosea,* all making offsets and seeds freely. We hand pollinated the white varieties,

and carefully saved the seeds, and were interested to find that after some days many of the seeds showed traces of pink, so these we discarded. We planted only those which remained white. Mr. Orpet wrote an account of this change in seed color in HERBERTIA of 1943, pp. 124-126. Subsequently we found that most of them came true although once in awhile even with the greatest care in selection there would be a blooming head colored the faintest dawn pink, and it has happened that a head perfectly white in full flower would show pink on fading. *B.* x *multiflora rosea* has been enormously prolific and shows great variations in tone from very deep pink to a white-throated type edged with pale pink, all having tall stems and very numerous flowers.

Amaryllis immaculata which was imported by W. M. James from the Argentine has been a great success both as a garden subject and greenhouse plant. It flowers with its foliage which is very handsome, has done very well both in full sun and in part shade. There has been some discussion in Herbertia as to the length of time it takes to recover from being moved but although our bulbs were moved in January of this year three bloomed well, so we hope to have a good flowering next summer. *B.* x *multiflora alba* has not been a success in greenhouse conditions so far as we can learn, but it is a gem out of doors, and established old clumps flower magnificently.

At this same time Mr. Orpet was experimenting with various *Lycoris,* finding that *L. squamigera* is not too happy here though it does better under lath than in full sun; *L. aurea* does well under both conditions; *L. radiata* grows almost anywhere and will take more water than most of these bulbs; one *Lycoris* species flowered sparsely and was not a really clean white so it was banished. *Lycoris incarnata* with a beautiful flesh tint increased copiously and grew untended for years in the open field.

An experience we had with Calostemmas: an amateur in Orroroo, S. Australia, Mrs. James T. Gray, sent seeds of *C. purpureum* in the fall of 1936. It flowered first in 1942, a small bulb which produces a long stem and a crowded head of small flowers. It is interesting as being one of the few Amaryllids native to that section, and has been found on islands off the southwest coast of Asia. In 1954 I found to my surprise three solid rows of those little bulbs, with four distinct colors,—dark rose, light pink, white, and gold, all flowering lustily and making seeds so freely they must have known a bulldozer was in the offing to clear the ground for another nursery in the making! It is more than likely that some other rare bulb collector had given them to us but there were no labels other than color and genus. Grown and flowering all together like that they were most charming and seem to be much more durable than other small bulbs, as for instance the Lachenalias. We lifted them and gave them to an Amaryllid collector and hope to hear later that they have been given homes in other gardens.

Leucoryne ixioides odorata caused a great furor when it was first introduced, and Mr. Orpet had what was probably the first big planting of it, flowering it in March, 1931, as he was growing for John Scheepers,

Inc. the bulbs which Clarence Elliott brought in from South America. The seeds which Mr. Elliott brought back from the same trip, at least a large quantity of them, were sold to Mr. W. R. Dickinson and grown with great success by W. M. James whom I do not have to introduce to readers of HERBERTIA. Mr. James and Mr. Orpet worked closely together for years, sharing both experiences and materials with enthusiasm. A planting of *Leucocoryne* in flower is a great sight, but like so many things introduced with great hope, it has not been a success as a general garden subject,—we have sold bulbs repeatedly only to have it reported that they died out after a few years, and in some cases never did so well. We find even yet an occasional flower come up from long-dormant seed, but as a rule we see it only once or twice. Mr. Orpet wrote a letter to Mr. Elliott in September 1944 which I quote: "I remember your visit here, the seeds of *Leucocoryne* you left here have been grown with great success . . . it is a difficult and costly bulb to raise *from seed,* the first year the tiny bulbs delve down at least sixteen inches, these have to be sifted out with water running all the time to discover them, but after replanting a normal depth is maintained and digging is easier. Of course the *Leucocoryne* is possible outdoors only here, glass culture is required elsewhere. But the flower is delightful in color and fragrant. The bulbs you sold to Scheepers were sent here to be grown as perhaps you will remember. These were kept three years for seed purposes and were sold I believe finally on the strength of the reputation the plant had merited. I found, however, that intense seeding (at times three spikes to a bulb in seed) finally killed a large proportion of the stock, and I had trouble in convincing Scheepers that this was a logical shortage."

While Mr. Elliott was here selling his seed of *Leucocoryne* he told Mr. Orpet the story of his discovery of *Alstroemeria violacea* in Chile. As he could not stay for the seeds to ripen, he got down and scratched in the gravel among the plants for ripe seeds from the previous year, and found about 100 which he took back to England. He germinated only one but raised and showed the plant and received an award, but later the plant was lost. In the meantime Dr. Harper Goodspeed on the expedition of 1938-39 which he described in HERBERTIA of 1940, found and brought back to Berkeley seeds of *A. violacea.* Mr. Orpet procured 300 seeds, along with instructions for planting all of which indicated that no matter what the treatment of seeds "vernalization," cold or hot treatments, chipping, sulfuric acid, soaking in water etc." there must be a full year from planting to germination, and flowering might take place five months after that. Mr. Orpet put his seeds in a pan of water, was called away for nearly two weeks and remembered in panic that his seeds were still soaking on his return. He found each seed showing a little white germinal point sowed them at once (in April) and was rewarded not only with a quick germination but 350 little plants (owing to a double embryo in some) a few of which flowered in June of the same year. *A. violacea* has proven to be a difficult subject though very well worth growing. Both Mr. Elliott and the Univ. of California Botanic

Garden lost their plants, and fortunately Mr. Orpet was able to supply them. He found that the tubers do not transplant easily so after a few failures he supplied only seeds to customers. Seeds, too, are not a reliable crop because in seasons of heavy fog they simply will not set and we have just had two crop failures in succession, although our records show that in one season we collected 8 oz. of seed from this self-same stand. That it is difficult is borne out by the fact that it is described in Baker's Handbook of the Amaryllideae (1888) and it goes without saying that anything so beautiful would not have been allowed to die out if any way had been found to prevent it. Probably the story is the same as that with *Leucocoryne*,—they both are native to high desert regions, and resent foggy or damp weather in their flowering seasons.

Although the color of *A. violacea* is very beautiful (it matches the HRS color True violet 36-2 perfectly) Mr. Orpet thought he might be able to get a lighter blue if it were mixed with *A. pelegrina alba*. Our plants of these two species grew side by side with no other plant of the genus near, and during the summer of 1943 both plants were crossed and recrossed. The results were not at all what was expected, for only occasionally is there a flower with violet coloring, on the contrary the flowers look like *A. pelegrina* except that they are a little larger, and the foliage is exactly that of *A. violacea*. Mr. Lytel who followed Mr. James at Mr. Dickinson's garden made the same crosses with the same results. The hybrid grows well and seeds freely,—we have never dug any tubers and the planting is still in its original bed.

About 1937 a customer of ours saw what she called *"Alstroemeria ligtu" angustifolia* at the RHS Chelsea Show, and was so enthusiastic about it that he sent to Constable for tubers of it and later for tubers of *A. haemantha*. The *A. ligtu* had flowered and seeded in 1938 and proved to be a fine tone of pink. The *A. haemantha* flowers were fine in color and a little different in shape from the usual *chilensis* strain but though we kept two separate patches growing by themselves we lost both. We still have some of the original pink Constable tubers and seed therefrom. As far back as 1940 Mr. Orpet, Mr. James and Mr. Harry Stinson were discussing the differences between *A. ligtu* and *A. chilensis* and finding them about like tweedledum and tweedledee, so this nursery adhered to the import name, but now I find they are merged into *A. chilensis* so from now we shall use that name! Mr. Stinson sent Mr. Orpet seeds and small tubers of various others; *A. hookeri* is a charming plant, low-growing with feathery foliage, persistent in the right location which is hot and dry, but not any more than holding its own; *A. pulchra tricolor* is my favorite,—growing not over a foot high with pansy-faced flowers and the color maroon and white. Unfortunately they were planted under a small tree which eventually gave them too much shade and they perished, but I had some 5-year old seed which germinated well and gave promise of a good crop but they were in the direct line of demolition of a grading process for the new nursery. *A. chilensis, A. pelegrina* and *A. pelegrina alba* were all sown in the open field,—*A. chilensis* throve amazingly with no care beyond occasional watering when the winter

rains stopped too early. The other two types failed out in the sun but did well under lath. *A. chilensis* grows larger and with better color under lath, but the sight of a field of color in late May here is breath-taking. One-year tubers transplant well, but after that, as Mr. Orpet says, "you don't dig them, you mine them." One imperative with Alstroemerias is complete rest after the flowering is finished. If they get too much water all sorts of trouble ensues. There seems to be a tendency after some years for orange types to predominate,—in which case the remedy seems to be to pull out the orange flowers and not let them go to seed, leaving the preferred colors to re-seed the beds.

The Nerines have been fascinating, but many of the finest are so over-bred that they do not reproduce easily. This seems to be true of many of the expensive Barr hybrids, and it has been so with the Elwes hybrids which Mr. Orpet received from Col. Stephenson Clarke in exchange for *Alstroemeria violacea.* From Col. Clarke Mr. Orpet received six dozen bulbs of about ten different varieties, all named and labeled late in the summer of 1945. Although we have treasured them, they have gone out one by one until now we have only twenty, ten of which bloomed this year, and these mostly a beautiful pale salmon color. Twice we imported lots from Mr. Vandertang who raises them on the Island of Jersey. He was able to save them in the German occupation only because the Germans expected to become owners of the islands and wanted to have those flowers! We have not any of these left. But the kinds which do succeed grow like weeds,—*N. bowdeni, N. magnifica* which looks very much like it but is much larger, *N.* 'Pink Triumphant' which blooms in mid-winter. Smaller types like *N. rosea crispa* are better and paler in color, and hold their own,—*N. filifolia* and *N. massonarum* are both evergreen with the same threadlike foliage, and are charming miniatures, spreading well by seed.

Haemanthus coccineus is a weed here, interesting largely for the foliage but growing with no care at all; *H. katherinae* is outstandingly beautiful both as a garden plant and cut flower, loves the shade, and in a large planting some bulbs will give bloom in June and some in September. *H. albiflos* persists but has not been too happy with us; *H. multiflorus* we imported but it was too tropical for our conditions so we shipped it to Florida. Stenomessons were a fine sight but bloomed only once or twice. *Chlidanthus fragrans,* a lovely small clear yellow fragrant flower blooms in May but does well only when the bulbs are lifted and stored for the winter,—it persists in the open ground but sulks. *Sternbergia lutea* on the other hand seems to thrive anywhere, in sun or shade, and blooms lustily in the fall when there are few blossoms to be seen. *Vallota purpurea* we have tried time and again with very little to show for our pains. Cypellas,—beautiful but brief; *Cyrtanthus* persists but is of inconsiderable value; all the *Zephyranthes* are happy with no special care; *Hymenocallis narcissifora* is temperamental about blooming while *festalis* is not only dependable but much more beautiful. The little old *Pancratium maritimum* has been in old gardens here for generations as has *Sprekelia formosissima* and they both share the same

love of periodic neglect, only to bloom forth profusely when they are watered after a long rest.

It may seem that this paper is hardly to be classed as a biography because Mr. Orpet's association with plants has been largely stressed almost to the exclusion of human relationships but as I have shared his life and work since the summer of 1932, I have found his heart is so largely with his plants and his friends chosen so exclusively in relation to their similar interests that I find it impossible to picture him except with a pen dipped in chlorophyll.

Be it remembered that most of the work Mr. Orpet has done with Amaryllids began when he was nearly 75, and that along with these experiments (a) he ran a persimmon orchard which included a large

Fig. 1. La Forest Morton trophy cabinet.

mail order business; and a nursery which specialized in rare plants, cacti and succulents and bulbs; and (b) he introduced many novelties from Australia, the Canary Islands, South Africa and South America. These experiments were of no less interest and value than his work with Amaryllids, but for readers of HERBERTIA the latter have been stressed. Now at 92 his physical share in gardening is over, but plant life is still his consuming passion and he gladly welcomes any opportunity for discussion of any phase of this subject, and no amateur problem is too elementary for him to give his full attention to solving. Speaking as he ever does from the point of view of the plant, he can always point out

what its needs are, how it must be cared for to give the best results and he does this with such clarity and such sweet reasonableness that the veriest tyro can understand. He regrets only that he cannot keep abreast of modern scientific experiments with genes, chromosomes etc., and dismisses the subject with a sigh and "all that is too vast for me!"

IN MEMORIAM — LA FOREST SMITH MORTON

The news of Mrs. Morton's death on October 29, 1955 at the age of 68 years was a great shock to all who knew her.

Mrs. Morton, a native of New Orleans, née La Forest Smith, was long active in gardening circles in her native City. She was active in the Garden Circle of New Orleans which in cooperation with other local gardening societies and the American Amaryllis Society sponsored the annual New Orleans Amaryllis Show in spring. She was a member of the New Orleans Horticultural Society, and the Federated Council of Garden Clubs. She was a member of the American Amaryllis Society (affiliated with the American Plant Life Society) and was in charge of the examinations for the Amaryllis Judge's certificates, and she was Registrar of Amaryllis Names. She is survived by her husband, Mr. W. D. Morton, Jr., a daughter, Mrs. Rosalie Rodener; a son, W. D. Morton III, Glen Olden, Penna., and four grandchildren.

Mrs. Morton had just acquired a greenhouse so that she could grow her Amaryllis to greater perfection, and had sent in her first article on growing Amaryllis in the greenhouse which is published in this issue. At the request of the writer, Mrs. Morton had sent a picture of her trophy cabinet on October 26, only three days before her death. This photo is reproduced in Fig. 1. The two small cups and the smaller cup with the white base were awarded to her for being the most outstanding member of the Garden Circle for the years, 1953, 54 and 55. The other cup with a white base was presented to her when she was voted Life Honorary President. The two gold keys to the City of New Orleans were awarded for her work toward founding the New Orleans Municipal Amaryllis Garden and for outstanding work toward beautifying the City of New Orleans; and for staging outstanding annual official Amaryllis Shows since 1951. The other awards were received for outstanding exhibits at the Amaryllis Shows.

With the passing of Mrs. Morton, the horticultural world has lost a great enthusiast and an inspiring worker.—*Hamilton P. Traub*

IN MEMORIAM — DAVID J. W. CHANDLER

In the death of Mr. David J. W. Chandler of Tecoma, Australia, on the 23rd August, 1955, the world of horticulture has suffered a real loss. For many years he was Vice-President of the Royal Horticultural Society of Victoria, and in that capacity he tried to develop a wider general knowledge and love of rare and beautiful plants. His own practical

contribution was to import many items not previously known in Australia and introduce them into commerce. At the same time, he himself raised some notable contributions to the world's gardens. These include such plants as early winter flowering Nerines, *Clematis* 'Golden Belladonna' (awarded a gold medal by the R. H. S. of Great Britain), Montbretias, Gladioli and many new and beautiful colours in Zantedeschias.

Mr. Chandler's ability to name rare and unusual shrubs, bulbs and plants was well known. At every horticultural show his advice was sought in the naming of items not generally known. Many a discussion on a particular variety was referred to him for an opinion and his decision was rarely questioned.

He had the highest standing as a nurseryman and for some time was Vice-President of the Nurserymen's and Seedsmen's Association.

Following a visit to Japan in 1939, he imported many new shrubs, including Camellias. These include such gems as 'Golden Temple,' named by Mr. Chandler while visiting the nursery in Japan where the Camellia was raised. Other Camellias first imported into Australia by him include *magnoliaeflora,* 'Lady Clare' and *reticulata* (Forrest's variety). Most of the shrubs introduced by him have since become widely popular in Australian Gardens.

Recognition of the collector's items acquired by Mr. Chandler came in 1948, when the R. H. S. of Victoria awarded him the first Fawkner Medal for his "Collection of Rare Shrubs and Plants."

—Reg. F. Harradine

IN MEMORIAM — MAJOR ALBERT PAM, O. B. E.

The many friends of Major Pam were shocked to learn of his sudden death on September 2, 1955.

For several years, Major Pam had visited America and especially southern California, where his interests in horticulture had gained him many friends. He always came with gifts of seeds and plants.

In our spring 1955 catalog, we tell a story about Major Pam and one of the plants that was widely distributed through his efforts. Major Pam told this story in a very humorous way and we have reproduced it as nearly as possible in his own words. The title of the story is "Ich Dien" and we will be pleased to send it to all who request it.

—Cecil Houdyshel, La Verna, Calif.

IN MEMORIAM — HERMON BROWN

An announcement should be made at this time of the passing of Hermon Brown on March 16, 1955, the date being just too late for its mention in the 1955 issue of HERBERTIA. There are many of you who

[IN MEMORIAM—HERMON BROWN, continued on page 76.]

1. REGIONAL ACTIVITY AND EXHIBITIONS

NEW ORLEANS AMARYLLIS SHOW, 1955

MRS. W. D. MORTON, JR., *President,*
Garden Circle, New Orleans

The Hon. de Lesseps D. Morrison, Mayor of New Orleans, proclaimed the period, March 28 to April 3, inclusive, Amaryllis Week in New Orleans, in recognition of the 1955 Amaryllis Show of New Orleans which was held April 2-3, 1955.

Fig. 2. The Queen of the Official Amaryllis Show of New Orleans, 1955. Miss Carol Ann Schilleci (lower center) is crowned by President of the Council—Victor H. Schiro. Maid of Honor, Miss Ennie Goodrich (left) and last year's Queen, Miss Carrol Anne Le Compte (right). Photo—*The Times-Picayune-New Orleans States.*

The Garden Circle sponsored one of the most outstanding flower shows ever staged in New Orleans, it being the eighth Official Show of New Orleans, on Saturday and Sunday April 2nd. & 3rd., 1955. The show was beautifully staged on the entire floor of the McMain Junior

High School Cafeteria, 5712 So. Claiborne Ave. The many lovely artistic arrangements, and colorful Dutch and America Amaryllis made a very striking appearance, against the Club colors of Green and Silver.

The Show was Judged by twelve accredited Judges, and all Horticulture Judges were accredited Amaryllis Judges from the American Amaryllis Society. Four Gold cups, two tri-color ribbons, two sweepstake ribbons, two Club ribbons, five American Amaryllis Society Awards in Horticulture were given. New Orleans is fast becoming the Amaryllis City of the South.

The Consul General E. L. Hechtermans of the Netherlands, gave a very interesting talk on Dutch Bulbs. The Main event of the show was the crowning of the beautiful Official Amaryllis Queen, Miss Carol Ann Schilleci, daughter of Mr. and Mrs. Rosario Schilleci, crowned by President of the Council Victor H. Schiro. Maid Miss Ennie Goodrich and Miss Carrol Anne LeCompte. Commissioner Schiro presented the new Queen with a gold key to the City. Plans have already been started for next year show.

THE GREATER GULF COAST AMARYLLIS SHOW, 1955

Mrs. A. Primo, *Alabama*

The Greater Gulf Amaryllis Show on April 2, 3, 1955 sponsored by the Amaryllis Society of Mobile, Alabama, fulfilled all expectations even though a severely damaging freeze had visited the area several nights before the show opening.

This was a standard competitive specialty show—six divisions, 16 sections. The divisions were as follows:

1. American Named and Unnamed Hybrids.

2. Artistic Arrangements. There was an invitational class in this division for the individual garden clubs which comprise the Federated Garden Clubs of Mobile County. The garden clubs responded enthusiastically with approximately twenty outstanding arrangements using amaryllis as the dominant feature. There were about eighty artistic arrangements entered in the show. One of the most unusual entries and one which won an Award of Merit, was a mass of amaryllis bloom in a mammoth plexiglas bubble. This was the work of the Florence Place Garden Club.

3. Dutch Named and Unnamed Hybrid Amaryllis. There were about 60 named varieties exhibited, ranging in color from pure white, through all the pastel tints of pink, peach, salmon, rose, to the light, medium and dark reds into maroon and purple. The unnamed Dutch hybrids, though not in the same class as to color with the named varieties, showed a very pleasing variety of bloom tint.

4. Exhibits of Growers in and around Mobile. This was the spectacular beauty of mass bloom. The growers expressed their good taste, originality and their own personalities in their exhibits. Seed and supply stores also exhibited in the show with colorful tables of attrac-

tively packaged bulb plant foods, preparations and accessories for both pest and disease control, plant aids and tools, and containers both utilitarian and ornamental.

5. Arts and Novelties. Mobile artists, both master and student of the art, exhibited paintings of amaryllis in oils, water color and pastel. This was also an invitational class. These fine artists had captured on canvas the living beauty around them. There were nine entries in the hobby class. Again, originality and the expression of individual personality were the keynotes of these exhibits.

6. Competitive Educational. This division included all stages of amaryllid growth beginning with complete soil formulas and examples thereof. Seedlings were shown, from the three-month old stage of growth to the fully developed blooming size three-year old bulb. One grower exhibited specimens of bulb cuttage for vegetative propagation. This practice is becoming popular among growers in the Gulf Coast sector. These growers are developing their own highly profitable and satisfactory techniques.

A miniature working model of a ferris wheel with each basket spilling its precious burden of amaryllis bloom immediately caught the attention of the visitor to the show. This beautifully arranged focal point was placed at the end of the wide improvised corridor effected by the tables of unusual artistic arrangements to the left, and the educational, hobby and commercial displays to the right. Mr. Percy Skinner of the Amaryllis Society designed this most clever focal point for this year's Amaryllis Show in Mobile. The Men's Garden Club of Mobile brought indoors the cool loveliness of a rustic, flower-bordered pool with their special exhibit which was placed just inside the main entrance to the show. The pool was fringed with fern, caladium, amazon lilies and many varieties of amaryllis, dwarf day-lilies and narcissus. The wide corridor, highlighted at the far end by the turning ferris wheel of blossoms, stretched behind the lovely placid pool.

Mrs. E. A. Wiggins, one of our members and also a fancier of birds, added greatly to the exhibit with her beautiful assortment of tropical birds. One particularly large cage held more than fifty parakeets of various pastel colors. Bougainvillea in several beautiful colors twined in and about this cage. Smaller cages with birds in pairs were placed advantageously among the exhibits.

Hot coffee and delicious homemade cake were served and helped to create a spirit of good fellowship. Needless to say this particular exhibit helped to defray the expenses of the Show.

Mr. Harry Goff was General Chairman of the Show and to him must be given credit for much of the fine integration of exhibits. Mrs. A. Primo was co-Chairman. Mr. Ernest Thublin was Staging Chairman.

The Sweepstakes trophy, given for the most blue ribbons acquired in the show was awarded to Mrs. A. Primo. The sweepstakes trophy in horticulture was also awarded to Mrs. Primo. Mrs. Herbert J. Johnson of Mobile also received two awards, one for the outstanding horticultural specimen in the show and one for the outstanding arrangement. The

trophy for the best arrangement by a garden club was won by the Cottage Hill Garden Club. Best hobby display award was won by C. A. Strain of Mobile and Bradfords Garden of Fairhope was adjudged first in commercials. A painting of amaryllis won first prize for Mrs. Dorothy Boone in that class and Mrs. E. A. Wiggans' display of birds won an award of merit. Mrs. William P. Cazalas of Mobile was presented a trophy for her series of blue ribbons won in the arrangement section.

The annual show is sponsored by the Amaryllis Society of Mobile, Alabama, Mr. Lou Costa, President.

AMARYLLIS ACTIVITIES IN DALLAS, TEXAS

MRS. B. E. SEALE, *President,*
Dallas Amaryllis Society

The Dallas Amaryllis Society was organized in April 1952 to promote interest in growing Amaryllis; to study and make research pertaining to Amaryllis breeding and culture; to disseminate information concerning Amaryllis and the supplemental study of the Amaryllidaceae family.

The Society meets on the third Tuesday afternoon of each month from October through May. The programs are given by Society members; followed by a discussion period and a "Tea Hour."

Such subjects as "Amaryllis in The Garden Design," "Amaryllis In Bloom for Christmas," "Amaryllis of Tomorrow," "Types and Strains of Amaryllis," "Growing Amaryllis from Seed," "Vegetative Propagation of Amaryllis," "Amaryllis Culture and Merchandising In Holland," "The Amaryllidaceae," "Insects and Rust on Amaryllis," "Judging and Rating Amaryllis," "Practical Arrangements of Amaryllis for the Home," "Glamorizing Table Arrangements with Amaryllis," "Why I Grow Amaryllis," "Succeeding with Amaryllis," "Louisiana's St. Joseph Lily," "Biographies of Dr. William Herbert and Mary Gibson Henry," have provided good programs.

A "Travelogue" by Margie Korn, one of the members, was given after her yearly trip to Europe. The pictures and slides taken in the bulb fields of Holland are most exotic. Amaryllis inspection and selection are high-lights of her trip.

Last year five members of the Dallas Amaryllis Society attended the Amaryllis Shows in New Orleans, Louisiana and Mobile, Alabama. The Artistic Arrangement and Horticultural Divisions of both Shows were beautifully and interestingly staged, with quality Amaryllis of named clones being an outstanding feature of the Shows.

There are six members of the Society who are nationally accredited Flower Show Judges. The members are an earnest, enthusiastic group of gardeners and they are devoting much time to the culture of Amaryllis.

The climate of North Texas permits the growing of American Strains of Amaryllis in the garden. However, we grow the Dutch Hybrids in pots in the house or green-house through the winter months.

After danger of frost is over, the pots are put into the garden soil in semi-shade to grow until fall, when they are taken up and allowed to rest for ninety days before time for another cycle of bloom and growth.

The members are growing all types of Amaryllis, except the "Orchid Flowering" type and we hope to grow those this year if we can obtain them. During December, January, February and March, the members exhibit their house-grown Amaryllis.

Fig. 3. Hybrid *Amaryllis* grown by Mrs. E. B. Seale, Dallas, Texas; from left to right, the two whites are 'Albino', the red, 'Queen Superiora' (van Meeuwen). Photo—Mrs. E. B. Seale.

I have several hundred Amaryllis of all colors in my garden and they are most rewarding in the springtime, making a garden of flashing beauty. I am especially proud of my seedlings. Each year I make new plantings of seeds from the Dutch Hybrids and the American Strains. I am always delighted when I have a young seedling that blooms with gorgeous beauty for the first time. It is a pleasure to share my seedlings with neighbors and friends.

The blooming hybrid *Amaryllis* shown in Fig. 3 speak for themselves as a "Tall Tale From Texas." The white Dutch Amaryllis, 'Albino,' (second from left, Fig. 3) grew two scapes; the first scape was forty-two (42) inches in height with four blooms; the second scape was fifty (50) inches in height with four blooms. A yard-stick was used to show the unusual height, also two other Dutch Hybrids of usual height for a comparison. It was grown in a sunny south window in my home last Winter.

At the Dallas Spring Show (1955), sponsored by the Dallas Council of Garden Clubs and featuring floriculture and out-door gardening, the Dallas Garden Club exhibited several hundred blooming Dutch Hybrid Amaryllis in a garden setting, grouping the various colors in an exotic garden design. This was the first time that an "Amaryllis Garden" has been entered in the annual show. It was most spectacular and won an Award of Merit and Distinction, both for growing and display.

The rugged constitution of Amaryllis enables them to grow under adverse conditions of heat and lack of rainfall, as we have sometimes in Texas in the summer. There is enough cold weather in Winter to kill the foliage and force the bulbs into dormancy, but not enough cold to freeze the American Strain bulbs in the ground.

There is a complete set of HERBERTIA (1934-1955) in the Society library; the volumes contain material for programs, study and research; they contain information of value to all gardeners because of the wide range of plant life discussed. The Dallas Amaryllis Society is the "Ambassador of Encouragement and Venture" in growing Amaryllis of all types in Texas.

FURTHER NEWS OF THE AMARYLLIS ROUND ROBINS

EDITH B. STROUT, *California*

The Amaryllis Round Robins, which started in 1943, have continued with their same high degree of enthusiasm. By comparing notes and photos with one another, many inferior bulbs have been culled out of various member collections, and better types of hybrid amaryllis are now appearing. Seedlings resulting from crosses of hybrid Dutch amaryllis imported soon after the war have been blooming, and the better ones of these kept for further parents. Pollen and seeds from the better blooms have been exchanged among members. Polly Anderson of La Canada, Calif. now has a collection of fine hybrids of her own breeding, as have other members like Richard Guerdon of St. Louis; Eunice Fischer of Oshkosh; Madge Tebben of Waukegan, Dr. Robert Thornburgh of Palos Verdes Estates, and John Weisner of Florida.

Mrs. Tebben told of her experiences with foliar feeding in the 1955 HERBERTIA, and also her plants to use fluorescent lighting in early spring and possible late fall. All of us robin members are very keen to hear about the results.

Mr. John Weisner also wrote about his seedlings and cuttage in the 1955 HERBERTIA and will no doubt write more about that for further issues. The robin members also are very interested in this and in hearing his descriptions of new blooming seedlings.

Mrs. Carrie Armstrong, a commercial florist of Joy, Ill., had to dispose of her fine collection of amaryllis due to illness and advanced age. She kept only a few of her pure white bulbs. Though she has had to stop all gardening activities, she is still keenly interested in all the doings of her friends in the robins, and enjoys hearing of their successes. She has been a member of the American Amaryllis Society since its founding.

Since all of the members grow hybrid amaryllis, there is much discussion about these bulbs. But nearly all grow other members of the Amaryllidaceae, and both Mrs. Glenn Fischer and Mrs. Fred Flick have fine collections of daylilies, originating many excellent seedlings. The most extensive and successful growers of crinums are the members who live in the southern states or in California. Mr. Fred Jones of Corpus Christi is well known to members of the Society for his fine collection of *Zephyranthes* and is also building up a collection of amaryllis species, as is also Armyn Spies of Belleville, Illinois.

In the future we hope to have a regular summary of the work being done by these and other members of this enthusiastic group of amaryllid fanciers.

EDITOR'S MAIL BAG

Our good friend, Thomas R. Manley, is now settled in his new location at Selinsgrove, Penna., and is testing a large number of Ludwig and Warmenhoven hybrid Amaryllis clones. Since his reports are based on at least two years of testing, his report on these will appear in the 1957 Herbertia.

Dr. Philip G. Corliss, the Vice-President for the Southwest, will undertake a lecture tour of England in May and June of 1956. He will talk before the Royal Horticultural Society on June 5, 1956 (slide-illustrated) on "Plant Breeders of the United States and their Introductions."

In the fall of 1955 Miss Josephine Henry will accompany a group of other scientists from the Philadelphia Academy of Natural Science working on river surveys on the Ucayali River east of Tingo Maria and then at Iquitos in Peru. Later she will travel as far south as Chile to make a collecting trip for various plants, including various Amaryllids. She is particularly interested in finding *Amaryllis* L., and various *Rhodophiala* Presl species. The latter are the small-flowering species formerly grouped with *Amaryllis* L.

AMARYLLIS COMMITTEE — CHAIRMAN'S REPORT, 1956

There will be one item of good news for all of us in the fact that a new book will go into publication this year by the Macmillan Company devoted entirely to the subject of amaryllis—THE COMPLETE AMARYLLIS MANUAL, by Dr. Hamilton P. Traub. It was once my privilege to examine the manuscript. Not only were the contents pleasant to read but the book is as complete as one could ask. Publication of this type of book is expensive especially with reference to the matter of illustrations. It is my understanding that the price will be at the popular level so that it will be within the reach of all who care to own it. A very good feature for those who often refer to such a book is its excellent arrangement and indexing. The following list of chapter headings will give the reader some idea of what to expect: What is an Amaryllis?, The Amaryllis Plant, The Wild Amaryllis, The cultivated Amaryllis Through the Years, Divisions of Cultivated Amaryllis, Long-trumpet and Belladonna Type Hybrid Amaryllis, Reginae and Leopoldii Type Amaryllis, Orchid-flowering, Double and Miniature Type Amaryllis, Amaryllis Breeding, Amaryllis Propagation, Amaryllis Culture: Growing to Maturity and Maintenance, Amaryllis Diseases and Their Control, Insects, Mites and Other Animal pests and their Control, Amaryllis Marketing, Amaryllis Shows, Amaryllis as a Cultural Asset, Bibliography, Appendix A. Catalog of Chromosome Numbers in Amaryllis, Appendix B. Naming or Typifying of *Amaryllis* L., and *Amaryllis belladonna* L., Appendix C. Key to the 46 *Amaryllis* species, and complete descriptions of the species, Appendix D. Amaryllis Organizations, Nurseries and Dealers, and Index.

Perhaps this will be a good time to send out an appeal to those of you who can afford a little time to write an article for the next issue of HERBERTIA. There is a great need for popular articles that would appeal to the average gardener on the subject of amaryllis of any kind. The last few issues have seen several of these come in that all have enjoyed. Let the Editor hear from you as early as possible so that space reservations can be made.—*Robert G. Thornburgh, M.D.*

[**Zephyranthes lutrae,** continued from page 29.]

description. He states that "Kew reported that it has some resemblance to the plant known as *Cooperia pedunculata*, but differs in being almost sessile." On the basis of this statement, *Zephyranthes lutrae* Hort. ex Pam can be definitely placed as a synonym of *Zephyranthes drummondii* D. Don, in Sweet, Brit. Fl. Gard. ser. II. Pl. 328, March 1, 1836 (Syn.—*Cooperia pedunculata* Herb. Amaryll. 179, pl. 42, fig. 3. 1837). Recent collections of *Zephyranthes drummondii* D. Don, have conclusively shown that the pedicel length of this species varies from very short to the length as shown in the type illustration.—*Hamilton P. Traub.*

2. SPECIOLOGY

[EVOLUTION, DESCRIPTION, CLASSIFICATION AND PHYLOGENY]

PLANT HUNTING WITH THE CLINTS IN MEXICO

FRED B. JONES, *Texas*

It was my good fortune in May, 1954, and again in May, 1955, to be a guest of the Morris Clints of Brownsville, Texas, on two of their plant-hunting trips to Mexico. In the latter year an opportunity presented itself, also, to visit their trial plot which is located perhaps two or three miles from their home. So, placing myself somewhat in the

Fig. 4. Stop for lunch near the Rio Corona in Tamaulipas, Mexico. Photo—Fred B. Jones.

position of a reporter, I should like to comment on certain aspects of these expeditions which were of particular interest to me, relate a personal experience or two, and then describe briefly the trial plot in Brownsville. All of which is intended to give some idea of the research which the Clints are carrying on and the manner in which they go about it.

Kitty and Morris Clint have been going to Mexico on trips such as these for quite a number of years. Apparently they learned quickly that Mexico is one of the richest countries on earth in so far as its plant life is concerned, yet one which has not been fully explored, despite a long history of botanical exploration. Neither of them took even the begin-

ners' course in botany while they were in college. Neither did I take such a course, nor had I been to Mexico before for the specific purpose of hunting plants. Yet, as we embarked on these expeditions, I feel certain that we all hoped to make some contribution, however slight, to the knowledge of Mexican bulbs. On these particular trips, as planned by the Clints, we were going to search for *Zephyranthes,* those diminutives of the Amaryllis family, as Wyndham Hayward has aptly described them. We would dig several bulbs of each form and variation, as Kitty and Morris had done on previous trips, and try roughly to determine the range limits of each.

Our interest in the *Zephyrantheae* dated back several years, during which time we had acquired through purchases, exchanges and field collecting, perhaps thirty of the seventy (more or less) species currently recognized, all of which are natives in warm climate regions of the Americas. Of course we had some familiarity with the literature of the subject, particularly with Baker's *Handbook of the Amaryllideae* (1888) and the well-known articles on these genera by Sealy (1935) and Hume (1937). We had learned, too, about the collections made in Mexico by Pringle in the late nineteenth century. Pringle interested us particularly because he collected in the same region which we planned to drive through. He worked along the newly constructed railroad lines, and some idea of the magnitude of his efforts may be gained from the fact that he discovered no less than 1200 species of plants previously unknown to science (see Davis, H. B., *"Life and Work of Cyrus Guernsey Pringle,"* 1936). In San Luis Potosi state, high on the central plateau, he found various *Zephyranthes,* among which were *Z. concolor* (yellow), *Z. verecunda* (pink) and *Z. Lindleyana* (rose). A new white species which he found was described as *Z. erubescens,* and it came probably from the same area, although no one knows for sure. Most of these bulbs and others of lesser interest were found blooming in May and June, just as the long dry season was giving way to scattered showers.

It was into this same region that the Clints chartered their 1954-1955 trips, and in each of these years, it was near the middle of May. Only we were exploring along the main highway which was constructed not so many years ago, rather than along the railroads which Pringle followed, and the two by no means run parallel to each other.

On the first trip I was anticipating with a good deal of eagerness our visit to the discovery site of Kitty's new species, *Z. clintiae* (HERBERTIA, 1952), partly because I was now personally acquainted with its co-discoverers (not a particularly scientific reason), also because, as Kitty once correctly pointed out, I am "keen" on type localities. The highway would lead by this spot, and I knew there was no thought of passing it up without stopping. But alas, when we had passed over several chains of mountains and had finally reached the place, Morris, who always drove, scarcely slowed down, and continued on in the direction of Ciudad del Maiz. Of course I knew something was wrong. Then it dawned on me that the Canyon de Borregos, where the species grows,

was occupied by a number of the local countryfolk, and hence it would not be an auspicious time for us to stop. Actually, the Canyon was extremely dry that year, as was all the surrounding region, so that we would have found little in bloom. But on our second trip in 1955, we found the Canyon quiet with not a soul in sight. We took possession of the place this time and found some bulbs in bloom, but unfortunately, not Kitty's namesake. Beside a fine *Dasylirion* which grew in the Canyon de Borregos, I snapped a picture of the Clints (Fig. 5).

I soon found that Kitty and Morris had acquired a vast practical knowledge of Mexican plant hunting. They knew just when to stop at a location and when not to, where to look for bulbs either in flower or in leaf, and for how long—even the time factor is important. I learned

Fig. 5. Kitty and Morris Clint near the discovery site of *Zephyranthes clintiae*. Photo—Fred B. Jones.

that it is inadvisable to stop just anywhere: the situation must first be surveyed. At this particular season, the rural people, who are the ones the plant-collector meets everywhere, are mostly idle because the land is still too dry to work. So it is evidently quite an event for an American car to pull off to the side of the highway, and its occupants, in a businesslike manner, begin a minute search of the nearby terrain. Of course one tries to pick a spot where there will be some semblance of privacy, but likely as not, there will be people not far off. We joked about how there seemed to be a Mexican behind every bush. Our collecting was done almost entirely by the roadsides, never very far from the car which was usually in plain view. This manner of collecting would have been impracticable except for the fact that the Mexican countryside is still largely unfenced and is obviously trespassed by any-

one who wishes. There may be limits to this trespassing which I am unaware of, nevertheless, it is still possible to select one's location and stop and collect without fear of being "run out." As everyone knows, this is no longer possible in many sections of the United States. Rarely does one see a "No trespassing" sign in the Mexican rural areas, and may the day of its arrival be long delayed!

I was constantly impressed by the seriousness with which the Clints take their plant collecting. They obviously have a wonderful time at this game, yet, they never go about it in a haphazard or hit-or-miss fashion. Each trip is preceded by days of study and preparation which includes the setting up of goals or objectives. On our 1954 expedition, the major objective was the finding of *Zephyranthes concolor,* that handsome yellow-flowered species which, so far as we could learn, none of the present generation of bulb enthusiasts had seen (See HERBERTIA, 1955). On the 1955 trip (that is, the May trip, for the Clints make more than one trip to Mexico each year), there were apparently several equally-stressed objectives, and the itinerary was planned accordingly. Thus there was a colony of a wide-leafed species growing along a certain stone fence in Guanajuato state, and these bulbs had not been seen in bloom in the wild; it was hoped that they would be blooming on the particular day when we would reach their location. Had they been in bloom, a complete pictorial record would no doubt have been made. Farther on, we hoped to find in the mountains of Hidalgo state, along the winding Pan-American highway, flowers of a species known only from its bulbs and foliage—a foliage distinct from that of other Mexican amaryllids. As it turned out, this particular bulb was blooming rather profusely. Climbing over the steep, rocky slopes trying to find a few bulbs not hopelessly imbedded in the rock crevices, I think we all had the same feeling of wonder and fulfillment which we had experienced the year before when we found *Z. concolor* on the desert plateau. For me, at least, the finding of this white species in bloom was the high point of the second trip.

Returning to the preparation that precedes a collecting trip, I noticed that all is planned, even to the smaller details, well in advance of crossing the Rio Grande. Road conditions are investigated, weather information is studied and reservations are made if the tourist traffic is heavy. The drive which is to be made each day is plotted carefully, ample time being allowed, needless to say, for plant-hunting along the way, and also for a stop under some convenient tree for lunch (not that we always found a tree, however). On the rear seat of the car is placed a big box of food and other necessities which would come in handy in case of a forced delay on the highway. In this connection, I never tired of listening to stories about an unavoidable overnight stay on the unpaved "Tula road." This was years ago and the Clints rarely leave the main highways now.

After digging several bulbs of each form or variety which may occur at a location, the notebook is brought out and a stack of paper bags made ready. Never is a location left without recording the essential

field data. This includes, of course, the distance from nearby towns or cities, the altitude, date, type of soil, etc. After removing foliage and adhering soil, the bulbs are dropped into the paper bags, each sort going into a separate bag which is then numbered. This same number goes into the notebook and later is inscribed on the marker indicating where the bulbs are planted. If at all possible, pictures are taken of bulbs which are in bloom, or of foliage which is thought characteristic or even of a habitat. By taking along two cameras, pictures may be taken in either black and white or in color.

After having passed quarantine, the bulbs are ready to be planted out in the trial plot which is located on the Clint "farm" on the outskirts of Brownsville. This tract, which has a considerable number of acres in it, slopes gradually down to a "resaca", which is one of the characteristic water courses of the lower Rio Grande valley; a part of this acreage is still covered with a dense growth of ebony, acacia, mesquite, etc. which forms an attractive background to the trial plot and the other improvements which have been made nearby. The plot itself is not large, yet even now there is room in it for many hundreds of bulbs, succulents and other plant materials. It is laid out geometrically, with walks of Mexican paving blocks, and as I recall, there is a gentle slope even here; the soil is a fine sandy-loam which lends itself to the cultivation of a wide range of plants and certainly is an ideal one for bulbs. Everything is planted in short, straight rows, each form and variation clearly labeled, the entire planting in perfect order.

As a direct result of the collecting activities of Morris and Kitty Clint, I feel certain that a great deal more is going to be known about the bulbs of Mexico. Not merely because they are bringing back for study many sorts which have been hard to lay hands on, but because they are going about their work in a scientific manner, making the observations and taking the notes which are so important to those who later on will study these plants. In time, no doubt, the varieties of outstanding merit will become available to anyone who is interested in growing them. Thus far, collecting has been confined mainly to Eastern and Central Mexico; but at this writing I receive news that they have for the first time visited Guadalajara and Morelia, cities far to the west and south. I look forward to the day when they will have explored for bulbs in the farthest reaches of the Republic, particularly in such remote regions as Oaxaca and Yucatan. I believe that time will come. Then their trial grounds will bulge with interesting and surprising species not yet seen by many of us, and I wonder if anywhere in the world will there be growing and blooming in one place, so extensive a collection of the bulb riches of Mexico?

Zephyranthes lutrae Hort. ex Pam, nomen subnudum

In Herbertia 7: 40. 1941, Major Pam publishd the name *Zephyranthes lutrae* Hort. ex Pam, *nomen subnudum,* without giving an adequate

[**Zephyranthes lutrae,** continued on page 24.]

BOLIVIAN FORM OF AMARYLLIS BELLADONNA L., AND ANOTHER **AMARYLLIS** SPECIES OF THE SAME AREA

IRA S. NELSON, *Southwestern Louisiana Institute*

In the 1954 volume of HERBERTIA, I made a brief report of the Bolivian plant-collecting expedition sponsored by the Louisiana Society for Horticultural Research. Mention was made of collecting a series

Fig. 6. Unidentified *Amaryllis* sp., from Santa Cruz, Bolivia, growing in 4-inch pot. Scapes on other plants are normally about twice as tall. Photo—Ira S. Nelson.

of *Amaryllis* which varied in flower color from cream to pale yellow, many of which developed a blush after opening. This series greatly resembled *A. belladonna* L., in flower conformation and size. *A. belladonna* L., was collected at the same time and often in the same area. I was unable to get notes on vegetative characteristics while in the field because the foliage was either dormant or was just starting growth.

During the past year I have had opportunity to examine the vegetative characteristics of these plants. Unfortunately so few of them have bloomed that we must await still another flowering season before they can be identified. Several vegetative characteristics in these two types now appear to be distinct.

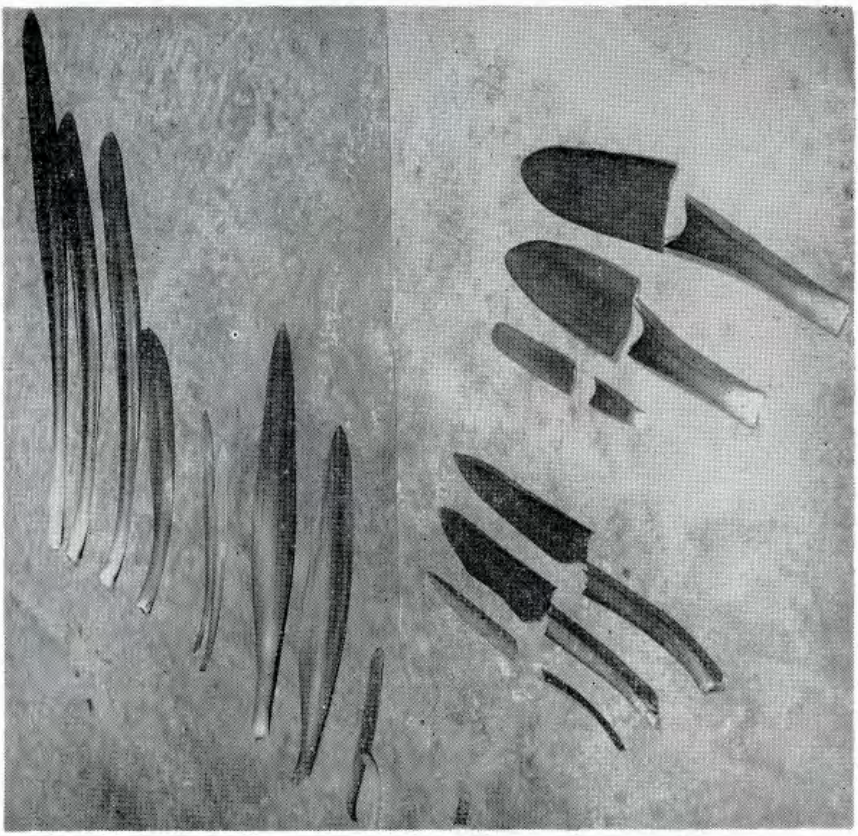


Fig. 7. Bolivian **Amaryllis** spp. (groups on left hand side; entire leaves) upper 6 leaves from **A. belladonna;** lower 4 leaves from "Crucenian" sp. Two smallest leaves in each group from 5 month old seedlings; all others from mature bulbs.
(Groups on right hand side; basal and tip portions of leaves) 3 leaves each of **A. belladonna** (lower) and "Crucenian" (upper) which are broader. Photo—Ira S. Nelson.

In order to distinguish between the two, I will refer to the unidentified type as the Crucenian *Amaryllis,* which designates Santa Cruz, Bolivia, as the area in which it was found.

Generally speaking, *A. belladonna* L., produces more leaves per bulb than does the Crucenian plant (Fig. 6). Also its leaves are longer, narrower and a darker green. The foliage of the Crucenian *Amaryllis*

has more pronounced veins. It seldom exhibits any red color at the base of the leaves as does *A. belladonna* L., from the same area.

Some leaf measurements are recorded in table 1-I. The 12 plants measured were selected at random from many growing in 4 inch pots. The length and width of both the longest and the widest leaves are given. These measurements overlap somewhat but the length-width index in each of the two groups is distinct. This index is expressed numerically by dividing the leaf's length by its width. An examination of table 1-I reveals that the *A. belladonna L.,* leaves measured were on an average 17.4 times as long as they were wide, while the Crucenian series were on an average only 8.3 times as long as they were wide. Plants with larger bulbs, grown in six inch pots, retained approximately the same length-width index as those shown in table 1-I.

Table 1-II gives the bulb measurements of the same plants that were

TABLE 1. Comparison of foliage, bulb size and reproductive records of a Bolivian form of **Amaryllis belladonna** L., and another species (unidentified, and indicated as "Crucenian" species) from the same area (Santa Cruz, Bolivia).

Characters measured:	Range and average based on measurements from 6 plants * "Crucenian" Amaryllis sp. Range:	Average:	Range and average based on measurements from 6 plants * Amaryllis belladonna L. Range:	Average:
I. FOLIAGE:				
Number of leaves per bulb	3 — 7	5	5 — 8	7
Length of longest leaf, cm.	28.6—38.6	34.3	34.5—49.7	44.2
Width of longest leaf, cm.	3.0— 4.5	3.7	1.8— 3.4	2.4
Length-width index of longest leaf	6.6—11.5	9.2	14.5—25.9	18.4
Length of widest leaf, cm.	24.8—37.0	30.4	32.5—49.7	40.8
Width of widest leaf, cm.	3.5— 4.9	4.1	2.1— 3.4	2.5
Length-width index of longest and widest leaf	5.0—10.6	7.4	14.4—19.5	16.3
Average length-width index of longest and widest leaves	5.8—11.0	8.3	14.6—21.1	17.4
II. BULB SIZE AND REPRODUCTIVE RECORDS:				
Bulb length, cm.	4.2— 6.0	4.9	3.7— 4.0	4.2
Bulb width, cm.	4.2— 5.2	4.7	3.1— 4.5	3.7
Number of rhizomes	4—13	6.5	—	—
Number of new bulbs	1— 7	4.2	0— 1	0.8

* The measurements were taken from 6 individual plants of the species.

recorded in table 1-I. In both groups most of the bulbs were slightly longer than they were wide. Exceptions were present in both groups.

In all cases observed *A. belladonna L.,* either produced no new side bulbs or produced them immediately ajacent to the mother bulb as do commercial hybrid *Amaryllis.* The Crucenian *Amaryllis* formed new bulbs almost exclusively on the ends of rhizomes which arose near the joining line of the basal plate and the bulb scales. In some cases the rhizomes enlarged close to the parent bulb and formed a bulb, but continued terminal growth in the form of a rhizome until the growing tip became exposed at the surface of the soil. They then produced another bulb. Some of the rhizomes coiled around the inside of the pots and never reached the surface. These had not formed bulbs when examined.

It is significant that rhizomes formed on all of the Crucenian *Amaryllis* bulbs and that no rhizomes were present on any of the bulbs of *A. belladonna* L. This is true of all plants examined which number

about 100 of each. More than half of the rhizomes which developed on the Crucenian *Amaryllis* formed new bulbs on their tips by November 1, 1955.

Of the plants listed in table 1-II, the Crucenian *Amaryllis* produced an average of 4.2 new bulbs per plant while *A. belladonna* L., produced an average of only 0.8 new bulbs per plant. This sample although small,

Fig. 8. Bolivian **Amaryllis** and hybrid: (a) top row, grown in open bed (left to right) "Crucenian", **A. belladonna,** and "Crucenian"; (b) center grown in pots (left to right), 2 clumps **A. belladonna** (in 6-inch pot), "Crucenian" (in 6-inch pot), and (in 4-inch pot); (c) bottom row, seedlings 5 months old in 2-inch pots (left to right) **A. belladonna,** hybrid **(A. belladonna x** "Crucenian") and "Crucenian". Photo—Ira S. Nelson.

is typical of plants growing in four inch pots. Larger bulbs growing in six inch pots produced a greater number of new bulbs per plant; however the reproduction ratio between the two types remained about the same. When the Crucenian *Amaryllis* were collected very few rhizomes were found. This indicates that the rhizomes disintegrated after the new bulb was formed and before flowering the following year.

One mature seed pod was found at the time the plants were collected. The seed was sent back and was planted in November 1954. Nine seedlings from the pod are now one year old and 5 of them have already produced rhizomes with new bulbs on their tips.

Crosses between *A. belladonna L.*, and the Crucenian *Amaryllis* were made last spring. The Crucenian *Amaryllis* seedlings are conspicuous by their relatively wide foliage and flat leaf posture. The hybrids exhibit narrower foliage more nearly like *A. belladonna* L., but have the prostrate leaf posture of their Crucenian parent. (See Fig. 8.)

It is the opinion of the writer that the Crucenian bulbs are the most important *Amaryllis* found during the 1954 plant collection expedition. Fortunately they appear to be rapid multipliers which naturally will hasten their release. It is hoped that in the next issue of Herbertia Dr. Traub and the writer can establish the true identity of these interesting Crucenian plants. The Louisiana Society for Horticultural Research has sent bulbs to Dr. Traub but these have not yet bloomed for him.

AN ANDEAN **AMARYLLIS** SPECIES

[Mr. Hannibal brought a single flower of an *Amaryllis* species collected by Dr. Goodspeed in the South American Andes for identification to the writer at Salinas, Calif., in 1944. It was keyed out as *Amaryllis forgetii* Worsley, which is native to Peru, near Cuzco. This identification was tentative since the bulb and leaves had not been seen. The writer has not been able to see complete specimens and thus the identity is still tentative.—*Hamilton P. Traub.*]

(a) REPORT OF MRS. EDITH B. STROUT

Among my numerous acquisitions from here and there, I acquired a bulb marked "Amaryllis forgetii." The bulb is 2 inches in diameter and has a neck from 2½ to 3 inches long. The leaves are 22 to 24 inches long, about 2 inches wide at the broadest spot, acute tips, narrower at the neck and the base of the leaves are colored maroon for 4 inches. The under side of the leaves are a decided gray-green (RHS Spinach Green 0960/3) and the upper sides are a more normal amaryllis type green (RHS 0960). But to me the most noticeable thing about the leaves is how the base broadens into a scale-like protection sheath and wraps itself completely around the neck—in fact forming the neck of the bulb. All of the amaryllis seem to do this to some extent, but these are more pronounced than other bulbs which I have and seem more like a *Clivia* in this respect.

This bulb bloomed for me in May, having a peduncle 19 inches tall, maroon at base and fading into all green at the top (Fig. 9). Spathe valves were 3½ inches long, purplish or maroonish. Pedicels were short, 1⅛ inches, and there were 2 bells, ascending, which measured 7 inches from top to bottom, 6½ inches across the 2 upper petepalsegs. The setepalsegs measure 1⅞ inches, the petepalsegs 1½ to 1⅝ inches, while the lower petepalsegs is 1⅜ inches wide. The tepalsegs start to twist or crinkle somewhat like a cyclamen but are only slightly reflexed.

The color is a Cardinal red (RHS 822) quite uniform, deeper red veins, velvety in appearance with a deep, rich red substance. There is an Agathia Green star (RHS 60) on a third of the limb, which was outlined with an iridescent cardinal red band with what I call an "overlay of purple." That is, when seen in some angles, there is a definite purplish cast or tone, but move an inch to the side and only the red is visible. This characteristic always reminds me of the iridescent taffetas which used to be, and again seem to be coming, in vogue for party dresses.

The tube was 5/8 inches. Filaments and pistil were the same Agatha green in the throat for the length of the star, then Cardinal red to the

Fig. 9. Unidentified *Amaryllis* species collected by Dr. Goodspeed in the Andes. Photo—Edith B. Strout.

tips. Pistil was ½ inch longer than the limb, and dripped nectar almost continually. The anthers were purple before maturing.

This species seems to belong to the Omphalissa sub-genus, in which the corona or paraperigone closes in the throat. One could say that the "eye" seemed to be formed by hairy sheets or appendages on the tepalsegs which formed a very narrow opening through which the filaments and pistil had to push their way out, like a trap door to keep out insects. It made me think most of all of the paper hoops through which circus performers jump and the filaments seemed to be pushing their way through thin encircling membranes.

It did not set seeds, either with self pollinization or with pollen from other hybrid amaryllis. For me it seems to prefer a sandy soil.

The bright red tepalsegs and green star form a striking, nearly

startling, contrast. As the outside of the tepalsegs has the same color arrangements, the bloom will catch anyone's attention seen from any angle. The twisting tepalsegs are very graceful and add that much needed and valuable ingredient—variety. Its ascending bells also give it a pert air and I found its simple deviations from our more formal hybrid amaryllis to be very refreshing.

(b) REPORT OF MRS. PAUL A. KANE

This species amaryllis, tentatively identified as *A. forgetii,* came to my garden from California. Its first location in my garden was in deep shade. The soil was pure leafmold and quite damp. It was the type of garden bed in which we grow coleus, caladiums and other shade and moisture loving plants.

The bulb flourished and increased somewhat, but did not flower. After some years it was decided that the space could be given over to something more productive of bloom. Space in this garden is at a premium and plants must pay their way in color or leaves.

So, the bulb clump was relegated to a very dry spot of sandy soil on the east side of the house. Protected from rain by wide, overhanging eaves, only a driving rain would reach it. There are not very many heavy, driving rains in San Antonio in a year, so that I believe if it got moisture more than once a month it was unusual.

Much to my surprise I found several scapes rising from the clump, in late July. This seemed an odd time for an amaryllis to bloom. However, with one exception, it has bloomed at this time of the year ever since. This year it bloomed in early June. In mid-May we had had the heaviest rainfall, over a period of some days, in many years. Since other bulbs are also blooming out of their usual time it must have been the extra rainfall.

The scape is about 25 inches in height with two to three flowers. These are bright red with a deeper spot of red towards the base of the tepalseg. The tepalsegs do not recurve but are slightly twisted.

In spite of hand pollination it is not self fertile and pollen saved from hybrid Dutch type amaryllis was either not fresh enough or not acceptable. To date it has not kept a seed pod, these fall off after a few days.

(c) REPORT OF L. S. HANNIBAL

The bulb tentatively identified as near *A. forgetii* was one of several given to the writer by Dr. Goodspeed out of his collection from Andes. Dr. Goodspeed made several plant hunting trips down into the Andes some 15 years ago and collected a large number of herbarium specimens and living bulbs of plants allied to or belonging to the Amaryllidaceae. Just where the above tentatively described bulb species was found is not known, although such probably could be determined by going over the herbarium material. It first flowered in 1944, and a single blossom was given Dr. Traub who was then living in Salinas. He keyed it out tentatively as the above named species. Offsets were distributed to several collectors.

No seed were ever set. However, since that date much has been learned regarding self sterile plants, and now presumably by using elevated temperatures and mixed pollens seed would be obtainable. The behavior of the bulb suggested that it grew in a warm damp location in part shade, and rarely if ever had a dormant period. It was not happy in the San Francisco Bay area due to the cool nights and overly damp winters. The writer lost his bulbs to the ravages of the 'Lesser Bulb Fly' which prefers some *Amaryllis* in lieu of Daffodils.

NOTES REGARDING **BLOOMERIA HUMILIS**

Robert F. Hoover

[The reader is referred to pp. 21-22, Plant Life 11: 1955, where *Bloomeria humilis* Hoover was first described.—*Editor*]

The occurrence of *Bloomeria humilis* at a second locality is to be reported: two miles north of Arroyo de la Cruz on State Highway 1, San Luis Obispo County, California, June 14, 1955, *Hoover 8357.* The presently known range of the species, doubtless significantly, coincides with that of another localized endemic, *Ceanothus maritimus* Hoover (see Leafl. West. Bot. 7: 111—112. 1953).

Living plants from the above cited locality and in cultivation were compared with *B. crocea* var. *aurea* (Kell.) Ingram as it occurs at San Simeon, not far from the occurrence of *B. humilis,* and at San Luis Obispo. Comparison with fresh flowers of *B. crocea* var. *montana* was also made. The only error worthy of remark in the original description of *B. humilis,* which was drawn up from dried specimens, is found to be one of measurement. The lower portion (appendage) of the filament before drying ranges from 3 to about 4.75 mm. long, and the upper portion (filament proper) from 5 to 7 mm. The length and conspicuousness of the lower portion is the most noticeable difference from *B. crocea* in the fresh flowers. In *B. crocea* the structure is hardly more than a cup surrounding the base of the filament and can there quite properly be termed an "appendage."

The observation that the lower portion of the filament may be either papillose or smooth in *B. humilis* is confirmed by study of the fresh flowers. In different plants it varies from rather densely papillose to virtually not at all so. The papillae when present are generally less prominent than in *B. crocea* and mostly confined to the margins toward the base.

None of the wild plants of *B. humilis* seen this year had two leaves or offsets from the corms,—both of which features are frequent in cultivated plants of this species. This fact, together with a parallel situation in certain other species, leads me to believe that the production of offsets is often a response to favorable environmental conditions rather than a genetically constant character. For example, this year I have found offsets in cultivated plants of *Muilla Clevelandii, Brodiaea elegans* var.

mundula, Brodiaea minor var. *nana,* and certain strains of *Brodiaea coronaria,* none of which had been observed to produce them before. Nevertheless, there remain several species which seem unable to form offsets in any environment. Vegetative reproduction has still never been observed or reported in *Bloomeria crocea,* so that the capacity to produce offsets, rather than their actual presence, may be regarded as distinctive of *B. humilis.*

DOUBLE **AMARYLLIS** CULTIVATED IN INDIA

WYNDHAM HAYWARD, *Florida*

Double Amaryllis, that is, double in the sense of a full double flower, in which the filaments are distorted into more or less extra petalage and sometimes a compact frilly form of bloom, as in the 'Kwanso' daylily, and various double *Narcissus,* have been known since Dean William Herbert's time.

Amaryllis albertii, Lemaire was published in the Illus. Hort. plate 498, in 1866. Herbert made his first reference to a double *Amaryllis* in his Append. Bot. Reg. 31, 1821, and again in his "Amaryllidaceae," 1837—*Amaryllis equestris* var. semi-plena. In this he made it a variety of what we know as *Amaryllis belladonna,* Linn., the West Indian red Amaryllis.

In this connection it is worth while to quote from Dr. Henry Nehrling, "Die Amaryllis," Berlin, 1908,—

"In Cuba and the other West Indies Islands and in gardens of Florida one also finds double Amaryllis, *A. alberti,* Lemaire, (Ill. Hort. F. 498) . . . Baker maintains in his handbook of the Amaryllideae that it is a variety of *reginae,* but I have found that it is similar to the *A. equestre* in growth and entire dissimulation."

A photograph of *A. albertii* appears on page 103 of the 1950 HERBERTIA. The writer has personally received bulbs from Puerto Rico in the West Indies. Herbert in 1837 reported his *Amaryllis equestris* var. *semi-plena* had been "found by Fraser in Cuba near Havanah, and adds: "imported also from Bahama."

In spring of 1955 the writer received from an Indian nursery firm, a number of which are located in the vicinity of Kalimpong, North Bengal, a photograph of a "new" double *Amaryllis,* (Fig. 10), which has been cultivated in some part of Sikkim and North of Bengal. There must be a large quantity of these double *Amaryllis* available, as they were quoted by the thousand. A dried specimen of flower was also received and promptly forwarded to Dr. Hamilton P. Traub, who examined it critically and reported that it was apparently a less double form than *Amaryllis belladonna* var. *albertii* and should be identified with Herbert's *Amaryllis belladonna* var. *semi-plena.* (See Fig. 10.)

The reported "discovery" of a quantity of cultivated double Amaryllis in North India is not surprising. A number of families including several named Chandra, a common name in Nepal, have engaged in the

nursery business in the Kalimpong area and Sikkim State for many decades. They have proved to be a reservoir of many valuable plants and bulbs which might otherwise have been lost in Europe and America during the enforced neglect of World War I and II days.

Some of these nurseries go back at least 50 to 75 years, and were trading in bulbs and plants with Western growers and dealers 50 years ago. It is known that the late Dr. Nehrling supplied them with *Amaryllis, caladiums* and Gloriosa and possibly other bulbs. When grown in a suitable warm climate, not subject to frosts, the *Amaryllis albertii* and doubtless other doubles grow well and multiply, just as they do on the lower East Coast of Florida where frosts are virtually unknown. In

Fig. 10. *Amaryllis belladonna* var. *semiplena,* a semi-double form cultivated in Sikkim, India. Photo—Standard Nursery, Pakyong.

Central Florida results have not been so successful, as the winter frosts seem to damage the bulbs systematically and retard the growth even when planted some inches underground.

A few bulbs of *Amaryllis albertii* or *A. belladonna* var. *semi-plena,* might well propagate naturally to many thousands in 50 or 75 years time in some warm-climate garden of a maharajah's estate in the warm valleys of the Himalayan foothills. Or in a similar location in Assam or the Brahmaputra valley.

It is hoped to obtain some of the bulbs for further study, on the chance that they may prove to be a distinct variety in double form as yet unknown here.

MISS HENRY'S SOUTH AMERICAN COLLECTING TRIP

Editorial note:—During the year 1955 Miss Josephine Henry, of Gladwyne, Penna., made a plant collecting trip, particularly for amaryllis. The following excerpts from letters received will interest the readers:

Under date of November 4, 1955, Miss Henry writes from Lima, Peru,—

"On Sunday, October 30th, I went to the market at Huras after lunch. I bought some lovely woven bags and belts, and then strolled through the place looking for purple potatoes. Suddenly I noticed a bunch of pink *Amaryllis* with blackish maroon stems! They were a bit wilted, but stunning. They lay among potatoes! Never having seen anything like them I began making inquiries in my scanty Spanish. A friend, who was with me, could not understand why I was so anxious to get bulbs. The little Amerindian woman said that they grew a very long way off,—Nicrupampa or Negropampa above Huras. I bought two blossoms to press. They told us that we could not go to the place in a car, but a little way. Still further inquiries indicated that it was between three and four kilometers, which is as nothing by car. We had first asked the woman if she could have some bulbs brought to the market by Monday morning, but she said that Tuesday would be the earliest. By that time it would be too late.

The Amaryllis flowers were bright pink, with pink stripes radiating into the white tepaltube which was light yellow at the base, and they had some fragrance. The peduncles are up to 18 inches tall, and the flowers are 3 inches across. The last half inch of the filaments and style is bright pink. The pollen is cream-colored. The more I looked at these bright pink flowers, the more eager I was to obtain bulbs.

In the morning I returned to the market on the chance that there might be some bulbs of the pink *Amaryllis* for sale, but there was no sign of any bulbs. However, I did see a few flowers of the Pink Amaryllis in another shop. Again, I was told that it grew a long way off. We inquired further, and were told to cross the bridge and turn right on the road which leads to the brewery where we could leave the car and walk the remainder of the way. This we did and found ourselves walking between adobe walls on granite foundations which surrounded the little farms. We were the cause of much amusement among the Amerindians living there, but they are very nice. As we progressed we continued to ask if any one had seen these flowers, and we were informed that this was the general area where the pink Amaryllis was native. Finally, we came up to a man who was washing his socks in the acequia or irrigation ditch beside his wife, who was washing clothing. He knew that they grew above, and said that it would take three hours to get some bulbs. Their idea of time is not too accurate, and having a very bad headache I was not too eager to climb an unknown distance. He agreed to have three bulbs by four o'clock, he came down the mountain with eight large bulbs just as we returned at four o'clock.

Upon reaching Lima, I called on Dr. Ferreyra at San Marcos University, and he said that he had never seen anything remotely resembling this *Amaryllis* species! It has four to eight flowers per umbel. He is drying some specimens which will soon be on their way to you for description and identification. Also some bulbs are on their way to Gladwyne.

I will keep my eye open for more *Amaryllis*. This country is beautiful and very fascinating. Dr. Ferreyra wished to be remembered to you."

Hotel Carrera, Santiago de Chile,
December 10, 1955

"Enclosed is a little thing of a lovely shade of shrimp pink which was growing about the town known as Los Vilos. Yesterday I passed through there and even though the sky was heavily overcast, these lovely shades of pink were wonderfully pretty. I got a number of bulbs. They are 5 cm. in diameter and very round, but they have a neck about six inches long and it and the bulb are *very* dark.

"About ten miles east of La Serena one of the bell boys from the hotel went with me and we got some seed stalks of an *Amaryllis* known locally as *A. añañuca* (= *Rhodophiala añañuca),* but naturally I do not known if it is that or *A. bagnoldii* (= *Rhodophiala bagnoldii).* They were growing on an almost bare granite grit knoll, with almost nothing but cactus for company. They claimed that the flowers are red or yellow. Time will tell us much more. ". . . Some more bulbs have been sent to mother from Peru. Some bulbs from Abancay, one a tiny amaryllid, and the other a fair sized one, but I could find out nothing as to the flower color or blooming habits."

[Editor's note.—In her Air Mail letter, Miss Henry enclosed a pressed specimen of the plant from the environs of Los Vilos which came through in fair condition. This will be preserved for comparison with the plants as grown under cultivation. It shows a short peduncle, two narrow spathe-valves, and a four-flowered umbel, with pedicels varying greatly in length. The stamens are shorter than the tepalsegs, and the style is shorter than or subequals the tepalsegs. The stigma is trifid. This comes very close to *Rhodophiala chilensis* (syn.—*Amaryllis chilensis* L'Hérit.) of which we have only the yellow-flowered form in cultivation at present. According to the published description there is also a bright red form. However, only a closer examination of the living material will make clear just where it belongs.]

THE LECTROTYPE OF **LYCORIS STRAMINEA** LINDL.

HAMILTON P. TRAUB, *California*

In 1845, Fortune sent to Kew Gardens, England, from China, a plant which Lindley named *Lycoris straminea* Lindl., in the Journal of the Hort. Soc., London, *3:* 76. 1848. Lindley gave an inadequate description and the name was in fact a *nomen subnudum.* With this in the way, it was not possible to identify a number of *Lycoris* species recently imported from China and Japan. There was always the possibility that one of these might turn out to be *Lycoris straminea* Lindl.

For over a decade attempts were made to locate the type specimen of *Lycoris straminea* Lindl., but without success until 1954. Finally, through the kindness of Dr. S. M. Walters, Curator of the Cambridge University Botany School Herbarium (CGE), the type material was located. Dr. Walters kindly sent a photograph of this material which is now available for study. Dr. Walters remarks: "As you can see, the two specimens on the sheet differ rather significantly in the length of the tepaltube, the right hand one having the order of 1 cm., whilst some at least of the flowers on the left hand one are only a few millimeters."

According to Lindley, *Lycoris straminea* Lindl., has a very short tepaltube and thus he apparently based his description on the specimen on the left hand side of the sheet which is hereby designated as the lectotype of that species.

It now remains to put on record an emended description of the species on the basis of the inadequate one of Lindley, and the details that can be made out from the designated lectotype.

Lycoris straminea Lindl., **emend.** Traub.

Lycoris straminea Lindl., in Jour. Hort. Soc. Lond. *3:* 76. 1848, *nomen subnudum.*

EMENDED DESCRIPTION.—*Bulb* and *leaves* unknown; *peduncle* up to 22.1 cm. tall, 6.6 mm. in diam., at the base, narrowing toward the apex; *spathe-valves* 2, lanceolate, 2.4 cm. long; *umbel* 5-flowered; *pedicels* 1.1—1.3 cm. long; *ovary* 5.8—6.6 mm. long, almost spherical; *perigone* pale straw-colored with a pink line along the middle of the tepalsegs, and a few scattered red dots; *tepaltube* 4—5.5 mm. long; *tepalsegs* linear-oblong, undulate, 3.5—4.1 cm. long, up to 5.2 mm. wide; *stamens* and *style* much exserted from the perigone; *stigma* pointed. Habitat: China; collected by Fortune in 1845.

M. E. JONES **HYMENOCALLIS** SPECIMENS

HAMILTON P. TRAUB AND ROBERT K. VICKREY, JR.*

Examination of the plant specimens in the Pomona College Herbarium on which *Hymenocallis jaliscensis* M. E. Jones (Contrib. West. Bot. no. 18. p. 33. 1933-35) was based shows that two different species are included in the description given. The type and isotypes from Salsillo, Mexico, and a different and larger plant from La Paloma. Not only did Jones base his description on material from two distinct species, but he also averaged the measurements from these different plants. Thus the tepaltube is indicated as 7.5 cm. long, but the tepaltube of the smaller species (type and isotypes of *H. jaliscensis* M. E. Jones) is actually 6 cm. long in the type, and 5 cm. long in the isotypes. The tepaltube in the larger plant is 12.8 cm. long. Thus the value, 7.5 cm. as reported by Jones was apparently arrived at by averaging the five values, and should be compared with 6.76 cm., the average according to our measurements of the tepaltubes of the Jones herbarium specimens.

Until this error was understood, it was not possible to determine the status of *H. jaliscensis,* and Sealy (1954, Kew Bull. 218) was correct in indicating the anomaly of the longer tepaltube. This confusing situation shows conclusively that in taxonomy when an average value is given, it is necessary also to indicate the actual range of differences encountered.

(a) **Hymenocallis jaliscensis** M. E. Jones, **emend.** (= **H. dillenii** Roem.)

The following description is based on the type and three isotypes. June 1, 1892, Salsillo, State of Jalisco, Mexico, *M. E. Jones* 119,358 (POM), right hand plant (= lectotype); left hand plant (= isotype); and 119,359 (POM), two specimens (= isotypes). Values from the published description (Sealy, 1954) are given in parentheses; identical values are italicized.

Bulb 3-3.5 cm. long, 2.7-3 cm. in diam., sheathed neck 5 cm. long. Leaves 1—*4*, narrow oblong-elliptic, acute, tapering to a petiole-like base, up to 12-14-16.5-20(-23-30) cm. long, up to 0.8-1.4-1.8(-2)-3.3(-3.7-4.6) cm. wide at the widest part. Peduncle produced in June, 16-(-20)-21.5-25.5(-30)-36 cm tall. Umbel (2)-4(-6-8)-flowered. Spathe-valves 1.8-2-3 (-4)-4.5(-5.5) cm. long. Perigone white. Tepaltube (3.5)-*5*-6 cm long. Tepalsegs 4(-5.5-6.7)-8 cm. long. Staminal cup funnel-shaped, *1.5*-1.7-*2*-2.4 cm. long. Filaments *2*(-2.5-3)-4 long; anthers 1.2 cm. long; style overtopping the stamens; stigma capitate; capsule 0.8—1.5 cm. long, containing 2—4 ovate seeds from 4—8 mm. long.

This description agrees well with that published for *H. dellenii* Roem., by Sealy (1954), and apparently *H. jaliscensis* M. E. Jones is conspecific with *H. dillenii* Roem.

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(b) M. E. Jones, 119,360 (POM) = **Hymenocallis acutifolia** (Herb.) Sweet

The larger specimen, June 9, 1892, La Poloma, State of Jalisco, Mexico, *M. E. Jones* 119,360 (POM) has a tepaltube more than twice the length of that found in *H. dillenii* (syn. *H. jaliscensis,* type 119,358), which indicates that the former belongs to another species. The description that follows shows that it is *H. acutifolia* (Herb.) Sweet. Values from the published description (Sealy, 1954) are given in parentheses; identical values are italicized.

Leaves (6) or *7,* linear-lorate, acute, (30)-33(-62) cm. long, (1.4)-1.8(-2) cm. wide. Peduncle 21.5(-25-38) cm. tall; spathe-valves (5.5)-6.2-(12) cm. long. Umbel (3)-4-(6)-flowered. Perigone white. Tepaltube (7.5-8.5-12)-12.8 cm. long. Tepalsegs 8-(8.5-11-12) cm. long. Staminal cup (2)-3(3.5-4?) cm. long. Filaments (4)-*6* cm. long. Style overtopping the stamens. Stigma capitate. Capsule 1.4 cm long.

As indicated the agreement is very close to that of *H. acutifolia* (Herb.) Sweet and the specimen may be referred to that species.

ACKNOWLEDGEMENT.—Thanks are due Dr. Lyman Benson, Botany Department, Pomona College, for re-checking certain critical measurements included in the present report.

HYMENOCALLIS KIMBALLIAE SMALL, EMEND.

HAMILTON P. TRAUB, *California*

In 1933 Small described *Hymenocallis kimballiae* from western Florida. He based his description on a plant collected on the Appalachicola River in northwestern Florida by Mrs. Kimball of Mobile, Alabama. Mrs. Kimball transplanted the species to her garden in Mobile, and it was from this source that Mrs. Mary G. Henry obtained offsets in 1951 which she shared with the writer. The plant has been grown as a tub patio plant in California since 1952, and it developed into a magnificent clump when it flowered on October 20, 1955, at La Jolla. The writer made a new description from living material which amplifies the incomplete diagnosis by Small. In the emended description Small's data is included in parentheses when it differs from the new information, and is italicized when the values are identical in both.

Hymenocallis kimballiae Small, **emend.** Traub

Hymenocallis kimballiae Small, S. E. Flora, 323, 1053. 1933. Holotype collected May 1921 by Kimball (NY).

Bulb ovoid, *large,* without a pseudo-stem. Leaves (on mature bulbs) 6—10, evergreen, thick-textured, furrowed in center on top, deep green, shiny, very narrow hyaline edge, mostly ascending, spreading, 43—58 cm. long, wide lorate in upper part, 5—7—(10) cm. wide, apex acute, sometimes sword-shaped, and narrowing to the base, 3.8—4.4 cm. wide. Peduncle 42 cm. tall at anthesis, *flattened, sharp-edged, glaucescent throughout,* 2.6 cm. in diam. at base, 2 cm. in diam. at apex. Spathe-

valves 2, 8.2—10 cm. long, up to 3 cm. wide at the base, tapering to a blunt apex, thin, whitish, soon becoming papery. Bracteoles similar to spathe-valves but smaller. Umbel 8—(9—15)-flowered. Ovary sessile, light green, 1.4 cm. long, 1.4 cm. wide. Ovules 6 per locule. Perigone white and greenish-yellowish in general aspect, tepaltube greenish below, whitish toward apex, tepalsegs white on upper side, yellowish-greenish on underside. Tepaltube 8.7—(12—16) cm. long, 7 mm. wide, *obscurely 3-angled.* Tepalsegs narrow-linear, *involute,* (9—10.5)—11.2—12 cm. long; setsegs up to 12 cm. long, 9 mm. wide, petsegs up to 11.2 cm. long, 10 mm. wide. Staminal cup funnel-shaped, 2.5 cm. long, 6 mm. in diam. at base, (2.5—3)—4.2 cm. in diam. at apex, margins of cup not spreading, irregular, but not distinctly toothed between the filaments (a minute tooth between the filaments according to Small). Stamens and style yellowish in lower part, changing to green in upper part; filaments 6—6.5 cm. long; anthers 2 cm. long, pollen orange-colored. Style overtopping the stamens, stigma capitate. Capsule broadly ovoid, (2.5—3.5) cm. long. According to Small it flowers in summer in its native habitat, and has a fragrance reminiscent of the tea rose.

TYPE MATERIAL.—It was collected by Kimball in the estuary of the Appalachicola River in May 1921 and is reported (Small, S. E. Flora, 1503. 1933) to be in the New York Botanical Garden Herbarium but the holotype has not been located up to the present. The specimen—Traub 523a & 523b (one flower dissected)—from cultivated plants (in hort. Traub, La Jolla, Calif.) can be traced back to the original holotype material from which it was propagated by vegetative means. Mrs. Kimball, the original collector, has definitely stated that it was derived by vegetative propagation (offsets) from the living holotype material. Therefore, until the holotype can be located, the specimen, Traub 523a & 523b, may be used as a substitute.

DISCUSSION.—On the basis of Small's incomplete morphological description, Sealy (Kew Bull. 224-225. 1954) reduced *H. kimballiae* Small to *H. latifolia* (Mill.) Roem., but this appears to be untenable in the light of the emended description. *H. latifolia* has a relatively long pseudo-stem (14 cm. long) formed by the bases of the leaves, 2 ovules per locule, and is generally a larger plant with leaves 50—90 cm. long; peduncle 60—80 cm. tall, whereas *H. kimballiae,* under cultivation from 1951—1955 has not developed a pseudo-stem, has 6 ovules per locule, and is a smaller plant with leaves 43—58 cm. long; peduncle 42.5 cm. tall.

Although the number of ovules per locule may vary somewhat in some species, a difference as great as 2 to 6 in this case appears to be significant. This, together with the absence of the pseudo-stem and a generally smaller plant, appears to justify maintaining *H. kimballiae* as a separate species. A comparison of living plants of these two species may reveal other differences of diagnostic value.

Chromosome studies of *H. kimballiae* are being made by Dr. Flory. At present no living material of *H. latifolia* is available, and it is hoped that collectors will provide it for similar studies. Such comparative data should throw further light on the affinity of these two species.

H. kimballiae somewhat resembles *H. tenuiflora* Herb., particularly in having *more* than 2 ovules per locule (3-4-5), but the staminal cup is somewhat smaller and the flowers are more slender in appearance in the latter species. *H. pedalis* Herb. with 4—6 ovules per locule differs from our plant in the shape of the leaves, longer tepaltube and generally larger size of the plant.

DUTCH PURE WHITE HYBRID **AMARYLLIS**

WYNDHAM HAYWARD, *Florida*

The Dutch Amaryllis growers maintain a virtual monopoly on the production of "pure white" Hybrid *Amaryllis* seedlings and named clones at the present time. No commercial growers or dealers in America are offering pure whites in quantity, either seedlings or named clones, in the trade except those of Dutch production. A few growers are beginning to work up stocks from seed and by vegetative propagation methods, but they are not an important factor yet.

Ludwig and Co., one of the three leading Dutch Amaryllis firms, sell to dealers in the United States an outstanding "pure white" Amaryllis currently under the name 'White Giant', their standard white variety, which at its best is a superb form with flowers up to 8½ or nine inches in diameter. The bulbs must be well established and the plants well grown to produce this outstanding quality. Unfortunately very few bulbs become well enough established the first season, in the author's experience to demonstrate this quality. But it can happen.

When well grown, as indicated, 'White Giant' is doubtless as fine a pure white as exists in the named clone field. Close to it is the new white, 'Ludwig's Dazzler', which Ludwig & Co. describes as "a fine accession to our collection, a promising clone which will win the hearts of Amaryllis lovers in the future." The writer has seen magnificent specimens of this plant to date but too few to form an opinion of the clone for general purposes.

"Pure white," in an Amaryllis, is more or less a relative term. All the white *Amaryllis* in the trade have been bred by painstaking segregation and careful crossings out of colored or partly colored *Amaryllis* over the past century. Pure whites were obtained more than 50 years ago, however, in Europe, and are pictured in Dr. Nehrling's monograph "Die Amaryllis" (1908).

'White Giant' (Fig. 11) has a light green throat. Grown under glass this green, which exists more or less in all "pure white" Amaryllis, becomes a pale or light apple green that is actually charming and sets off the pure crystal snow-color of the tepalsegs. 'White Giant,' however is not always an easy bulb to establish, to grow or to bloom. Unfortunately this is true of most of the whites.

For a specimen of 'White Giant' at optimum quality of flower see the accompanying photograph taken in Winter Park showing a specimen

grown in the spring of 1954 by Miss Susan Lupe, an excellent plants-woman. Photo by Sickles Studio. The flower is wide open, flaring, with just about everything an *Amaryllis* could have.

'Queen of the Whites' (Fig. 12) heads the list of the Warmenhoven strain whites. J. R. Manley rated it continuously AA in the Cleveland Amaryllis trials, which he conducted several years ago, and his photo-

Fig. 11. Pure white hybrid *Amaryllis* clone—'White Giant' (Ludwig), as grown by Miss Susan Lupe, Orlando, Florida, in 1955. Photo—Wyndham Hayward.

graphs and color slides show a magnificent specimen which fully deserves the honor. However the writer has found that very few of the bulbs of 'Queen of the Whites' will equal this particular bulb which Mr. Manley received and tested for his trials. Probably 200 bulbs of 'Queen of the Whites' have been bloomed at Lakemont Gardens in Winter Park over the past 10 years, and the quality of the flowers, even on giant bulbs and some well-established, first, second and third year plants, has been good,

bad and indifferent, perhaps one-half good, 10 per cent bad, (definitely rogues) and the balance good to indifferent, but mostly reasonable quality flowers.

The conclusion has been inescapable to persons who have studied these plants in bloom that there are a number of variant types and a few rogues in the 'Queen of the Whites' stock. When one receives one of the top quality bulbs, such as Mr. Manley received, one has obtained

Fig. 12. Pure white hybrid *Amaryllis* clone—'Queen of the Whites' (Warmenhoven). Photo—Thomas R. Manley.

one of the finest pure white Amaryllis in the world. It is a huge, rather informal flower at its best, but graceful and charming. Size up to 8 or 10 inches diameter. Narrow petaled types and bulbs producing greenish or red dottings or markings on some petals form the major part of the rogues. About two out of fifty bulbs each season turn out to be some other color entirely, definitely showing the presence of rogue material.

This is easily understood when one realizes the difficulties and

scientific control necessary for the vegetative production of a true stock of a pure white named clone of Amaryllis. It is only too easy to spill a few of the small vegetative propagations by accident from one flat to another in the lath house or greenhouse when the cuttings are being

Fig. 13. Pure white hybrid *Amaryllis* clone—'Nivalis' (Ludwig). Photo—Shockley.

made by hundreds and inserted in the propagation flats. The stock could be cleaned up by propagating only from bulbs of known superiority, the best types in the clone.

However, here another factor enters the picture. John Weisner and others who are experimenting with the Dutch propagation cuttage meth-

ods report their sincere belief that newly propagated bulbs may show variation the first season or two after they mature. In other words juvenile bulbs may not, even under optimum culture, reveal the full glory of the mature parent clone. This could indicate that some of the ''good to inferior'' bulbs which have turned up in 'Queen of the Whites' and other clones are merely the product of juvenile bulbs, not yet old enough to produce top quality flowers.

One factor which may influence this is that a normally grown adult Amaryllis bulb is three to four years old when sold, at mature size of 3 to 3½ inches diameter (26-28 cm.). However, by rushing the bulbs in growth, forcing them into a quick maturity, with heavy over-fertilizing, one can produce Amaryllis bulbs 2½ inches diameter and up, which are blooming size, in 18 months to 30 months. It is possible that these heavily forced bulbs will not produce a top quality flower the first season. This is worth investigation.

In other words an Amaryllis bulb started in October of 1950 from small vegetatively propagated cutting, could have been ''forced'' to blooming size in the case of a reasonably vigorous clone, by March 1952 (18 months), and readily by March of 1953 (30 months). But the commercial grower who takes the normal three or four years, will not have had the bulb attain blooming size until 1954, or possibly 1955 in the case of a slow growing clone. All the pure white Amaryllis are slower than most of the colored clones in their growth, more delicate in constitution, and generally less vigorous and thrifty, as is the case with other pure white flowers.

Other good pure white clones in the Ludwig portfolio are 'Snow Queen' and 'Nivalis' (Fig. 13), excellent quality bulbs, with medium size flowers, easy for the amateur to grow and bloom and free flowering under good culture. These will last for years in a collection with proper care. They are not recommended for outdoor culture, although some fanciers do succeed with them outside in the lower South. They come from a long line of greenhouse generations, are less robust than their colored confreres, and need more protection from torrential rains, cold and hot sun in the lower South and similar climates. In the North they are strictly a pot plant.

Other Ludwig pure whites include 'Bridesmaid', 'Early White' (the earliest flowering of all, but frequently comes with only two flowers to the scape and may show darker shading on reverse of the petals) 'Caspar Ludwig,' etc. These are good, reasonable whites of no special merit over the others. A new Ludwig white named 'Marie Goretti' has interesting fringed character.

Warmenhoven's list of pure whites also boasts 'Joan of Arc,' at its best the world's finest pure white Amaryllis in this grower's opinion, but again, there are occasional rogues and inferior quality flowers. It is wide petaled, just slightly informal (off the stiff, formal pansy shape) enough to make it appealing and lovely. Only about half the bulbs of 'Joan of Arc' which have bloomed at Lakemont Gardens have approached this superb quality flower. The quality runs high in this clone

however, and the clone seems reasonably clean and free from aberrant forms and rogues, comparable to the Ludwig & Co. pure white clones in this regard.

Many amateurs who have bloomed no other pure white clone in top exhibition form have had good success with 'Joan of Arc,' hence its popularity in the trade today. Other Warmenhoven whites are 'Mt. Tacoma,' and 'Leading Lady,' which are clones similar to 'Joan of Arc' and 'Queen of the Whites' but which usually do not create so favorable an impression when in flower. With optimum results, however they will surpass an ordinary 'Queen of the Whites' or 'Joan of Arc' in exhibition flower quality.

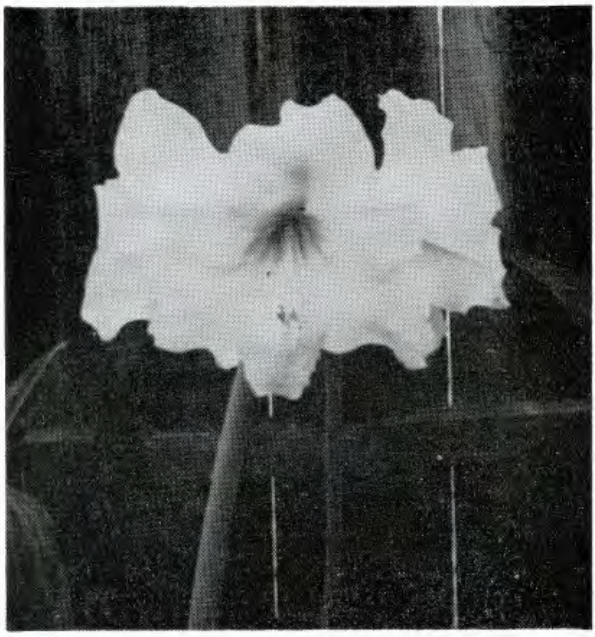

Fig. 14. Pure white hybrid *Amaryllis* clone—'Albino' (van Meeuwen). Photo—Wyndham Hayward.

The only pure white in the Van Meeuwen price list of named clones is 'Albino' (Fig. 14) which has proved to be outstanding in optimum flower form, but occasionally showing variation in the flower and sometimes pink or red dotting on the petals with occasional bulbs, as do the Warmenhoven clones, especially during warm weather in spring at the height of the blooming period. The Ludwig bulbs seem nearer the pure albino type, and seldom or never show the red dotting or lines. These traces of color ancestry occur mostly on petals of second or third or

fourth flowers to open in the case of 'Queen of the Whites' or 'Albino', and are no serious detraction.

SUCCESS WITH **ZEPHYRANTHES FLAMMEA**

Mrs. Morris Clint, *Texas*

Toward the end of December, 1953, about 30 bulbs of *Zephyranthes flammea* (R. & P.) Baker were received from Dr. Cesar Vargas of Cuzco, Peru as "*Zephyranthes tubiflora* var. *flammea*, coastal type collected near Cuzco." When asked about culture, Dr. Vargas stated that the bulbs grew in sandy clay soil in full sun and bloomed in the month of September, the beginning of spring in Peru. Information from other sources of this species in the wild told of climatic conditions impossible to duplicate in our garden. However, our experience with various Mexican species of *Zephyranthes* has shown us that natural environmental conditions usually must be somewhat or even radically altered for successful garden culture, so it was decided to forget all that we had read about the habitat of this species and to use the meager information received from Dr. Vargas as a starting point and feel our way from there.

With the bulbs came 15 tiny, hard-coated, seed like bulblets, 1/8" to 1/4" in diameter. We now know that these are the mature bulblets often found around the base of some species in the subgenus *Pyrolirion*, but at the time we were quite mystified as to their identity. Of course, natural curiosity prompted us to plant them. Not certain whether they were seeds or bulbs, we set them about 1/2" deep in a 6" bulb pan in ordinary potting soil and kept them moderately damp. Within a few weeks we were rewarded with a few tiny, thread-like leaves. When the contents of the pot was transferred to open ground around the last week in February, more than half of the bulblets had sprouted and shortly after most of the others came up (eventually, 14 were raised to maturity). All grew so rapidly that their marked resemblance to the older bulbs soon left little doubt as to their true identity.

The adult bulbs were first planted in three 7" bulb pans in sandy loam potting soil, with oak leaf mold added for humus content. The pots were kept in as much sun as our patio could provide and watered rather sparingly. Leaf growth was slow and reluctant, but satisfactory enough. Late in February, 1954, the bulbs were planted in our amaryllid beds at the farm in three different locations, with the light varying from full sun to more than half shade. The bulbs in shade stayed moist longer and soon outgrew their sisters in full sun. Light rains in April and May, however, reversed the picture and, in addition, the group in full sun rewarded us in May with a gorgeous, flame-red blossom (Fig. 15). During this entire period, natural rainfall was very light and infrequent and auxiliary watering was resorted to only when the plants showed serious need, for fear of rotting the bulbs. On June 24, a small

gulf hurricane brought us 4″ of rain. The response of all bulbs to the extra moisture was so immediate and so startling that we resolved to increase our watering program in the future—at least during their active period of growth.

When the heavy rainfall brought no more flowers, we wondered whether the bulbs would bloom in September or whether they would

Fig. 15. *Zephyranthes flammea* from Peru, as grown by Mrs. Morris Clint at Brownsville, Tex. Scape 11-½ inches tall; flower 3½ inches in diameter. Photo—Mrs. Morris Clint.

adapt themselves to our seasons and bloom normally during our own spring. In September, 1954, the rains were late, but a series of showers ending in very heavy rainfall around the first week in October brought no blossoms on our bulbs, so the first of the questions was answered. Shortly afterwards, the bulbs began to go dormant so it was decided to proceed on the theory that they would bloom in the spring if allowed a

period of winter rest. Consequently, when we were forced to move the bulbs (late in October) in re-vamping some of the beds, we replanted them immediately without watering them.

All but the clump of bulblets were dug and found to be large and solidly healthy. Most of the bulblets on the first clump that we handled were unfortunately lost, for we were unaware that the small bulblets detach themselves and inch away from the mother bulb when mature. They are easily lost in the loose soil and extreme care is necessary to gather the entire supply. We now find it simpler to locate and remove them before disturbing the older bulb in any way. This is not too difficult, as we found that the largest bulbs were very shallowly seated in the ground, with only an inch of soil above the tops of the bulbs.

For our new location, we chose a newly prepared bed of sandy loam on a slight slope, partially shaded in the summer after 4 P. M. by an ebony tree. The soil had been spaded to a depth of 10″, mixed with gypsum (to help dissolve a salt crust which forms when strong gulf winds bring salt laden air and dust across miles of prairie and farm lands to the north and east) and superphosphate, and about an inch of granulated peat thoroughly mixed with the top 4″ of soil. The bulblets were planted about ¾″ deep in separate rows in the same bed. At the present writing (July 1, 1955), all or most of these bulblets are still firm and good, but have just begun to sprout. We now regret that we had not planted them in pots and kept them moist, as we would have gained 6 months or more in time.

The bulbs were not watered at all during the winter and early spring and rainfall for the same period was negligible. Early in April, we noticed the first tips of green showing on a few of the Peruvian bulbs, so decided that the time had arrived for their first watering. Light rain fell that night and one can imagine our joy and satisfaction when we discovered 3 buds the next morning. The beautiful flowers stayed in good condition for 3 or 4 days, were hand pollinated, but failed to set seed. A heavier watering was given about 10-14 days later—which brought 10 flowers, including one on the group of young bulbs we had raised from bulblets! On the next blooming, we had 15 flowers, including several on the young bulbs, and by the end of May, all of the larger bulbs had bloomed and most of the bulblets. Whether we may expect more than one blossom per bulb when they are more established remains a question still to be answered.

All efforts to set seed have so far failed, but the quantity of bulblets produced by each bulb and the short time required to bring these along to blooming size should satisfy all amateur propagation problems. Our young bulbs were moved for the first time around the first of May, 1955 and were found to possess both mature and newly forming bulblets. The latter were planted immediately in pots and have already started to sprout, so we are well under way with our third generation.

As we have now carried the Peruvian bulbs well past a full year's cycle of growth, and have grown and flowered one set of bulblets, it seems safe to believe that *Zephyranthes flammea* and possibly other

relatives of this species can be grown and flowered successfully in the Rio Grande Valley of Texas and in other regions having similar climatic and soil conditions.

HAEMANTHUS ZAMBESIACUS

L. S. Hannibal, *California*

This rather unknown plant is allied to *Haemanthus multiflora* in that it has a leafy stem sheathing the leaves, keeping them well clear of the ground, and a scape that is quite sturdy, which supports a colorful flower umbel. *H. zambesiacus* Baker is found in the summer rainfall area of Southern Rhodesia at an elevation of 5000 feet. Typical of the plants of that area it is spring flowering (November) with the foliage appearing soon after the scape has reached its full development. From descriptions the plants must provide a vivid splash of color across the veld when in flower. This is understandable as the entire umbel with its many flowers is a very brilliant red.

On close examination the umbel is composed of a hundred or more individual flowers, each on a delicate pedicel 2 or 3 cm. long and less than a mm. in diameter. The tepalsegs have degenerated to a point where they are merely fine filaments about 15 to 20 mm. long. The floral pigmentation, a deep red color is carried in both these tepalsegs and the stamens. The anthers are quite small, but a bright yellow, and show up quite vividly when examined closely. The spathe valve is in five parts.

The writer's bulbs were received too recently to know much about their culture. Apparently they grow in a black loam (an equivalent of our "Black Adobe") and should be hardy to relatively sharp dry winter conditions. From the appearance of the initial blossom the plant is a welcome collector's item.

NEW HEMEROCALLIS INTRODUCTIONS OF MERIT

Philip G. Corliss, M.D.
Somerton, Arizona

The increasing number of hemerocallis registrations and the swelling ranks of breeders make it impossible for any evaluator to be familiar with the merits of all the new varieties. There are doubtless many fine daylilies now available which are not included in the following recommendations because I have been unable to study them sufficiently or perhaps even to see them at all during the past season which carried me nearly twenty thousand miles on trips to visit breeders, growers, and exhibitions in all parts of the country. Some omissions are purposeful, however, as the varieties had some fault such as weak scapes, etc.

Personal preferences in flower colors, sizes, patterns, forms, and other characteristics vary. Were it not so, our hierarchy of iris judges would have caused the disappearance of any iris which showed venation

at the haft regardless of whether such markings accented or enhanced the beauty of the flower. Some rosarians would have stopped the progagation of all but fragrant roses, despite the offense of fragrance in the hospital or the home and garden of those subject to allergies. There are daylily judges who want flowers whose color is a clear self. Others like only green throats, feeling that green-throated flowers are cool and restful in the midsummer garden when the daylily becomes truly the perennial supreme. (Personally, I would prefer the brightest of throats, as I seek stimulation from flowers—if I wanted to be rested and cooled I would leave the garden for some air-conditioned retreat where I could

Fig. 16. Hybrid *Hemerocallis* clone—'Green Envy' (Lenington). Photo—Dr. Philip G Corliss.

close my eyes.) Realizing that there are many tastes, I have therefore listed what I found to be the best of many types among recent introductions.

My article on regional daylily performance appearing elsewhere in this issue should be studied before deciding which of the recommended varieties you will acquire. *The hybrid daylily introduction of 1956 which performs well in every region is the exception.* Introductions from breeders of your region, or from breeders whose past releases have proved to be good in your region, should be preferred.

DWARF: There are but few true dwarf daylilies (under twelve

inches in height), the available ones are sparse bloomers and do not have tiny flowers, as do the dwarf roses, etc. Mrs. Robert Schlumpf, of Houston is one of the leading breeders of dwarfs and her 'Yellow Rain' will soon be joined by several others. Among her seedlings are some dwarf doubles. 'Little Cherub' (Claar) will usually fit the height requirement of the dwarf class.

LOW GROWERS suitable for borders were well represented in introductions of the past decades but the interest in larger flowers of more height has caused many of them to fall into undeserved obscurity. Among the newcomers may be mentioned: 'Sparkle' (Arthur Jones, Atlanta) is a dependable bicolor of clean tones and sun resistance—I am proud to have selected it in this breeder's seedling beds. 'Dixie Pixie' (Mrs. Will Land, Beaumont, Texas) is a pert little fellow of smart red with an interesting form. 'National Velvet' (Viola Richards, Indiana) is highly acclaimed as a red border flower of good habits. 'Havana Brown' (Milliken) is one of my favorites, although the color has proved to be darker than the name suggests.

SPIDERS: The low favor in which the large spider types was held has been replaced by a general tolerance and even some degree of popularity, especially since they are appearing in clones whose scapes are strong enough to stand erect with their heavy flower load. Even such conservative breeders as Mrs. Thomas Nesmith now introduces some spiders. Among the best new ones: 'Daddy Long Legs' (Mrs. Walter Schroer, Valdosta, Ga.) This was the sensational seedling at the 1954 meeting of The American Hemerocallis Society—a huge yellow spider with stunning maroon band. 'Oliver Twist' (Emigholz): I had the honor of naming this, and am pleased to see that no less an astute judge than Mrs. Frances Lamb of Lexington, Ky., concurs in my judgment. 'Red Resplendence' (Nesmith): This may be considered an huge star-shaped flower rather than a spider, but its brilliant red segments of great length will place it high on any list. 'Sumatra' (Land): This one is different: it has an oriental overlay that gives it charm and distinction. 'Summer Orchid' (Mrs. Aldina Gates, Baton Rouge): The incredible competitive entry of this spider in The American Home Achievement Medal Class at the Baton Rouge 1955 Exhibition gave the judges (I was one) an easy job, although there were thirty-seven outstanding entries in the class. One of the three spikes of 'Summer Orchid' entered held five huge magnificent flowers open; the other two spikes had three flowers each! 'Preacher Gray' (Mrs. Dave Clark, Baton Rouge): This and 'Scorpio' (Wheeler) are the only spiders I have seen whose extensive petals will produce THREE complete twists!

EVENING BLOOMERS: To meet my favor, an evening-blooming daylily should open its flowers as soon as the day's heat is done: at sundown. The evening bloomer that opens at nine or ten is of little merit compared to that which unfurls a fresh flower at dusk when, deprived of the pleasure of our garden by the midday heat, we seek its cool beauty. Evening bloomers should either drop before morning garden visitors appear or should remain in attractive condition until the heat empties

the garden of its human elements. The flower which best meets these requirements is 'Twilight Tryst' (Nesmith). Its erect scapes, with high but multiple branching, carry many buds which open yellow flowers with narrow bands. Two other recent Nesmith introductions, 'Thistledown' and 'Eventide' also receive high rating. For those who prefer evergreen varieties, 'Night Life' (Register) is supreme.

Fig. 17. Hybrid *Hemerocallis* clone—'Sunset Sky' (Bright Taylor). Photo—Dr. Philip G. Corliss.

EYED (BANDED) VARIETIES: This class has indeed received a "new look" during the past few years. Formerly composed chiefly of yellow flowers with dark zones of varying width, we now find in this group large size, triangular form, twisted segments, and a full range of colors. 'Hidden Heart' (Nesmith) for instance, is a pastel lavender with purple band, while 'Hopi Chief' (Connell) has a basic color like the flesh of ripest cantaloupe with purple zone. From Mrs. Bright

Taylor, Mr. David Hall, and the author of this article—and presumably many breeders—we will soon have pinks of various hues with contrasting bands. Among the outstanding novelties are: 'Halo Light' (Nesmith): A 1956 introduction of unusual beauty. 'Nashville' (Claar) The banded wonder that "has everything"—crimped, twisted segments; large size; triangular form; etc. 'Norma Borland' (B. Taylor): Overlapping petals and deep orange color in a large and vigorous flower of round form. 'Petrouchka' (Nesmith): I watched this one from its virgin bloom and was given the honor of naming it. The unusual melon-colored flower has strong white ribs in addition to its dark bands. 'Trophy' (Saxton): Perhaps the most dependable extended bloomer of this class, remaining open until midnight.

UNIQUE COLORS: There are some named clones which stand alone because of their unusual color. Familiar varieties of this class are 'Kanapaha' (Watkins) and 'Spice' (B. Taylor). Some good new ones: 'Fiftieth Anniversary' (Stout): This is a banded variety, but its peculiar base color of tangerine-like tone with wide purple band make it unique. 'Jack Frost' (Lester): The frosty edge on the segments of this large and beautiful yellow flower may be due to fading, but it is always outstanding. 'Hawthorne Rose' (Bach): This handsome flower has an unusual rose color accented by white ribs which is not duplicated by any variety I have seen. 'Orange Ice' (W. Wood): Here is a large flower in tangerine color which is exciting favorable comment everywhere.

The rest of the new introductions I would recommend, subject to their regional performance, will be grouped by color class only:

PALE YELLOW (NEAR-WHITE) An albino daylily has not yet been reported. The closest approach to white flowers is found in the pale yellows, which vary according to conditions of soil, temperature, humidity, and sun. The late Mrs. William Bach of Bloomington, Illinois had a good lead on most other breeders in the search for light flowers. Her charming 'Snowy Egret' was descended from her yellow 'Alice' and the generation beyond 'Snowy Egret' produced 'White Orchid,' 'White Triangle,' 'White Elf,' 'White Tower,' 'Grace Lanore,' and 'Blanche Lafitte.' From the northeast come 'Carved Ivory' (Nesmith) and 'Evalina' (Saxton), both of them exquisite flowers which are trailblazers in the quest for whites. The fabulous garden of Mr. Hooper Connell in Baton Rouge has been the birthplace of many outstanding near-white flowers, two of the Connell introductions in this class being 'Fortuna' and 'Verilite.'

MELON (CANTALOUPE or HONEY-DEW, that is): The hems in the delicate melon tones make delightful garden subjects, blending especially well with most other garden flowers. The most outstanding flower in this class is Mrs. Nesmith's 'Precious Treasure,' which surprised me by holding its elusive color in gardens where I have seen it in several parts of the country including the deep South. I am partial to Mrs. Bright Taylor's 'Cockade' for its perky form and frequent extra flower segments. Mr. Lemoine Bechtold's 'Distinction' is a large spider-type flower, unique in this color class, as far as I know.

COPPER: The hardy 'Copper Colonel' (Sass) and the evergreen 'Olive Baldwin' (B. Taylor) are now joined by Mrs. Schlumpf's 'Copper Crest' which I have grown for several years. It performs better each year and is rapidly becoming one of my favorite varieties.

PASTEL: The modest descriptions with which Mr. Henry Sass introduces his hemerocallis have caused many to overlook his delectable 'Ivory Glow,' which is truly a garden treasure. Mrs. Will Land's 'June Ohmstede' is a dependable performer in the class which produced the current Stout Medal winner—'Prima Donna' (B. Taylor).

Fig. 18. Hybrid *Hemerocallis* clone—'Beau Brummel' (Nesmith). Photo—Dr. Philip G. Corliss.

FULVOUS: Although it is now the fashion to decry fulvous daylillies, no garden should be without the valiant 'Rusticus' of Mr. Hooper Connell. Its sturdy stalks should serve as models for every breeder who seeks to produce flowers whose scapes will not sprawl into neighboring clumps. The flowers of 'Rusticus' approach a medium brown tone, so heavy is the overlay of brown stippling.

SALMON: Depending on their performance in your region, I recom-

mend either 'Salmon King' (G. Douglas) or 'Salmon Sheen' (B. Taylor).

YELLOW: Despite the great increase of daylily registrations in the past decade, have you ever considered how really few of the yellow varieties are top performers in every respect? Substance, sun-resistance, scape quality, or floriforousness are often lacking in older yellow daylilies. I find that my list of improved yellow daylilies comes chiefly from the south. Listed alphabetically and with their chief merits, are: 'April Showers' (LAND): has delightful form, remontance, large size. 'Butterball' (Schlumpf): is good in the North and the South. Its flower is fragrant and has a delightful open form with charming ruffling. 'Crepe Suzette' (Connell): The overlapping petals are so full that the heavy texture and crimping produce an unique flower. 'Gita' (Traub): Darkest of the medium yellow, this dependable flower on erect scapes is always a garden joy. 'Mary Henry' (Traub): No chorus girl is this stately queen who proudly holds her head above lesser stars. 'Peace' (Register): I see no reason to retract my earlier declaration that this is the finest yellow daylily for southern gardens—its smooth beauty befits its name. 'Spring Song' (Register): Large flowers and loose ruffling identify this handsome variety. 'Yellow Cotton': (C. W. Davis, Baton Rouge): This large flower always attracts attention with its stunning color mass.

ORANGE (GOLD): If 'Naranja' (Wheeler) and 'High Noon' (Milliken) are to be displaced as the leaders of this class, the following seem to be most likely to accomplish the feat: 'Coeur De Lion' (Connell): As stalwart as its namesake, and only one of many fine golds from Mr. Connell. 'Cradle Song' (Milliken): Worthy offspring of 'High Noon,' slightly shorter in scape height, but more floriforous. 'Gold Cloud' (H. Sass): When the modest Henry says, "This is perhaps my finest introduction" you don't need to see it to know how good it is: Terrific! 'Gold Strike' (Milliken): Oh, for a 'Gold Strike' that would never stop blooming! Sutter never had it so good! 'Gold Vellum' (Nesmith): A 1956 entry from Fairmount Gardens that has the chic tailoring one expects from Mrs. Nesmith. 'Golden Cockerel' (Nesmith): Another Fairmount hem I was privileged to name. It is a late-season bloomer that will make friends and influence people in any garden. 'Golden Triangle' (Traub): Will take all comers in its class. 'Louisiana Purchase' (Miss Edna Spalding, Louisiana): A slight fulvous zone fails to dim the lustre of this large and handsome flower. 'Yellow Orchid' (Bach): Don't let the name dissuade you—it is partly my fault, for I simply had to burst into print about this stunner—it is golden.

GREEN: Fortunately (?) there aren't any green daylilies—yet. But the growing number of hemerocallisarians who want to be "cooled" by green throats will be thrilled by Mr. George Lenington's gold 'Green Envy' (Fig. 16) which surrounds a surprisingly large throat of green with full crimped petals of rich gold.

BLENDS: In pastel tones, but with richer coloring than the "pastels" listed above, we suggest these: 'Creole Belle' (Mrs. J. C.

Murphy, La.) Handsome flower with blue tones. 'Chloe's Child' (Nesmith): This large and full flower of open countenance is surely one of Mrs. Nesmith's greatest breeding triumphs. 'Intermezzo' (Wm. Munson, Jr., Florida): Exquisite beauty of form and coloring are combined in an exotic beauty from one of our newest and youngest breeders of distinction. 'Rising Star' (B. Taylor): The advent of blue tones in this leading breeder's introductions. 'San Francisco' (B. Taylor): The availability of this majestic beauty has gladdened the hearts of many

Fig. 19. Hybrid *Hemerocallis* clone—'Marse Connell'. Photo—Dr. Philip G. Corliss.

who have admired it or heard rumors that it rivalled the charm of its namesake city. 'Sunset Sky' (B. Taylor) (Fig. 17): A true blend, with definite blue cast in the stunning color ensemble.

BICOLORS: This class should be limited to those flowers whose sepals and petals are contrasting (not banded varieties) and a separate class should be provided for bitones (sepals and petals of varying depths of the same color). The best new ones: 'Gay Lark' (Connell): This one has already climbed high on the Popularity Poll and needs no "push"

from anyone. 'Merriewoode Star' (W. Wood): This enormous flower of tawny brown and yellow will please especially those male gardeners who like their hems to be big and spectacular. 'Son of Troubadour' (C. W. Davis): Worthy son of a worthy parent! Now we will tackle the large class of shades of red—from pink to darkest black-red. Regional performance and local conditions will affect the color of these flowers more than those in the yellow classes.

PINK: Please remember that there are many "pinks" in all color charts. A salmon-pink is a pink according to the charts just as truly as that baby-ribbon pink which most people expect when you mention "pink". The most outstanding baby-ribbon pink is still 'Marie Wood' (W. Wood) but it is a capricious performer in many climates. When it thrives, it has no close rival in its color class. Of similar color, and a good performer, is 'Pretty Pet' (Nesmith). Although Mrs. Nesmith's Pink Prelude is still new and scarce enough to include in this list, I must confess to a preference for some of its direct descendants—notably 'Pink Profusion' and 'Her Majesty.' Stevens' Pink Damask is another northerner of which the same things may be said as of 'Pink Prelude.' From the Chicago breeders, 'Evelyn Claar' (Kraus) continues to rate highly and its offspring, such as 'Tootie' (Claar) carry its orchid tones. We have some fine "frosty" pinks now available. These are pinks which, when they fade, attain a delectable frosty sheen like strawberry meringue. Viola Richards' 'Cherubim' and 'Seraphim' appear to be two of the best of this type. We still like Frank Child's 'Pink Dream,' but, like 'Pink Prelude' and 'Pink Damask,' some of its offspring seem superior. 'Pink Delight' and 'Pink Paradise,' both from Geddes Douglas, are strong contenders among the pinks. Despite the availability of these fine pinks, regional factors will make it wise for gardeners in the deep south to depend on the pinks developed from Mrs. Bright Taylor's line breeding for best performance.

ROSE: The baby-ribbon pink is really a diluted rose. Under certain conditions, many flowers classed as "pink" may have a depth of color which takes it into the "rose" class, and some classed as "rose" may often bloom as "pink". An outstanding example of such a chimera is Mrs. Hugh Lester's tremendously popular 'Picture,' a beautiful flower under any condition. Also, like her 'Galahad,' Mrs. Lester's 'Picture' flourishes in apparently all regions. Among new rose introductions from the north, 'Rose Brocade' and 'Regency Rose,' both from Mrs. Nesmith, are outstanding. 'Rose Overlay' (G. Douglas) is a luscious beauty. Among the evergreen varieties, I particularly like Mrs. Bright Taylor's 'Celebrity' because of its size, form, and vigor.

SALMON RED: In this class I include the light brilliant reds which incline to the yellow side of the spectrum. The best example of this color class is Mrs. Nesmith's well-known 'Bloodroot', and it is the Nesmith descendants of 'Bloodroot' which still rule the class: 'Pimento,' 'Pirate's Treasure,' and 'Mount Joy' are now joined by 'Beau Brummel' (Fig. 18) which has added the large size, twisted petals, and triangular form to this color class. Among the evergreen varieties I like Mrs. Bright Taylor's 'Rebel Red.'

RED: Here are the spectrum reds, garnets, rubies, and other red beauties. The best new ones: 'Bess Ross' (Claar): This one is drawing raves from such widely separated gardeners as Mrs. Douglas Pattison

Fig. 20. Daylily flower arrangement including also Alstroemeria and other plant material. Photo—Dr. Philip G. Corliss.

(Calif.) and Gene Wild (Missouri). 'Betsy B.' (Vestal): This one "did something" to me at the Little Rock meeting, and does it again every year. 'Dark Secret' (Connell): Here is one of the few flowers that can

rival the velvet elegance of 'Garnet Robe.' 'Marse Connell' (Connell) (Fig. 19) is the ruby bitone mastadon first escaped from the once-unsuspected nest of so many amazing hybrids to bring fame and its attendant rewards (?) to its quiet and modest originator. 'Crimson Velvet' (Nesmith): is the latest of a distinguished line of ruby beauties which has paraded from Fairmount Gardens ever since 'Royal Ruby' was introduced. 'Semaphore' (Connell): is another solid ruby Connell variety with tremendous color value and velvet texture. 'The Doctor' (Claar): continues to out-perform all other good reds as far as sun-resistance is concerned.

PURPLE: Yes, the dark reds are getting more blue in their make-up. Descendants from 'Amherst' (Wheeler) and 'Canyon Purple' (Nesmith) are the new 'Winter Purple' (Wheeler-Murphy) and Mrs. Nesmith's 'Hidden Heart' and 'Purple Pageant.' From Mr. Connell comes 'Blue Horizon.'

BLACK-RED: Many in this class were formerly called "purple". Good new ones include: 'Convoy' (H. Sass): Dependable, handsome, dark. 'Royal Champ' (H. Sass): A newcomer with height that will set him on guard over lesser fry. I am impressed. 'Royal Envoy' (B. Taylor): The darkest flower to date from Mrs. Taylor, and it has all the good qualities which are expected of her introductions. 'Royal Mantle' (Land): A stunning large flower with recurved segments. 'Royal Toga' (Register): This is still Mrs. Register's finest entry among dark-colored varieties, in my opinion.

BLACK: Not many years ago some of the black-reds were called "black." We now have flowers so dark there is no other place to classify them. Two of our leading newcomers among the breeders seem to have the edge here: 'Black Butterfly' (Mrs. J. W. Alexander, Texas): The Alexander varieties in the L. S. U. test garden at Baton Rouge were one of the outstanding features of the 1955 hem meeting. This variety was one of many in her collection which impressed many visitors. 'Black Knight' (Schlumpf): Here's a really dark one from Houston.

Now, PLEASE, if you got into this article in the middle, go back and read the first three paragraphs and the preceding article. Then you won't be too hard on me if I missed some spectaculars, or if you mortgaged the old home to surround it with some of the varieties I have suggested and they do not reward your favor.

REGISTRATION OF NEW AMARYLLID CLONES

Registrars: Dr. J. B. S. Norton and Prof. W. R. Ballard

This information is published to avoid duplication of names, and to provide a space for recording brief descriptions of new Amaryllid clones. Names should be as short as possible—one word is sufficient. It is suggested that in no case should more than two words be used. *The descriptions must be prepared in the form as shown in the entries below, and must be typewritten and double-spaced.* The descriptive terms used

should be in harmony with those given in the "Descriptive Catalog of Hemerocallis Clones, 1893-1948" by Norton, Stuntz and Ballard.

There is close liaison between the AMERICAN PLANT LIFE SOCIETY and the AMERICAN HEMEROCALLIS SOCIETY regarding the registration of new hybrid daylily clones. By cooperative arrangement with the AMERICAN HEMEROCALLIS SOCIETY, beginning with the 1951 HERBERTIA edition, descriptions of only such hybrid *Hemerocallis* clones for which the registration fee has been paid to Registrar, W. E. Monroe, 2244 Cloverdale Ave., Baton Rouge, La., will be included here also, if requested, and space is available. Correspondence regarding new hybrid Hemerocallis clones to be published in HERBERTIA should be addressed to Prof. J. B. S. Norton, 4922 40th Place, Hyattsville, Maryland, *enclosing self-addressed, stamped envelope,* for reply.

Correspondence regarding other amaryllids such as *Amaryllis, Lycoris, Clivia, Crinum, Brunsvigia, Hymenocallis,* and so on, should be addressed to: Mr. W. D. Morton, Jr., Registrar of Amaryllid clones, 3114 State Street Drive, New Orleans 25, Louisiana, with registration fee of $2.00 for each clone to be registered.

HYBRID AMARYLLIS CLONE

Introduced by Ludwig & Co., Hillegom, Holland,—

'LaForest Morton'. Outstandingly beautiful dark pink Leopoldii; scape 28″; 6½″ wide across face; uniform dark pink self. *Registration No. A-390.* More detailed description will be included in the 1957 issue. Named in honor of the late Mrs. W. D. Morton, Jr. (LaForest Smith Morton).

HYBRID HEMEROCALLIS CLONES

Introduced by Dr. Philip G. Corliss, Somerton, Arizona.

'Black Gold'. Flowers a black self with nasturtium (RHS-610) throat, diamond dusted, 5½″ flower, full, widespread; scape 36″, high, multiple, close branching; evergreen; diurnal; recurrent; extra early; sun resistant; scape proliferations. June 7, 1955.

'Cocopah Rose'. Height 48″; early, remontant, evergreen; scape erect, branching high; banded; petsegs and setsegs porcelain rose (RHS 620), throat persimmon orange (RHS 710), with wide eye-zone of plum purple (RHS 934); heavy substance, full, widespread (6″).

'John Harvard'. Height 30″; extra early, remontant; bitone, petsegs cardinal red (RHS 822), setsegs orient red (RHS 819), throat nasturtium (RHS 610); extended bloomer, evergreen, flower 5″ wide, widespread.

'Golden Pinafore'. Height 30″, early midseason, remontant; ruffled gold flower—tepalsegs and throat cadmium orange (RHS 608), evergreen, flower 4½″, full, recurved.

'Cocopah Firebrand'. Height 45″, early, remontant; tepalsegs blood red (RHS 820) self, throat Chinese yellow (RHS 606), evergreen, sun resistant, flower 5½″ wide.

THE GENERA **RHODOPHIALA** PRESL AND **PHYCELLA** LINDL.: KEY TO THE SPECIES AND SYNONYMY

HAMILTON P. TRAUB, *California*

During the year 1955, Miss Josephine Henry set out on a plant collecting trip in South America. She will travel in various countries as far south as Chile, and will collect various plants, including amaryllis. Since only a limited number of the 31 small-flowering species formerly grouped with *Amaryllis* L. (in the tribe *Amarylleae)* are available in the United States, she plans to collect as many of these as possible in Chile. Traub (1952; 1953) has shown on the basis of breeding experiments that most of these species belong to the genus *Rhodophiala* Presl (in the Tribe *Zephyrantheae).* A few have been referred on morphological grounds to *Phycella* Lindl. (in the tribe *Eustephieae).*

When the plants to be collected by Miss Henry arrive, it will be necessary to identify them. For this purpose, a revised key to the species is required. The objective of this article is to fill this need.

A few words are in order about the use of the key and synonymy. Descriptions of all of the species are at present available in Traub & Moldenke's Amaryllidaceae: Tribe Amarylleae (1949). After any particular species has been singled out by means of the key, the reader may look up the description by means of the index in the text just mentioned. In the text the description appears under the generic name *Amaryllis* plus the species epithet which is carried over to *Rhodophiala* in practically all cases. All of this data will appear in the complete text of the *Amaryllidaceae* now in preparation for publication, but a few years will elapse before this will be actually published. In the meantime, the present key and synonymy will serve the immediate need.

GENUS **RHODOPHIALA** PRESL

Bot. Bemerk. 115. 1844 (lectotype—*Rhodophiala amarylloides* Presl, see Taxon, 1: 122. 1952; Plant Life 9: 59. 1953). Syn.—*Rhodolirion* R. A. Phil., in Linnaea 19: 65. 1857-58 (type: *Rhodolirion andinum* R. A. Phil.); genus *Myostemma* Salisb., in Gen. Pl. Fragm. 135. 1866 (type: *Myostemma advena* (Ker-Gawl.) Salisb.).

Diagnosis.—*Chromosomes* as far as determined: 2n = 18; *bulbous* perennials; leaves narrow-linear, usually 2—5 mm. in width, rarely wider—up to 1.3 mm., or 20 mm. wide; *peduncle* hollow, leafless; *umbel* 1—6-flowered; *spathe* usually of two free valves, rarely monophyllous, or the two valves slightly united at the base; *bracteoles* very small to tiny; *pedicels* variable in length; *ovary* 3-loculed, *ovules* numerous in each locule; *perigone* bilaterally symmetrical, variously colored, openly funnel-shaped, funnel-shaped, or sometimes not widely open, or the tepalsegs even formed into a pseudo-tube above the tepaltube; *tepaltube* usually very short, under 5 mm. long, rarely up to 5—7.6 mm., or 13—20 mm. long; *tepalsegs* 6, of four different sizes, usually longer than the

tepaltube; *stamens* 6, of four different lengths, stamens and *style* fasciculate, declinate-ascending; *anthers* oblong, versatile; *stigma* distinctly trifid or obscurely trifid (capitate); *fruit* a loculicidally dehiscing capsule; *seeds* discoid, winged, dark brown or black.

TYPE SPECIES: *Rhodophiala amarylloides* Presl, Bot. Bemerk. 115. 1844 (= *Rhodophiala pratensis* (Poepp.) Traub.

PHYLOGENETIC POSITION: *Amaryllidaceae*, Tribe *Zephyrantheae*, near Habranthus Herb., *Zephyranthes* Herb., and *Sprekelia* Heist.

DISTRIBUTION: thirty-one species in Chile, Argentina and Bolivia.

KEY TO THE SPECIES OF **RHODOPHIALA**

1a. Stigma distinctly trifid:

Subgenus 1. **CHILANTHE**

2a. Perigone 6.7—11 cm. long:
3a. Perigone 10—11 cm. long:
Tepaltube 7.6 cm. long; peduncle 10cm. tall (Bolivia) ..... 1. *soratensis*
3b. Perigone 6.7—8.5 cm. long (Note.—See also 14a and 15a, below, species with perigone 5—6.3 cm. long; if grown under good culture these might bridge the 4 mm. difference in length.)
4a. Peduncle 30—90 cm. tall:
Flowers polychrome: yellow-green-orange-vermilion; paraperigone of orange-yellow appendages at the base of filaments (Chile) ..... 2. *splendens*
4b. Peduncle 20—22 cm. tall:
Flowers lemon-yellow and red (Chile) ..... 3. *ananuca*
2b. Perigone 2.5—6.3 cm. long:
5a. Umbel usually 3—6-flowered (many-flowered in R. tiltilensis); rarely 2-flowered in *R. advena* (11b), *R. jamesonii* (14a) and *R. bifida* (14b). [Note. —In case of 2-flowered umbels see also *R.* araucana (15a), *R. lineata* (16a), *R. elwesii* (17a) and *R. roseus* (20a).]
6a. Tepalsegs formed into a pseudo-tube, and extending 1.4 cm. beyond mouth, apexes slightly reflexed (Chile) ..... 4. *tenuiflora*
6b. Tepalsegs not formed into a pseudo-tube:
7a. Flowers scarlet or scarlet and green:
8a. Stamens almost as long as the perigone, flowers scarlet (Chile) 5. *consobrina*
8b. Stamens up to 2/3 as long as the perigone; flowers scarlet (Chile) 6. *tiltilensis*
7b. Flowers not scarlet or scarlet and green:
9a. Flowers purple:
Tepalsegs oblanceolate (Chile) ..... 7. *berteroana*
9b. Flowers rose red and white, white, yellow red, or pink:
10a. Perigone openly funnel-shaped:
11a. Tepalsegs oblong; perigone yellow, tinged red (Chile) 8. *bagnoldii*
11b. Tepalsegs oblong-acute; perigone white, yellow or red (Chile) 9. *advena*
10b. Perigone funnel-shaped, or not widely open:
12a. Perigone yellow:
Stigmatic lobes short and thickened (Chile) ..... 10. *bakeri*
12b. Perigone not yellow:
13a. Perigone rose-red, white at base (Chile) ..... 11. *moelleri*
13b. Perigone red or pink:
14a. Tepalsegs oblong-acute (Argentina) ..... 12. *jamesonii*
14b. Tepalsegs oblanceolate-unguiculate. obtuse (Agrentina) 13. *bifida*

1a. Peduncle up to 30 cm. tall:
11a. Spathe of two free valves ..... 13a. *bifida* var. *bifida*
11b. Spathe monophyllous ..... 13b. *bifida* var. *spathacea*
1b. Peduncle 6 cm. tall ..... 13c. *bifida* var. *pulchra*
5b. Umbel 1—2-flowered:
15a. Peduncle 30 cm. tall:
Perigone erect (Chile) ..... 14. *araucana*
15b. Peduncle 5—23 cm. tall:
16a. Flowers violet:
Stamens very short (Chile) ..... 15. *andicola*
16b. Flowers not violet:
17a. Tepalsegs yellow, lined red (Chile) ..... 16. *lineata*
17b. Tepalsegs not yellow, lined red:
18a. Flowers yellow with red throat (Argentina) ..... 17. *elwesii*
18b. Flowers red or yellow:
19a. Leaves 5 cm. long (Chile) ..... 18. *solisii*
19b. Leaves 15—30 cm. long:
20a. Bulb neck short, less than 2.5 cm. long (Chile) ..... 19. *roseus*
20b. Bulb neck 2.5—3.8 cm. long (Chile) ..... 20. *chilensis*
1b. Stigma obscurely trifid:

Subgenus 2. **RHODOPHIALA**

21a. Flowers yellow or a combination of red and yellow:
22a. Leaves 9—20 mm. wide:
Tepalsegs bright scarlet, tepaltube yellow (Chile) ..... 21. *fulgens*
22b. Leaves 3—4 mm. wide:
23a. Flowers entirely yellow (Chile) ..... 22. *montana*
23b. Flowers fiery-red, yellow toward base (Chile) ..... 23. *colona*
21b. Flowers not yellow or red and yellow:
24a. Umbel 2—5-flowered:
25a. Flowers red or violet-purple:
26a. Spathe-valves free, flowers bright red or violet purple (Chile) 24. *pratensis*
26b. Spathe-valves slightly united at base; flowers red (Argentina) 25. *gladioloides*
25b. Flowers rose at apex, paler towards base (Chile) ..... 26. *biflora*
24b. Umbel 1-flowered:
27a. Flowers white with a broad keel (Chile) ..... 27. *modesta*
27b. Flowers pink, red or purple:
28a. Peduncle about 5 cm. tall:
Flowers red (Chile) ..... 28. *uniflora*
28b. Peduncle 20—46 cm. tall:
29a. Perigone 3.5 cm. long:
Flowers purple (Chile) ..... 29. *purpurata*
29b. Perigone 7—7.6 cm. long:
30a. Tepalsegs bright red, tepaltube greenish (Chile) .... 30. *rhodolirion*
30b. Tepalsegs pink, petaltube green (Chile) ..... 31. *popetana*

SPECIES NAMES AND SYNONOMY

1. Rhodophiala *soratensis* (Baker) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum soratense* Baker, Amaryll. 42. 1888; *Amaryllis soratensis* (Baker) T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., Amaryllidac.: Tribe Amaryll. 95. 1949.

2. Rhodophiala splendens (Renjifo) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus splendens* Renjifo, in Renjifo & Phil., Descr. Alg. Pl. Nuev. reimpr. 6. 1884; Anal. Univ. Chile, p. 300, pl. 65. 1884;

Hippeastrum splendens (Renjifo) R. A. Phil., in Anal. Univ. Chile, *93:* 153. 1896; *Amaryllis splendens* (Renjifo) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 150. 1940; Traub & Moldk., Amaryllidac.: Tribe Amaryll. 95. 1949.

3. Rhodolphiala ananuca (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum ananuca* R. A. Phil., in Anal. Univ. Chile, *93:* 150. 1896; *Amaryllis ananuca* (R. A. Phil.) T & U, in Herbertia *5:* 130. 1938; *6(1939):* 149—150. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 90. 1949.

4. Rhodophiala tenuiflora (R. A. Phil.) Traub, in Plant Life *9:* 59. 1953. Syn.—*Hippeastrum tenuiflorum* R. A. Phil., in Anal. Univ. Chile, *93:* 154. 1896; *Amaryllis tenuiflora* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 152. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 89. 1949.

5. Rhodophiala *consorbrina* (R. A. Phil.) Traub, in Plant Life *9:* 59. 1953. Syn.—*Hippeastrum consobrinum* R. A. Phil., in Anal. Univ. Chile *93:* 152. 1896; *Amaryllis consobrina* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 150. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 88. 1949.

6. Rhodophiala *tiltilensis* (Traub & Moldk.) Traub, in Plant Life *9:* 59. 1953. Syn.—*Hippeastrum laetum* R. A. Phil., in Anal. Univ. Chile *93:* 151. 1896, non *Hippeastrum laetum* R. A. Phil., l. c. 157 (former rejected under Art. 75 of Code); *Amaryllis laeta* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 153. 1940; *Amaryllis tiltilensis* Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 88. 1949.

7. Rhodophiala berteroana (R. A. Phil.) Traub, in Plant Life *9:* 59. 1953. Syn.— *Habranthus berteroanus* R. A. Phil., in Linnaea *29:* 66. 1857-58; *Hippeastrum berteroanum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 44. 1888; *Amaryllis berteroana* (R. A. Phil.) T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 89—90. 1949.

8. Rhodophiala bagnoldii (Herb.) Traub, in Plant Life *9:* 59. 1953. Syn.—*Habranthus bagnoldii* Herb., in Bot. Reg. Lond. *17:* pl. 1396. 1831; Herb., in Amaryll. 162. 1837 (err. *H. bagnoldianus); Habranthus punctatus* Herb. Amaryll. 403. 1837; *Hippeastrum bagnoldii* (Herb.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Baker, Amaryll. 43. 1888; *Hippeastrum punctatum* (Herb.) R. A. Phil., in Anal. Univ. Chile *93:* 148. 1896; *Amaryllis bagnoldii* (Herb.) D. Dietr., in Syn. Pl. *2:* 1177. 1840; Steudel, in Nom. ed. *II(1):* 76. 1840 (err. *A. bangoldi);* T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 90. 1949.

9. Rhodophiala *advena* (Ker-Gawl.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Amaryllis advena* Ker-Gawl., in Bot. Mag. Lond. *28:* pl. 1125. 1808; Bot. Reg. Lond. *10:* pl. 849. 1824; T & U, in Herbertia *5:* 122. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 91. 1949; *Hippeastrum advenum* (Ker-Gawl.) Herb., in Append. Bot. Reg. Lond. 31. 1821; *Habranthus pallidus* Lodd. Bot. Cab. *18:* pl. 1760. 1833; *Habranthus miniatus* D. Don ex Sweet, in Brit. Fl. Gard. 2nd. ser. *3:*

pl. 213. 1835; *Habranthus hesperius* Herb., in Amaryll. 161. 1837; *Amaryllis valparadisiaca* Steud., Nom. ed. *2(1):* 183. 1840; *Chlidanthus cumingii* Presl, Bot. Bemerk. 115. 1844; *Habranthus mendocinus* R. A. Phil., in Anal. Univ. Chile *2:* 406. 1892; *Myostemma advena* (Ker-Gawl.) Salisb., in Gen Pl. Gragm. 135. 1866; *Eustephia macleanica* Baker , in Saund. Refug. Bot. pl. 332, non auct. Herb. (1841); *Hippeastrum pallidum* Pax, in Bot. Jahrb. *11:* 321. 1890.

10. Rhodophiala bakeri (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus bakeri* R. A. Phil., in Anal. Univ. Chile *93:* 150. 1896; T & U, in Herbertia *5:* 130. 1938, sphalm., *Hippeastrum bakeri; Amaryllis bakeri* (R. A. Phil.) T & U, in Herbertia *5:* 130. 1938; *6(1939):* 151. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 91. 1949.

11. Rhodophiala moelleri (R. A. Phil.) Traub, in Plant Life *9:* 59. 1953. Syn.—*Hippeastrum moelleri* R. A. Phil., in Anal. Univ. Chile *93:* 154. 1896; *Amaryllis moelleri* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 150. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 89. 1949.

12. Rhodophiala *jamesonii* (Baker) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum jamesonii* Baker, in Jour. Bot. Lond. *16:* 83. 1878; Baker, Amaryll. 44. 1888; *Amaryllis jamesonii* (Baker) T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 92. 1949.

13. Rhodophiala bifida (Herb.) Traub, in Euclides *13:* 156. 1953. Syn.—*Habranthus bifidus* Herb., in Bot. Mag. Lond. *52:* pl. 2597. 1825; *Habranthus angustus* Herb., in Bot. Mag. Lond. *53:* pl. 2639. 1826; *Amaryllis bifida* (Herb.) Sprengel, in Syst. Veg. Cur. Post. *4(2):* 133. 1827; T & U, in Herbertia *5:* 122. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 92. 1949; *Amaryllis intermedia* Lindl., in Bot. Reg. Lond. *14:* pl. 1148. 1928; *Amaryllis kermesina* Lindl., in Bot. Reg. *91:* pl. 1638. 1834; *Habranthus kermesianus* (Lindl.) Herb., Amaryll. 159. 1837; *Habranthus intermedius* (Lindl.) Herb., Amaryll. 160. 1837; *Habranthus lorifolius* Herb., Amaryll. 160, in obs. 1837; *Habranthus nemoralis* Herb., Amaryll. 159. 1837; *Habranthus pedunculosus* Herb., Amaryll. 161, pl. 26, fig. 1. 1837; *Amaryllis lorifolia* (Herb.) Steud., Nom. ed. *2(1):* 71. 1840; *Habranthus nobilis* Herb., in Bot. Reg. Misc. 88. 1844; *Amaryllis angusta* (Herb.) Schult. f., Syst. Veg. *7:* 808. 1850; *Hippeastrum bifidum* (Herb.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 43. 1888; *Hippeastrum pedunculosum* (Herb.) Holmb., in Anal. Mus. Nac. Buenos Aires, ser III. *5:* 146 1905.

13a. Rhodophiala bifida var. bifida (see no. 13, above.)

13b. Rhodophiala bifida var. spathacea (Herb.) Traub, *var. nov.* Syn.—*Habranthus spathaceus* Herb., in Bot. Mag. Lond. *52:* sub pl. 2597. 1825; *Amaryllis spathacea* (Herb.) Schult. f., Syst. *7:* 808. 1830; *Hippeastrum platense* Holmb., in Anal. Mus. Nac. Buenos Aires, ser. III. *5:* 146. 1905; *Amaryllis platensis* (Holmb.) T & U, in Herbertia *5:* 129 1938; *Amaryllis bifida* var. *spathacea* (Herb.) Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 93. 1949.

13c. RHODOPHIALA BIFIDA var. PULCHRA, (Herb.) Traub, *var. nov.* Syn.—*Habranthus pulcher* Herb., in Amaryll. 161, pl. 26, fig. 1. 1837; *Hippeastrum pulchrum* (Herb.) Holmb., in Anal. Mus. Nac. Buenos Aires, ser. III. *5:* 145. 1905; Amaryllis *pulchra* (Herb.) T & U, in Herbertia *5:* 122. 1938; *Amaryllis bifida* var. *pulchra* (Herb.) Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 93. 1949.

14. RHODOPHIALA ARAUCANA (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum araucanum* R. A. Phil., in Anal. Univ. Chile *93:* 152—153. 1896; *Amaryllis araucana* (R. A. Phil.) T & U, in Herbertia *5:* 130. 1938; *6(1939):* 151—152. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 94. 1949.

15. RHODOPHIALA ANDICOLA (Poeppig) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus andicolum* (Poeppig) Baker, in Jour. Bot. Lond. *16:* 82. 1878; *Zephyranthes andicola* (Poeppig) Baker, in Amaryll. 36. 1888; *Amaryllis andicola* Poeppig, in Fragm. Syn. Pl. Phan. 5. 1833; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 96. 1949.

16. RHODOPHIALA LINEATA (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus lineatus* R. A. Phil., in Anal. Univ. Chile *43:* 542. 1873; *Hippeastrum lineatum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 82. 1878; Baker, in Amaryll. 42. 1888; *Amaryllis lineata* (R. A. Phil.) T & U, in Herbertia *5:* 122. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 96. 1949.

17. RHODOPHIALA ELWESII (C. W. Wright) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum elwesii* C. W. Wright, in Kew Bull. 330. 1914; Bot. Mag. Lond. *CXLI:* pl. 8614. 1915; *Amaryllis elwesii* (C. W. Wright) T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 96. 1949.

18. RHODOPHIALA FLAVA (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus flavus* R. A. Phil., in Anal. Univ. Chile *27:* 333. 1865; *Hippeastrum solisii* R. A. Phil., in Anal. Univ. Chile *93:* 155. 1896; *Amaryllis flava* (R. A. Phil.) T & U, in Herbertia *6(1939):* 150-151. 1940, non auct. Pav. ex Roem. & Schult.; *Amaryllis solisii* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938.

19. RHODOPHIALA ROSEA (Sweet) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus roseus* Sweet, in Brit. Fl. Gard. ser. 2. *2:* pl. 107. 1833; Herb. in Amaryll. 163. 1837; *Habranthus pumilus* Lodd., in Bot. Cab. *18:* pl. 1771. 1831; Herb. Amaryll. 167. 1837; *Hippeastrum roseum* (Sweet) Baker, in Jour. Bot. Lond. *16:* 82. 1878; *Zephyranthes pur purata* R. A. Phil., in Linnaea *29:* 65. 1857-58; *Amaryllis rosea* (Sweet) T & U, in Herbertia *5:* 122. 1938, non auct. Lamarck 1783; *Amaryllis barlowii* Traub & Moldk., in Amaryllidac.: Amaryll. 97. 1949.

20. RHODOPHIALA CHILENSIS (L'Herit.) Traub, in Plant Life *9:* 95. 1953. Syn.—*Amaryllis chilensis* L'Hérit., in Sert. Angl. 11. 1788, non auct. Ruiz & Pav.; Poeppig, Fragm. Syn. Pl. Phan. 5. 1833; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 95. 1949; *Amaryllis chloroleuca* Ker-Gawl. in Jour. Sci. & Arts, *2:* 347, pl. 8, fig. 1. 1817; *Zephyranthes chloroleuca* (Ker-Gawl.) Herb., in Append. Bot. Reg. Lond. 36. 1821; *Amaryllis ochroleuca* Ker-Gawl. ex Herb., in Amaryll. 164, in obs., pl. 45,

Fig. 6 *(A. chloroleuca)*. 1837; *Habranthus chilensis* (L'Hérit.) Herb., in Amaryll. 163-164. 1837; *Hippeastrum chilense* (L'Hérit.) Baker, in Jour. Bot. Lond. *16:* 82. 1878; Baker, in Amaryll. 42. 1888.

21. Rhodophiala fulgens (J. D. Hooker) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus fulgens* J. D. Hooker, in Bot. Mag. Lond. *92:* pl. 5563. 1866; *Hippeastrum fulgens* (J. D. Hooker) R. A. Phil., in Anal. Univ. Chile *93:* 151-152. 1896; *Amaryllis fulgens* (J. D. Hooker) T & U, in Herbertia *6(1939):* 153. 1940.

22. Rhodophiala montana (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus montanus* R. A. Phil., in Anal. Univ. Chile *43:* 542-543. 1873 (reimp. 66.1873); *Hippeastrum montanum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; *Amaryllis montana* (R. A. Phil.) T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 99. 1949.

23. Rhodophiala colona (R. A. Phil.) Traub, in plant Life *9:* 60. 1953. Syn.—*Hippeastrum colonum* R. A. Phil., in Anal. Univ. Chile *93:* 148. 1896; *Amaryllis colona* (R. A. Phil.) T & U, in Herbertia *5:* 130. 1938; *6(1939):* 152. 1940, err. *A. coloniana;* Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 100. 1949.

24. Rhodophiala pratensis (Poeppig) Traub, in Taxon *1:* 122. 1952. Syn.—*Amaryllis pratensis* Poeppig, in Fragm. Syn. Pl. Phan. 5. 1833; T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 99. 1949; *Habranthus speciosus* Herb., in Amaryll. 158. 1837; *Habranthus pratensis* (Poeppig) Herb., in Bot. Reg. Lond. pl. 35. 1842; *Rhodophiala amarylliodes* Presl, in Bot. Bemerk. 115. 1844; *Rhodophiala leata* R. A. Phil., in Fl. Atac. 51. 1860; Anal. Univ. Chile *43:* 544. 1873; *Rhodophiala volckmannii* R. A. Phil., in Linnaea *33:* 259. 1864-65; *Hippeastrum pratense* (Poeppig) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 46. 1888; *Placea pratensis* Poeppig ex F. Phil., in Poeppig, Fragm. Syn. Pl. Phan. 5. 1883 (in synon.) et F. Phil., in Cat. Pl. Vasc. Chile, 291, 1881, in synon.; Baker, in Amaryll. 46. 1888, in synon; *Hippeastrum laetum* R. A. Phil., in Anal. Univ. Chile *93:* 157. 1896, non *Hippeastrum laetum* R. A. Phil. l. c. 151; *Stephanoma elegans* Kunze *(sic),* in Baker, Amaryll. 46. 1888, in synon.; *Amaryllis atacamensis* T. & U, in Herbertia *6(1939):* 151. 1940.

25. Rhodophiala gladioloides (Hieron.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus gladioloides* Hieron., in Bol. Acad. Nac. Cien. Cordoba *4:* 70. 1881; *Hippeastrum gladioloides* (Hieron.) Pax, in Engl. Jahrb. *11:* 321. 1890; *Amaryllis gladioloides* (Heiron.) T & U, in Herbertia *5:* 120. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 100. 1949.

26. Rhodophiala biflora R. A. Phil., in Linnaea *29:* 66-67. 1857-58. Syn.—*Amaryllis biflora* (R. A. Phil.) Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 101. 1949.

27. Rhodophiala modesta R. A. Phil., in Anal. Univ. Chile *34:* 544. 1873. Syn.—*Hippeastrum modestum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Baker, Amaryll. 45. 1888; *Amaryllis modesta* (R. A.

Phil.) T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 101. 1949.

28. Rhodophiala uniflora R. A. Phil., in Fl. Atac. 51. 1860. Syn.—*Rhodolirion montanum* R. A. Phil., in Linnaea *19:* 65. 1857-58; *Hippeastrum uniflorum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 45. 1888; *Amaryllis uniflora* (R. A. Phil.) T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 101. 1949.

29. Rhodophiala purpurata (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum purpuratum* R. A. Phil., in Anal. Univ. Chile *93:* 156. 1896; *Amaryllis purpurata* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 151. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 102. 1949.

30. Rhodophiala rhodolirion (Baker) Traub, in Plant Life *9:* 60. 1953. Syn.—*Rhodolirion andinum* R. A. Phil., in Linnaea *19:* 65. 1857-58, *Hippeastrum andinum* (R. A. Phil.) R. A. Phil., in Anal. Univ. Chile *93:* 158. 1896; *Hippeastrum rhodolirion* Baker, in Jour. Bot. Lond. *16:* 84. 1878; Amaryll. 45. 1888; *Amaryllis rhodolirion* (Baker) T & U, in Herbertia *5:* 123. 1938; Traub & Moldk., in Amaryllidac.; Tribe Amaryll. 102. 1949.

31. Rhodophiala popetana (R. A. Phil.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum popetanum* R. A. Phil., in Anal. Univ. Chile *93:* 156. 1896; *Amaryllis popetana* (R. A. Phil.) T & U, in Herbertia *5:* 131. 1938; *6(1939):* 1940; Traub & Moldk., in Amaryllidac.; Tribe Amaryll. 102. 1949.

EXCLUDED SPECIES

Rhodophiala andina R. A. Phil., in Anal. Univ. Chile *43:* 543. 1873. = *Phycella herbertiana* Lindl., in Bot. Reg. Lond. *16:* pl. 1341. 1830.

GENUS PHYCELLA Lindl.,

in Bot. Reg. Lond. *11:* sub pl. 928 (supra vol. 10, fol. 809. 1824). 1825; Herb., in Amaryll. 151. 1837.

Diagnosis.—*Bulbous* perennials; leaves narrow-linear, 3—13 mm. wide; flowers borne in umbels on a leafless peduncle; *umbel* usually 3—12-flowered, rarely 2-flowered; spathe-valves 2, free, linear, lanceolate or obtuse; *pedicels* slender, variable in length; *ovary* 3-loculed; *ovules* numerous in each locule; *perigone* declined, usually narrowly funnel-shaped; tepalsegs 6, regular, convolute, pomegranate red, bright red, purple, or scarlet, or two-toned red and yellow, or yellowish-green; *tepaltube* usually very short, rarely up to 9 mm. long; *stamens* 6, distinct, alternately equal, inserted alike at the mouth of the tepaltube, descending, straight, recurved at the apex; anthers short, versatile; filaments usually provided with subulate processes or cilia; *style* sloping downwards, longer than the stamens; *stigma* obscurely trifid or capitate; fruit a loculicidally dehiscing capsule; seeds numerous, flattened, black.

Type species: *Phycella ignea* (Lindl.) Lindl. (1825). Syn.—*Amaryllis ignea* Lindl., (1824).

PHYLOGENETIC POSITION: *Amaryllidaceae,* tribe *Eustephieae,* near *Eustephia* Cav., *Castellanoa* Traub, *Eustephiopsis* Fries, and *Hieronymiella* Pax.

DISTRIBUTION: seven species ranging from Peru, Chile, Argentina and Uruguay.

EXCLUDED SPECIES

Phycella chloracra Herb., in Amaryll. 155. 1837, and *P. obtusa* Lindl., in Bot. Reg. Lond. Misc. 91. 1844 = *Phaedranassa chloracra* Herb.

Phycella macleanica Baker, in Saund. Refg. Bot. pl. 332. = *Rhodophiala advena* (Ker-Gawl.) Traub.

SPECIES NAMES AND SYNONOMY

1. PHYCELLA GRANATIFLORA (Holmb.) Traub, in Plant Life *9:* 62. 1953. Syn.—*Hippeastrum granatiflorum* Holmb., in Anal. *Mus.* Buenos Aires, ser. III. *2:* 79-80. 1903; *Amaryllis granatiflora* (Holmb.) T & U, in Herbertia *5:* 120. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 104. 1949.

2. PHYCELLA PHYCELLOIDES (Herb.) Traub, in Plant Life *9:* 60. 1953. Syn.—*Habranthus phycelloides* Herb., in Bot. Reg. Lond. *17:* pl. 1417. 1831; *Hippeastrum phycelloides* (Herb.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 44. 1888; Kuntze, in Rev. Gen. Pl. *3(3):* 310. 1898; *Amaryllis phycelloides* (Herb.) Steud., in Nom. ed. *2(1):* 72. 1840; T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllida.c: Tribe Amaryll. 104. 1949.

3. PHYCELLA BONARIENSIS (O. Kuntze) Traub, in Plant Life *9:* 60. 1953. Syn.—*Hippeastrum bonariense* O. Kuntze, in Rev. Gen. Pl. *3(3):* 311. 1898; *Amaryllis bonariensis* (O. Kuntze) T & U, in Herbertia *5:* 120. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 105. 1949.

4. PHYCELLA GAYANA (O. Kuntze) Traub, in Plant Life *9:* 62. 1953. Syn.—*Hippeastrum gayanum* O. Kuntze, in Rev. Gen. Pl. *3(3):* 311. 1898; *Amaryllis gayana* (O. Kuntze) T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 105. 1949.

5. PHYCELLA HERBERTIANA Lindl., in Bot. Reg. Lond. *16:* pl. 1341. 1830. Syn.—*Rhodophiala andina* R. A. Phil., in Anal. Univ. Chile *43:* 543. 1873; *Hippeastrum andinum* (R. A. Phil.) Baker, in Jour. Bot. Lond. *16:* 84. 1878; *Hippeastrum herbertianum* (Lindl.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 45. 1888; *Amaryllis herbertiana* (Lindl.) T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 105. 1949.

6. PHYCELLA ANGUSTIFOLIA R. A. Phil., in Anal. Univ. Chile *43:* 543. 1873. Syn.—*Hippeastrum angustifolium* (R. A. Phil.) R. A. Phil., in Anal. Univ. Chile *93:* 158. 1896; *Amaryllis philippiana* T & U, in Herbertia *5:* 130. 1938; *6(1939):* 152. 1940; Traub & Moldk., in Amaryllidac.: Tribe Amaryll. 106. 1949.

7. PHYCELLA BICOLOR (Ruiz & Pav.) Herb., in Amaryll. 154. 1837. Syn.—*Amaryllis bicolor* Ruiz & Pav., in Pl. Peru et Chil., *3:* 57. 1802; T & U, in Herbertia *5:* 121. 1938; Traub & Moldk., in Amaryllidac.:

Tribe Amaryll. 106. 1949; *Amaryllis cyrtanthoides* Sims, in Bot. Mag. Lond. pl. 2399; *Amaryllis ignea* Lindl., in Bot. Reg. Lond. *10:* pl. 809. 1824; *Phycella ignea* (Lindl.) Lindl., in Bot. Reg. Lond. sub. pl. 928 (supra vol. 10, fol. 809. 1824). 1825; *Phycella cyranthoides* (Sims) Lindl., in Bot. Reg. Lond. *11:* sub pl. 928 (supra vol. 10, fol. 809. 1824). 1825; *Phycella glauca* Lodd., in Bot. Cab. *18:* pl. 1746. 1831; *Phycella attenuata* Herb., in Amaryll. 153. 1837; *Phycella graciliflora* Herb., in Amaryll. 152, pl. 25, fig. 4. 1837; *Phycella magnifica* Herb., in Amaryll. 152. 1837; *Phycella brevituba* Herb., in Amaryll. 154. 1837; *Phycella corusca* Lindl., in Bot. Reg. Lond. Misc. 43. 1838; *Amaryllis demissa* Steud., in Nom. ed. 2, *1:* 71. 1841; *Phycella macraeana* Pritz., in Ic. Ind. *1:* 838. 1855; *Phycella obtusifolia* Pritz., in Ic. Ind. *1:* 838. 1855; *Hippeastrum bicolor* (Ruiz & Pav.) Baker, in Jour. Bot. Lond. *16:* 83. 1878; Amaryll. 44. 1888; *Amaryllis magnifica* (Herb.) Vilmorin, in Blumeng., ed. 3, Sieb. & Voss, *1:* 1031. 1895.

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[IN MEMORIAM—HERMON BROWN, continued from page 16.]

made yearly calls to visit Mr. and Mrs. Brown for not only were his own strains of hybrid amaryllis worth the trip to see but this couple were themselves so friendly that one left them knowing that he had made two more real friends. He was 82 and is survived by his most gracious wife and a son, Leland H. Brown who is a professor of engineering at Stanford University. Coming to California from Kansas he was trained as a horticulturist in 1898. In 1900 he became curator of the Salisbury Public and Experimental Gardens, of Salisbury, Rhodesia, South Africa where he presided for twelve years. Returning to Gilroy, California he became an orchardist. He organized the San Jose and Gilroy Flower Lover's Club. Each year he held an exhibit of hybrid amaryllis that attracted Statewide interest and attendance. Subsequently in 1952 he moved to Palo Alto to be with his children but maintained his hybridizing experiments to the very last. There are many of you who will feel the loss of this gentleman as a personal one. There are few who kept such a long interest in hybrid amaryllis, producing them not only commercially but maintaining constant efforts to improve strains as a personal hobby.—*Robert G. Thornburgh, M.D.*

3. GENETICS AND BREEDING

NOTES ON **AMARYLLIS** BREEDING

J. F. Stewart, *California*

In the earlier years of our Amaryllis growing, the number of breeding-stock bulbs in bloom at any one time was very limited, and it was necessary to use whatever pollen was available on whatever bulbs were in bloom. As a result of this only a few of the crosses were within the color groups, and the balance were mixed, which resulted in good stock but unpredictable colors. During the last few years the crosses have been mostly within the color groups, with mixed crosses for experimental purposes only, and the following notes are based on first mentioned crosses.

Only those bulbs having characteristics we wish to perpetuate are used for parents, but, while the stock as a whole is immensely improved, we have not yet established any known continuity of strains.

To date there has been little inbreeding of clones, but next year there should be enough blooms of a few clones to permit a program of in-breeding.

Our cross-pollinating is done in five color groups; red, white, pink, salmon, and striped. All pollen from red blooms is kept in one container, all from whites in another, etc., and the containers kept in the refrigerator when not in use. Ripe pollen is added as it is stripped, and every two or three weeks, depending upon the abundance of fresh pollen, the containers are cleaned out and a fresh start made. I have no information on the life of pollen, but it seems to be good for a couple of weeks. Some experimenting to determine pollen life should be of interest. Pollen not to be used for breeding is stripped from the blooms before it is ripe and is destroyed. In the field there could be some contamination of crosses because we occasionally miss a bloom, but in the glass house the control is close, and we will do very little hand pollinating in the field from now on.

A few years ago a number of bulbs from a planting of Dutch pink and salmon seeds bloomed as two-year-olds. These were inter-pollinated and the stock kept isolated in the hope that the early blooming characteristic would be transmitted, but there has been no indication of it. The seedlings did show that the pink and salmon colors would blend to some extent, for there are a number of salmon-pinks, or pink-salmons, among them.

After having read of Mr. J. T. Weisner's experience with white giants, I did some experimenting on my own. There were seven in bloom in the glass house in late August and early September, which were interpollinated, but not one seed developed.

Our white seedlings are the most prolific multipliers and profuse bloomers of all the bulbs we have. Most of them, in the glass house, bloom twice a year, and some of them three times. There are some buds now, in late October, which should be in bloom around the holidays. They have been coming almost one hundred percent pure white, except for

some green of course, and tend to be of loose, informal shapes. There is one strain that crops up occasionally, with a definitely formal shape, but with rather narrow and somewhat spoon shaped tepalsegs that are a pure smooth white, with apple green at the center. This is not a particularly desirable flower but might add something to the stock. The whites are good propagators. The flowers do not do too well in the open field, apparently being sensitive to the hot sun and the wind.

The salmons do not bloom as often or multiply as freely as the whites, but they produce a larger percentage of seedlings with gorgeous high grade blooms than any of the other colors. They come generally true to color and propagate well.

The pinks, of the 'Pink Perfection' type come reasonably true to color, but with a great variety of shapes and sizes. Some of the largest ones have quite narrow tepalsegs. They propagate fairly well, but multiply less freely than some others. The only other pinks I have propagated by cuttings are 'Fidelity' which does not do well for me, and 'Sweet Seventeen', which does.

The stripes, particularly those which have the color on the center portion of the tepalsegs and the white on the edges, as differentiated from those bi-colors that have the colored tepalsegs with white markings, are the most difficult of all for me to reproduce by seeds. There must be some cross-breeding technique required for these which I have not yet learned. They propagate well, in general do not multiply too freely, and are liable to be slow to bloom. We have some beautiful specimens in this group. They come in all colors, and tend towards the informal in shape. They are eye-catchers and are more vivid and sharp from a distance than the solid colors.

The reds of course, comprise the greater part of our stock. The seedlings seem to reflect the great variety of stock in their background, having an infinite variety of shape, size, texture, and color depth, many being discarded. We get a large percentage of solid colors. They propagate well, and, mostly, multiply freely, although it seems to be the rule that the better the bloom, the fewer the offsets.

Part of our seeds are usually planted in the ground in the glass house, and part outdoors, with the glass house planting showing better germination and faster growth. They are transplanted to the field when a year old, as also are the out door seedlings. This transplanting is done with the greatest of care, as it is possible to lose a lot of the plants at this stage. We grow them in double rows on ridges three feet on centers, and use surface irrigation in the furrows.

Cross pollinating produces more and stronger seeds than in-breeding. Early planting of seeds is advantageous in at least two ways;—there will be a longer growing period before the winter dormant season, or frost, and there seems to be a relationship between early planting and high germination, although the seeds will carry over into the following season if well cared for. A few thousand of last year's seeds were planted out doors this year, as an experiment, and germination was fair. The seeds, when gathered, are kept in paper bags, and one year the

pods and all were put in. Due to the moisture remaining in the pods, and the natural heat, many of the seeds had sprouted in the bags before the condition was discovered.

TWENTY-EIGHT YEARS WITH **AMARYLLIS**

CHAS. SNYDER, *California*

My *Amaryllis* strain originated when I bought 50 one year old bulblets from Mr. Woodruff, a bulb grower at Encinitas, California, 28 years ago. Mr. Woodruff had worked in the Government greenhouses in Washington, D. C., hybridizing *Amaryllis*, and when he retired he was given some Amaryllis seeds for use in his experiments. Mr. Woodruff later sold his place and moved to Arizona where he passed away. The bulblets obtained were planted at Laguna Beach, and thus my strain was on its way.

Every three years I dug and replanted the large bulbs and the offsets, also we found quite a lot of self-sown seedlings which we saved and planted separately from the others and when they bloomed I discovered that many new ones had been added to my strain. I also planted a large bed closely set with alternating Hybrid *Amaryllis* and *Brunsvigia rosea* (Cape Belladonna) thus insuring two blooming periods and foliage the year round. In January 1945, I had no more room for expanding so I contacted Mr. Cecil Houdyshel of La Verne, California and sold him 2000 large bulbs many of them 3″ x 4″ in diameter. Mr. Houdyshel then sent in my name for membership in AMERICAN AMARYLLIS SOCIETY and I secured all back numbers of HERBERTIA to 1934.

In October 1945, I sold to Mr. Wm. E. Rice of Downey, California 8000 bulbs; 2½″ minimum and many were 3″ x 4″ in diameter. In looking over Mr. Rice's plantings at that time I felt sure that he must have secured the balance of Mr. Woodruff's bulbs. In 1945 (Spring), I planted a bed of 1000 selected large bulbs and from them I saved seed and planted them in August 1945. I subdivided my garden in 1946 and sold off lots containing all my offsets, but reserved 250 of the bulbs from the bed of 1000, and the 1945 seed bed was on a lot I still owned.

In January 1947, I planted on my orange grove in Alta Loma, California the 250 large bulbs and also 1350 bulblets from 1945 seed. I saved seed from the 250 bulbs and on account of trying to raise them in field beds I lost all of my 1947—1948 seedlings. From my 1949 seeds I raised about 5000 bulblets and when they bloomed in 1954 they proved to be my best strain.

Mr. H. Bruse Claffin of Upland, California did some hand hybridizing on my old strain in 1953, securing some 20,000 seeds, most of these should bloom in the spring of 1956. This spring (1955) Mr. Claffin bought about 100 of the best Holland bulbs and bloomed them in his hot house and used the pollen on my field grown strain and produced 40,000 seeds. In another year or two we can see the results.

In the spring of 1955 I tried an experiment with cut flowers, I contacted a shipper in Los Angeles and during the blooming season shipped air express 2500 stems with fair returns.

All Hybrid Amaryllis are beautiful to me because of their forms and the hundreds of different combinations of colors. As yet I have not segregated my bulbs as to color and all the bulbs I have sold to date have been mixed colors.

NARCISSUS NOTES — 1955

J. S. Cooley, *Maryland*

Some years ago I made some *Narcissus* crosses with the objective of producing an early variety that would meet our requirements better than the present varieties. One of the earliest daffodils to bloom here is 'February Gold.' It is a rich color and the blossoms are quite resistant to cold. However the flowers are small and the stem usually short, thus precluding its use by the florist. Another early blooming variety commercially grown here is 'The First,' which has a large flower and a long stem, but it is much more susceptible to freezing injury than 'February Gold.' The necks freeze to death during a cold spell while 'February Gold' may not be injured. Another objection to 'The First' is that during cool frosty weather the blooms do not open out fully. Both of these varieties persist well from year to year. Some of the early varieties such as 'Forerunner' do not persist well from season to season. The old variety 'Golden Spur' does not persist well and is too poor a flower to compete with some of the newer varieties. We need a long trumpet variety that is both early and resistant to the cold and also persists well from one season to the next.

In attempting to produce such a variety I crossed the species *minor* with some of the early long trumpets such as 'Henry Irwin.' The progeny from such crosses gave early blooming plants—some earlier than any other daffodils in our garden. The flowers were much more resistant to cold than 'The First' but the stems were too short and the flowers not so large as 'The First.' I am expecting to use these early blooming seedlings as parents for further pollination work in an endeavor to produce a variety that meets our present needs better than what we now have.

BREEDING MINIATURE DAYLILIES

Stanley E. Saxton, *New York*

There are four species of *Hemerocallis* which are of dwarf or near dwarf stature. Three of these; *H. nana, H. plicata,* and *H. forrestii,* belong to the subdivision having scapes shorter than the foliage. In the wild these three seldom exceed 12″ in height of space. When grown

under good culture in garden or greenhouse the scapes may attain a height of 16″ or more. In all of these the branching is at the top of the scapes and the inflorescence may have from one to several flowers. The flowers are 3″ or more in width. None of these three species are reliably hardy in the north temperate zone and their sparse flowering habit makes them undesirable for garden decoration.

The fourth dwarf species is *H. minor,* is hardy, and under good culture produces many 12″ stems, each with several 3″ lemon yellow flowers. It blooms shortly after *H. flava,* and is useful in the rock garden or front of the border. Its blooming period is rather short, and the arching stems tend to drag the flowers on the ground in rainy weather.

None of the above produce what the writer considers 'miniature' type flowers. The ideal toward which my breeding program has been planned is a plant of dwarf habit, hardy, producing many stems about 20″ tall, with good branching which will produce 15 to 20 flowers over a season of 3 or 4 weeks. The flowers must be small, preferably around 2″ in span and in a variety of colors and types.

In the book "Daylilies" (Dr. A. B. Stout-1934) a dwarf selection in deep fulvous red tones named 'Nada' was described as having flowers 4½″ in spread, and pictured as being about 8″ tall. In 1940 I visited Dr. Stout at the N. Y. Botanical Gardens and enquired about 'Nada.' Dr. Stout asked me to walk into the gardens and showed me this hybrid in bloom. The scapes on an established plant were nearly 3′ tall. This hybrid was therefore never introduced.

In 1941 the Farr Nursery Co. offered the miniature 'Mignon.' This had been developed by introducing H. multiflora into the dwarf line. I consider 'Mignon' a true miniature. It conforms to most of the specifications mentioned above. I felt that if more attractive colors and forms could be obtained in a flower this size, and on even shorter stems ('Mignon' is about 30″ tall), that then a race of minature daylilies suitable for edging or rock gardens could be offered to the gardener.

I obtained 'Mignon' in 1941 and began a series of breeding prorams using it with *H. minor* and various other low growing and small flowered hybrids.

For some time the results seemed good and some plants were even named, but the same difficulties dogged my efforts as had discouraged Dr. Stout with 'Nada'. For the first few years the hybrids would remain dwarf; then, given a richer fare or better location, the plants would stretch their stems to unwanted heights. By 1948 my selections were showing some promise, and I planted out a group of selections which had flowered from 1½″ to 2½″ in span on 18″ to 24″ stems for observation. These were allowed to grow in undisturbed clumps for 5 years in order to prove their eventual height when established.

The first plant to be introduced from this series was 'Pinocchio'. This was offered in 1950 before it had been given extensive observation. 'Pinocchio' is a pastel bitone with a light red eye zone on the petals. The flowers are about 2″ in spread, and are borne rather profusely on

24″ to 30″ multiflora type stems which are small and wiry but hold the flowers erect. This plant blooms early, shortly after *H. flava,* and the flowers remain in good condition from the time they open in late afternoon until the following evening. Since two sets of flowers are open in the evening the garden effect at that time is especially fine. The flowers from the previous day will have faded some so that the plant appears to have flowers of two differing shades of color. In addition to this extended bloom 'Pinocchio' gives creditable repeat bloom in the early autumn. It is completely dormant in habit and may prove more dwarf in warmer locations. Here in the north the stems have risen sometimes to 3′ in height and for that reason efforts have been continued to produce hybrids of lower stature.

In 1956 Saxton Gardens will introduce three additional miniature selections. These are all more dwarf than 'Pinocchio', the stems here having seldom risen to more than 24″ at the most, and often have been shorter. They retain good branching and the flowers are uniformly about 2″ in spread. All of these have the grasslike foliage and small fans of H. multiflora and H. minor and give the best showing when the clumps have become rather crowded. They are all fully dormant with shoots submerged during the winter months. The flowers are nicely formed, of open, slightly recurved type, the petals wide enough to give the flowers a solid compact effect. 'Jingle' is a light red self, the lowest growing of all. 'Tinkle' is a pastel with a flush of pink on the petals. It is similar in color effect to the daylily 'Serenade'. 'Wink' is a light peach toned flower with a bright red halo, or eye at the throat.

A bright velvety red miniature has been named 'Toy' and will be introduced later.

It may be of interest to note here that our miniature pink daylily 'Pinkie' seems to have been a whim of nature. It is not the result of breeding in the dwarf or miniature line, but rather comes from a line of breeding planned for the production of pink daylilies. None of the other plants in this progeny proved dwarf, although flowers on some of them were rather small. We have not used 'Pinkie' extensively in the miniature breeding program since it is undoubtedly dominant for larger flowers and taller growth.

HEMEROCALLIS OF THE FUTURE

George Gilmer, *Virginia*

I am not a prophet. But I have grown over 800 named varieties during the last 25 years. Every year recently and most years in the past I bought some new varieties the year they were introduced. The direction of change over the past years will probably continue for some years to come. If we know how they have developed we may project the course of improvement into the future with a good chance of being right or nearly so.

POLYPLOIDS. The greatest hope of a sudden improvement is in the new polyploid varieties, produced by colchocine. The plants I have seen have been greatly improved. Petals are often doubled in width and greatly increased in substance. The polyploids I have had and seen have been developed from varieties I have discontinued as surpassed by newer ones. Where they are crossed with the diploid they produce improved sterile triploids. To make real use of polyploids the newest and best varieties must be treated in a number sufficient to cross polyploid with polyploid. The possibility for variation will be greatly increased. If we take *ab* and add *ab* we can get *aa, bb, ab,* and *ba.* But if we take *abab* and *abab* we can get *aaaa, bbbb, baaa, abaa* and *bbaa,* etc., to a score of variations. If we take *abcd* and add *abcd* we can get over 100 combinations. After crossing for a few generations great variety could be in the genes of both parent. At present polyploids are intertesting but the value lies in the hope of future development, which is most promising.

DURABILITY. 25 years ago some varieties hardly opened before 9:00 A. M. and were closed by 5:00 P. M. Now most varieties are good for nearly 24 hours. In cool fall days on the second crop some last nearly 36 hours or more. In another 5 years most new varieties should last 36 hours and before many years might last as well as roses, peonies and iris. They now resist wilting for 12 hours better than most flowers.

SEASON OF BLOOM. For years 'Judge Orr' and 'Blanche Hooker' have given each year two full crops. Others have repeated some. This year the second crop on 'Costette' and 'Capri' was more and better than the first. There was some second crop on about 20 varieties. Three bloomed 3 times this year,—'Buttercup Lane' (Sass), 'Wideyed' (Craig), 7220 (Taylor). With a start like this we should soon have continuous bloom on the same plants from spring until freezing in the fall.

QUANTITY. Some report 50 to 75 blooms to a scope. A graceful stem could hardly be expected to carry more. But most of those in my garden seldom or never reach the 50 class. It is hoped soon all the new ones will bloom like the most prolific at this time.

BRANCHING. Branching is not a great deal better than on an occasional old one like 'Semperflorens,' but is improving all the time. The average is much better than formerly. Within a few years all the new ones should be as well branched as our present best and some even better.

COLOR. Some of the new ones have nearly every color but blue and white. 'Mabel Fuller,' 'Powder Puff' and 'Fond Caress' are splendid nearly white varieties. There are some near whites that wilt or curl in the hottest sun. 'Pink Dream' and 'Blue Danube' have blue pigment, which should be segregated and increased in these and others until true blue are produced.

SIZE. From 'Mignon' to the largest there is a wonderful range. But we should get more good small ones. They are needed worse than medium and large.

SHAPE. There is a wide variety. Some are spiders. Some have petals so wide they overlap. Some are shaped like lilies, others open wide or curl back. Some have pointed or twisted petals. There should be some more different colors in each shape.

IN GENERAL. For 30 years there has been a steady improvement in hemerocallis. Like automobiles, the new models are so fine, it is hard to see how anything better can be produced. But for years we have seen new ones better than any before. The improvement in the past 5 years is so great most of the older ones are surpassed. There is nothing in the past to indicate we have reached the limit. More people are breeding daylilies than ever before. There is always a chance a lucky cross may be a success. Then we have a number of professional breeders who are planning for the future and working for introduction 5 or more generations from now. Each year they have better stock from which to breed. Try to keep your collection up to date. Get a few of the best of the 600 new ones introduced annually. When they bloom the following year, you will be grateful to the patient men and women who have planned and worked with skill and patience to give you something better than was ever available before.

[PLANT LIFE LIBRARY, continued from page 4.]

MECHANISMS OF MICROBIAL PATHOGENICITY, edited by J. W. Howie and A. J. O'Hea. Cambridge Univ. Press, 32 E. 57th St., New York 22, N. Y. 1955. pp. 333. Illus. $5.00. In this book the papers presented by sixteen authorities at the 5th symposium of the Society for General Microbiology are brought under one cover. The object of the symposium is to focus attention on the processes and mechanisms whereby infecting organisms produce disturbances of function or metabolism, toxemia, visible lesions and death of the host organism. This stimulating book is indispensable to all who are interested in microbiology, physiology and pathology.

THE CHEMISTRY AND FERTILITY OF SEA WATERS, by H. W. Harvey. Cambridge Univ. Press, 32 E. 57th St., New York 22, N. Y. 1955. pp. 224. Illus. $5.50. The author summarizes recent investigations dealing with the salts and dissolved gases in sea water, the changes in composition brought about by plants, animals and bacteria, the mixing which takes place in the oceans, and the waters' physical properties. This important book is highly recommended.

BRITISH MOSSES AND LIVERWORTS, by E. V. Watson. Cambridge Univ. Press, 32 E. 57th St., New York 22, N. Y. 1955. pp. 419. Illus. $8.50. This charming book was written for the beginner in bryology, and also as a reference book for the more advanced student. Non-technical descriptions are given of 154 species of mosses and 55 species of liverworts, and each of these selected species is illustrated. With the help of the keys and notes that are given on additional species, it should be possible to identify 310 species of mosses and 136 species of liverworts. This stimulating book is highly recommended.

4. AMARYLLID CULTURE

[REGIONAL ADAPTATION, SOILS, FERTILIZATION, IRRIGATION, USE IN LANDSCAPE, DISEASE AND INSECT CONTROL, ETC.]

MY AMARYLLIDS

REG. F. HARRADINE,
102 Byng Drive, Middlesex, England

Some five years ago I received from Holland a bulb list in which were described and illustrated, some *Amaryllis,* in scarlet, orange and white. They were new to me, but they looked so attractive and the culture instructions given presented no great difficulty, so, I ordered a few. In due course the bulbs arrived, were potted up, and, in a surprisingly short time, flowered.

I do not think I shall ever forget the thrill of those first *Amaryllis* flowers. Their size, beauty of form and brilliant colour, fascinated me. I wished for more of them and this desire was intensified by what I read about them in Macself's 'The Amateur's Greenhouse' and Sander's Encyclopaedia.

Letters to many nurseries and bulb growers in England brought no results, but fortunately I noticed an advertisement by Ralph Cusack of Roundwood, Ireland, mentioning rare Amaryllids etc. I soon received his catalogue. What a list! What descriptions! I suppose only an Irishman could find such variety of superlatives and adjectives. An almost fanatical love for the wildlings and a supreme contempt for what he described as the 'overcultivated, overfed, overcivilised garden types'. His sorrow at having to close down his nursery must have been very great indeed.

I had several things from him:—*Amaryllis aulica,* an evergreen sp. from Central Brazil, with long bright green leaves, producing its first pair of flowers in December. Deep red, narrow tepals, four to five inches in length, bright green throat. In the sunlight the flower glistens like *Nerine sarniensis.* A second bud appears about the time the first flowers begin to fade. I find this one of the easiest of the sp. *Rhodophiala bifida,* an Argentinian miniature of which I had three bulbs. One only has survived and this has taken a long time to get going. Now it is growing strongly and will surely flower in due time. *R. bifida var. spathacea.* Came to me as *Habranthus roseus,* but, flowering in September, proved its true identity. An umbel of four small, perfect flowers, mauvish pink, the tepals being about 1½ inches in length. The flowers are held a little above horizontal. One notable feature is the splitting of the spathe on one side only. *Amaryllis striata.* A dwarf from southern Brazil which I find grows best if given some shade. A very good plant, some twelve inches in height, giving two stems, each bearing four scarlet, green throated and starred flowers, some three to four inches in length.

Amaryllis reticulata striatifolia. Another from south Brazil, with very beautiful four inch flowers, mauvish pink, finely netted with deep red veins. The leaves attain a length of about nine inches and are broader in the middle than at the base. A well defined white line along the middle of the leaf makes this plant decorative even when not in flower. I find it evergreen and summer flowering. *Rhodophiala* advena, a Chilean narrow leafed sp. which so far has refused to flower. I believe this one does take a long time to establish. *Habranthus brachyandrus* from Paraguay. A lovely plant which never fails to favour me with flowers. Fifteen inch stems bearing upstanding 2½ inch lavender rose, trumpet shaped flowers, with dark purple blotch at base of petals. Successfully pollinated this with Zephyranthes grandiflora this year. *Habranthus robustus* from Argentina. Pale rose pink trumpet flowers with greenish throat. Very nice. *Elisena longipetala,* from Peru. What an exquisite flower. A 'super' *Hymenocallis,* with longer, more twisted, spidery petals of pure glistening white. A really beautiful plant. *Crinum Moorei album var. schmidtii.* A very fine, vigorous, pure white form. The flower lasts a long time, especially if kept shaded and cool. I have it in bloom now (October). 4½ inch tepals, 4 inch tube, ¾ inch ovary and 2 inch pedicel. *Crinum powellii.* Too well known to need description. Does well here, blooming profusely. *Crinum erubescens* from Tropical America. High temperature essential to get it to flower. White and purplish pink and long tubed. Takes up a lot of room by reason of its very long leaves. *Clivia miniata,* from Natal. Is it possible to find another plant which asks so little yet gives so much. Lovely dark green strap like leaves and large umbels of orange-apricot coloured flowers in February/March. I grant a superiority to some of the hybrids, but—it is a lovely plant. *Haemanthus albiflos.* In flower now (Oct.). I think it more remarkable for its leaves than its flower. Dark green leaves attaining a length of 15 to 18 inches and a breadth of five inches or so, the edges of which have fine hairs. As the new leaves grow uprightly from the centre of the bulb, the older leaves arch over, eventually becoming streaked with yellow before finally dying off. The flower springs from between the old and new leaves on one side of the plant. A tight umbel of pure white flowers from which extend the deep yellow anthers. The flowers remain tightly enclosed by the greyish white spathe, which makes the flower interesting but, I think, unattractive. *Haemanthus coccineus.* This large bulb keeps producing its great leaves and gets progressively larger, but stubbornly refuses to flower. *Lycoris aurea.* Like a golden *Nerine. Lycoris incarnata,* salmon pink veined blue. *Lycoris radiata,* brilliant scarlet. *Lycoris squamigera,* lovely shade of pink lightly veined blue. These *Lycoris,* although so similar to Nerines, are certainly more difficult, that is, here in England. The text books say lift in the autumn and store dry or repot annually. I am sure they resent this treatment and prefer to be left undisturbed like other Amaryllids. They need warmth but dislike heat. They want moisture when in growth but must be kept dry when resting. I find it best to treat them like hybrid *Amaryllis* but with a much earlier resting period.

They seem to like this, no matter what the books say! *Pancratium illyricum,* I have not found the correct culture for this. *Pancratium maritimum,* easier and growing well, but being a young bulb, will not flower for a year or two. *Zephyranthes candida.* In flower now (Oct). Their dainty, white, upturned crocus like flowers, with rich golden anthers, I find particularly attractive. Also in flower now is *Zephyranthes grandiflora.* A much larger, carmine striped rose pink bloom, also possessing large golden anthers. Very lovely.

All the above were obtained from Ralph Cusack. Then he wrote saying he could carry on no longer because of bad health and inability to obtain essential labour. This was a blow, for by now I had really been bitten by the 'collector's bug'. It seemed a shame that such a wonderful collection of wild plants should be broken up. From my own experiences I can now realise the enormous amount of time and effort which must have been expended in building it up. I always try to bear in mind one piece of advice R. C. gave—'Damp, soaking damp, is the bulb's worst enemy: but above all, stagnant damp. It is essential to bear in mind, always, one supreme watchword—DRAINAGE.' How true!

Now, all magazine advertisements were carefully studied for clues to any possible source of supply, but, presumably because these plants are primarily greenhouse subjects in this country, references to Amaryllids seldom appeared. From P. M. Vandertang of Guernsey I was able to get *Nerine sarniensis,* that lovely, glistening, brilliant red 'Guernsey Lily' and its orange scarlet variety *corusca major,* both of which are now in bud. *Nerine flexuosa,* a lovely pink, and its pure white counterpart *alba.* Both lovely and free flowering. *Nerine undulata* Early flowering with rose pink flowers, the petals of which are nicely waved. *Nerine filifolia,* a smaller edition of undulata, very dainty flowers of long stems arising from tufts of grass-like leaves. *Nerine* 'Pink Triumph' a very fine pink hybrid. *Brunsvigia rosea,* (still listed here as "Amaryllis belladonna")—I have them in pots, three bulbs to a 12 inch pot, in the coolhouse, and they do very well. They have just finished a grand display. It is said that potted bulbs do not flower freely, but I get a good show each year. I leave them undisturbed excepting for renewing the top inch or two of soil after flowering, and keep always moist, never drying out. *Hymenocallis narcissiflora* 'Advance'—almost as beautiful as *Elisena.*

This nursery kindly gave me names of people in France, South Africa and Australia from whom they thought I might be able to get other species. From Vilmorin et Andrieux of Paris I received two varieties of *Amaryllis vittata,* both of perfect form and beautifully fragrant. One, white, spotted and striped rosy crimson. The other, creamy white, spotted and striped deep, dull brick red. The blooms are not over large, about four to five inches, but they are beautiful. Undoubtedly hybrids, but close indeed to the description of the true sp.

The Australian nursery had nothing but suggested I write to the Botanical Gardens, Singapore. This I did, and in due course the

Director very kindly sent me a parcel containing *Amaryllis belladonna* L. *(equestris), Zephyranthes cardinalis, Z. citrina, Crinum asiaticum, C. amabile* and *Eucharis grandiflora.* All have established well and I think I shall have flowers from some this coming season. *Eucharis* has already flowered. A lovely thing, and what fragrance. The Crinums are massive.

From Mrs. Richfield of Bloem Erf Nurseries, Stellenbosch, C. P. not only have I received many bulbs but also some very nice letters. I now know a lot more about South Africa than I did two years ago.

From this source I received *Crinum bulbispermum,* the well known Cape Crinum. *Cyrtanthus mackenii,* in varieties white, cream, apricot and pink. Dainty things, with drooping, long, tubular flowers held in an umbel. *Cyrtanthus o'brienii,* very similar to *C. mackenii* but bright red flowers. *Cyrtanthus obliquus* and *Cyrtanthus carneus,* these two spp. have only arrived during the last few weeks. They are, I believe, rather rare. *Brunsvigia sp.* un-named from Natal, recently received. *Buphane disticha,* a fan of blue green leaves, held tightly at the base, in the neck of the bulb, makes this quite ornamental in foliage. I hope soon to receive the other sp. of this genus, *ciliaris.* From what I have learned of these plants, they would seem difficult to flower. Apparently, in their native habitat it takes a veldt fire to make them flower. Seems I shall have to put a pile of sticks over them and simulate a scrub fire! *Cyanella capensis.* Who would think this an Amaryllid? The tiniest of flowers, in sprays, on stems springing from the centre of two or three small, tulip-like leaves. In flower a very long time. Charming plant. *Hypoxis stellata* var. *elegans.* Another small Cape member, with leaves similar to Cyanella, but bearing on a three inch stem, a large star like flower, with white pointed petals with black centre. Prior to flowering must be kept dry. Very pretty. *Haemanthus Katherinae.* I need the eloquence of Ralph Cusack to describe this beauty! I have seen it described as Nature's most spectacular flower. I think it must be. A hundred or more dazzling orange scarlet flowers forming a 'ball' some nine or ten inches in diameter, carried on a twelve inch stem. A glorious flower. *Haemanthus natalensis,* grows like *H. Katherinae,* but cannot equal it, although it is a lovely brilliant red bloom. *Haemanthus puniceus* is a little different to the others, the flower, which is bright vermillion red, appears with the leaves. The latter are much taller than the flower. It is a handsome plant. *Haemanthus magnificus,* only recently received. *Vallota speciosa,* another very well known Cape Amaryllid. Not unlike *Amaryllis striata,* but flowers held more erect and the tepals are more rounded. Rich red. Does not like to be kept too damp. Good drainage absolutely essential.

Through the kindness of a well known English Lily nursery—Messrs. R. Wallace of Tunbridge Wells, I was able to get a few bulbs from Van Tubergen. *Amaryllis* x *acramanii,* an early hybrid *(aulica platypetala* x *psittacina)* which, according to Nehrling was raised in 1835. Large, well opened flowers, scarlet with a white stripe, and a deep green and white throat. A lovely flower. This morning (Oct 15) I

was delighted to notice the tip of a bud just appearing. Hybrid *Zephyranthes (Cooperanthes hortensis),* my only one so far. This one has large expanded pale pink flowers of good substance, and is lovely. I hope I shall be able to get more in due course. There are many in the States, but the regulations imposed by our Ministry of Agriculture make it almost impossible to obtain them. *Crinodonna corsii (Amarcrinum howardii)* has been in flower some three weeks and still looks lovely. Large umbel of flowers of a really beautiful shade of deep pink, on a very strong stem. This is certainly a fine plant. *Crinum krelagei.* Also in flower (third stem this year). Light rose pink, reflexed flowers. Very nice. *Haemanthus multiflorus.* I have praised *H. Katherinae.* I could almost say the same of this one, almost; Not quite so startlingly beautiful, but—a lovely thing. A ball of interwoven carmine red petals. *Hymenocallis speciosa.* This nearly succumbed to bulb mite, but drastic treatment of the 'kill or cure' kind has cured it and it is now growing well. *Hymenocallis amancaes,* similar in growth to *Elisena,* but smaller and has brilliant yellow flowers. *Hymenocallis* x *festalis,* a hybrid between *Hymenocallis narcissiflora and Elisena.* White flowers with curving spidery petals. This branch of the Amaryllids has, I think, an almost ethereal beauty. They are all exquisite. *Sprekelia formosissima.* This has a real fascination for me. I have several in flower now. It is seldom I cut flowers to bring into the house, but I cannot resist bringing in some of these. Brought in as buds, they open to perfection and last well in a cool position. The precise manner in which it holds its petals, the somewhat unique shade of deep crimson showing up the deep golden colour of the anthers. A wonderful flower.

About this time I noticed in 'Gardening Illustrated' a letter from an American lady asking for English plant lists, to which I replied asking in my letter if she could give me the address of the AMERICAN AMARYLLIS SOCIETY, mention of which I had found in an American book—'Garden flowers in Colour' by Foley. This led to my becoming a subscriber to the A. P. L. S., receiving in due course a copy of HERBERTIA and Drs. Traub and Moldenke's "Amaryllidaceae". The 'Amaryllid fever' from which I was now suffering immediately took a turn for the worse, and I am afraid, although more than a year has elapsed since I received those books, there is no sign of it decreasing in intensity! I rather think I am now a chronic case! Well, further correspondence with this lady brought me an introduction to Mr. L. S. Hannibal. There cannot be much that I can say of 'L. S. H.' that Amaryllis enthusiasts do not already know. I have had the pleasure of several letters from him and much advice and information. Following up suggested sources of supply has led to my having correspondents in many far away places. Mr. Len Woelfle, with typical American generosity collected together a grand lot of bulbs to send to me, but found himself up against the regulations already mentioned ,and found he could do nothing and the bulbs had to be returned to the soil. The regulations become, in effect, an embargo.

From David Chandler, Victoria, Australia, I have had several fine

bulbs and many grand letters. I am sad to say he died suddenly on the 23rd August. We had, through the medium of our letters, become real friends. I shall miss his letters very much. *Amaryllis* x *johnsonii,* the earliest hybrid, so well known to devotees in the States as to make any description from me quite unnecessary.. It has grown well with me and has already given a good display of flowers. I would say it can still compare with a good many of the modern hybrids. *Rhodophiala pratensis* a Chilean sp. of *Habranthus* style. Twelve inch stem carrying slightly elevated 2½ inch flowers, variable in colour, reddish violet to purple. *Anigozanthos.* I have some 200 seedlings, almost a year old now and doing well, of the three sp. *flavida, rubra* and *manglesii.* I have never seen these plants, nor any illustration of them. In Australia they are regarded as weeds. I await the flowers with some anticipation. *Brunsvigia gigantea.* Growing strongly and should flower next season. *Brunsvigia hybrids* (hybrids between the Cape Belladonna, *Brunsvigia rosea* and other *Brunsvigia* species.) David Chandler did a considerable amount of hybridising with these plants, of which he was very fond. He sent me eight of what he thought were his best, including a semidouble. they are all growing nicely and I hope will favour me with bloom next season. I have no details of parentage. The leaves and manner of growth show much variation. *Bravoa geminiflora,* the Mexican Twin-flower, has not flowered this year. *Calostemma purpureum.* Have several bulbs, all slightly different in colour. I understand this variation is natural. *Calostemma lutea,* received a few weeks ago, now in growth. I hope to receive *C. alba* very soon. It is being collected from the Magnetic Isles north of Queensland. These plants have daffodil-like flowers on tall stems, some being bicoloured. *Clivia nobilis,* traveled all the way from Australia quite safely and is going well. *Eurycles cunninghamii,* still dormant. *Hymenocallis littoralis* and *H. macleana,* have settled down nicely and growing well. *Urceolina pendula.* Twelve inch stems carrying drooping tubular flowers, bright yellow. Pretty.

Through the kindness of a friend in Rio de Janeiro I received a collection of eight hybrid amaryllis, the *'Colecao Paulista'* of Dierberger of Sao Paulo. They are very nice. 'Taubate' a rose pink keeled white, green throat. 'Ribeirao Preto' a creamy white, pale amber green in throat, tepals lightly striped crimson. 'Campinas', light brick red, keeled white with amber green throat. 'Sao Paulo' White, the three upper tepals widely keeled with purplish mauve, lower tepals very lightly coloured. Greenish throat. 'Santos' Bright red self. 'Bauru' Reddish orange, dark in throat, fine amber white stripe along keel of tepal from throat to point. 'Piracicaba' White, with touches of amber, keeled white, striped to the outer edges in purplish mauve, greenish throat. 'Sorocaba' Orange red self, deeper in throat. All eight varieties have well opened flowers, all are very attractive. They bloomed 'on the bulb' soon after I received them, but during the year have made good foliage and the bulbs seem to have recovered and increased in size. I think most of them will again bloom in the early part of next year. From Dierberger I have just received a further collection of

hybrid Amaryllis, but these bulbs have only identity numbers, and no indication as to type or colour. Every bulb is already showing three buds! It is to be hoped they will get their root systems working without delay.

Dr. Vargas of Cuzco, Peru, earlier this year sent me a nice parcel of *Urceolina peruviana.* All the bulbs flowered. Like *U. pendula* with bright orange scarlet flowers, the golden anthers hanging well below the petals, tightly bunched. From five to nine flowers in the umbels. Also a parcel of an unidentified *Amaryllis* sp. Most of these flowered. I expected them to be *A. forgetii,* but excepting for the colour, which is dull crimson, all parts agree with the description given in 'Amaryllidaceae' for *Amaryllis moreliana.* At first sight it is not what I would call a very attractive flower. Heavily keeled deep green on the outside, with dull crimson to the edges, make it appear heavy especially as it tends to droop. But the inside of the flower is quite lovely. Bright green throat shading into white along the keel and extending each side, to form a beautiful six pointed star, which shows up brightly against the dull crimson. If the flowers were held more horizontally it would be really fine.

From Mr. Adrian Thompson of British Guiana I have had *Amaryllis stylosa.* I think this one of the loveliest flowers I have seen. The daintiness of its flesh red colour, the waved tepals, slender tube, perfect poise, beautiful creamy green throat—I think it a superb flower; something to gaze at in silence. *Hymenocallis ovata,* a lovely fragrance to this as well as a very attractive flower. *Crinum augustum, Crinum americanum* and *Crinum zeylanicum,* all in full growth and have yet to flower.

My latest aquisitions, all during the last few weeks, and all more or less dormant or settling down; from the Transvaal—*Crinum sp.* unnamed, a huge bulb. *Haemanthus amarylloides, Haemanthus nelsonii, Cyrtanthus sanguineus, Nerines bowdenii, filamentosa* and *masonorum.* From an English nursery, *Nerine spp. humilis, candida* and *thompsonii. Nerine hybrids* fothergilii *'Queen Mary', sarniensis 'Le May',* 'Rotherside', 'Lord Grenfell', and 'Rose Camellia'.

Finally, of my own efforts, I am looking forward to the Spring when I hope to have some 200 seedlings flower for the first time, of hybrid *Amaryllis.* I wonder, what will they be like?

That is the story of my Amaryllids so far. More will be reaching me soon, many, many more remain to be found. Seeking them has brought me into contact with some grand people, many of whom regularly correspond with me, and so, my life has been much enriched.

AN EAST INDIAN TREASURE: **EURYCLES SYLVESTRIS**

WYNDHAM HAYWARD, *Florida*

Another charming member of the Amaryllis family found in the far East is *Eurycles sylvestris,* Salisbury, a medium sized bulb, in growth and habit rather similar to the *Eucharis* species of the Western World.

As may be glimpsed in the accompanying illustration (Fig. 21) the species has handsome spikes of star-like white flowers, about a foot tall, and rounded, strongly nerved bright green leaves which are even more striking and beautiful than the blooms. The bulb is rather ovate, about as large as a good-sized *Eucharis grandiflora* bulb (1½-2 inches diameter), and requires much the same treatment, considerable shade, good drainage, and rich, humusy compost.

It was named *Pancratium amboinense* by the good Dr. Linnaeus, but neither of the appellations stuck, as it was proved to be no kind of a *Pancratium,* and Salisbury's species name of *sylvestris* was retained over the Linnaean *amboinensis* for some reason we are not now prepared to explain.

This appealing plant is far too rare in Western horticulture. It has arrived in the Hawaiian islands and is grown in numbers of gardens there; is mentioned in Kuck and Tongg's "The Tropical Garden" (Macmillan) as "Japanese or Brisbane Lily", bearing "stalks of white scentless flowers, rising from the clumps of heart-shaped leaves". The culture may be found to be more like that of the Ismene group of *Hymenocallis,* as plants in pots in the writer's garden at Winter Park lost their leaves and went dormant in the winter of 1954-55 for several months. However this may have been due to several sharp frosts.

It has been kicking around in Eastern horticulture and the literature for centuries, and was described by Rumphius, the famous Dutch botanist of Amboyna as "Cepa Sylvestris" (wild onion). Commelinus listed it under his "Narcissus", earlier in the 17th century. As a *Pancratium* it was described and illustrated by Ker in the early issues of the Botanical Magazine (Plate 1419.)

"It is a stove plant, requiring rest in winter," said Dean William Herbert, writing about it in his "Amaryllidaceae", 1837. He adds that it is "liable to rot if wet gets into the neck of the root (bulb)." He reports the plant is close to *Calostemma* botanically, and of the co-species *Eurycles cunninghamii,* says it inhabits the same vicinity as *Calostemma,* which is Australia. On the other hand, E. sylvestris ranges from Malay through the East Indies to the Philippines and Australia. *E. cunninghamii* is a smaller form.

When not in bloom, *E. sylvestris* is even more good-looking than *Eucharis,* when the foliage is advanced to optimum extent. It will attract more attention than most Amaryllids in bloom or out in a choice collection. Three bulbs will do nicely in a seven-inch pot or pan or gallon can. Drainage must be very good, and in Florida the giant lubber

grasshoppers (up to 3 inches long) are excessively fond of the tender leaves in summer.

Bulbs can be obtained from Hawaii with no difficulty, and from India at a lower price with much difficulty. They are a worthwhile addition to the Amaryllis repertory of American tropical bulb fanciers and might conceivably become a staple in the bulb trade some time when

Fig. 21. East Indian Chalice Lily, *Eurycles sylvestris*. Photo—Lowe.

the problems of cultural requirements and propagation are worked out. The writer has never seen seed form in Florida, and offsets are comparatively slow, the same as in *Eucharis*. Another modern reference to it may be found in Neal's "In Gardens of Hawaii," the outstanding book of island horticulture.

AMARYLLIS CULTURE AT DOWNEY, CALIFORNIA

J. F. Stewart, *California*

I feel most fortunate in having the opportunity to write these notes for the Annual, and wonder that more of the members do not take advantage of it. I know that I enjoy reading about the experiences of others, and that a large part of what I know about *Amaryllis* culture has come from articles published in Herbertia. Perhaps some reader will pick up a pointer or two from my experiences, and, who knows, some other potential gardener may be started on his merry way.

The 1954-1955 season has been a grand year in most every way for our hybrid *Amaryllis*. There were no extremes of weather, and no serious insect or disease attacks. The weed crop was also outstanding. As I get older, the weeds get tougher.

We had a great profusion of blooms outdoors, many thousands, most all of which were beautiful—only a few bulbs were destroyed because of not measuring up to our idea of desirability.

We gave away many dozens of bouquets, which aroused most enthusiastic interest. A noteworthy sidelight on this is that most of the inquiries received were from men.

A few of our blooms were displayed at the Downey Women's Club's "Spring Garden Festival". There was no competition, but the display was well received. So many people are not familiar with the hybrid Amaryllis flowers and are amazed when they first see them.

A few hundred of the bulbs dug last fall, of a mixed stock, both as to color and parentage, were not re-planted at the usual time, but were stored in drawers in the dark end of the garage, with the drawers left open for ventilation. Some that bloomed in storage were discarded, but the balance were planted outdoors this summer at various times, and under varying conditions, for experimental purposes. Part were stripped to the clean bulb, roots removed, and treated with mercuric chloride, part were treated with formaldehyde before planting, and part were planted as they were, in March and April. On Decoration Day, 24 were planted without any treatment. Of these, two were in bloom on June 29 and six on July 4, with 2 and 4 very good blooms per 18-inch scape. Of 24 planted July 4, six were in bloom by Aug. 18, with flowers which were a little below par. The balance were planted Aug. 1, and none of these have bloomed. These last ones were rather badly depleted, were down to about two and a quarter inches in diameter, and were obviously losing vitality. With the exception of 5 or 6, every bulb in all of the foregoing experiments is now, late October, growing nicely and making a good, healthy, strong plant.

The conclusion from all this seems to be that the bulbs have quite a long shelf life and are difficult to discourage, but that the best flowers come from early plantings. The loss of roots before planting, *under our conditions,* seems to have little, if any, effect on the vitality of the bulb. I have checked hundreds of bulbs that have been planted with the usual

cropped roots, and have found that in almost all cases the old roots die and a new root system develops. When our bulbs are dug in the fall and we intend to replant them ourselves, the roots are cut off close to the bulb to help prevent air pockets. *When bulbs are transplanted during the blooming season all possible roots are retained.* We do this transplanting either to move the bulbs to rows of separate colors, or to pot up for breeding stock. There seems to be little, if any, set-back if care is used.

The glass house stock also did well this year. There is one outstanding salmon that had 9¾-inch blooms this year, and almost perfect flowers. I am proud of this one. It is being propagated and will be named. We measure our flowers diagonally across from the lower left to the upper right tepalseg, or vice versa, and without touching the flower.

Some bulbs were purchased from Holland, but they arrived late and only part of them bloomed, some with no scapes and quite off-type flowers. They were large bulbs, had some fungus and some were slow rooting. *Finally got them going with a lot of bottom heat.* There seems to have been some substitution here, since some of the flowers were not even close to the catalog description.

The results of my experiments in treating fungus with formaldehyde and mercuric chloride were not conclusive. It seems, from these limited experiments, that any concentration of formaldehyde that will kill the fungus is detrimental to this type of succulent-rooted bulb. Mercuric chloride seems to offer possibilities. Some of the bulbs treated with this were quite badly set back, but are making a good recovery. More work is needed to establish the value of the material and the most effective dilution. *Mercuric chloride should be handled with great care and only by those acquainted with its dangerous nature.*

I have been using a spray containing copper, put out by a local firm, which seems to show some good results, and plan to continue with this for the present. Any bordeaux mixture should have similar effects. I have been trying to obtain a copper-lime dust, but to date have found no commercial source.

The Kildeers, our favorite birds, raised their brood on the place, as usual this year, but had a bad time of it. They had four eggs, in their nest out in the amaryllis garden, which were about half developed when the crows got them. They then started another nest up closer to the house, and had two eggs laid when the crows got those. The third nest was started in a neighbor's garden, and this time they made it. Came home with three young ones. They run, and hunt food immediately after hatching, but do not fly for several weeks. Cute little rascals, and they become almost tame. One got killed somehow, we found it in the back yard, but the other two have grown up and are not now distinguishable from the parents.

Mocking birds raised a family under the ventilating sash on the small glass house, and doves are raising a pair of young ones on the place now. Young doves seem to be the most helpless of all the birds here.

These are almost full grown and the parents are still feeding them.

My pal Jack, the 85 pound boxer, developed some serious malignancies and we had to have him put out of his misery. Part of me went with him. We don't have a dog now, but as time goes on we will some day find ourselves the owners of a new pup, I'm sure.

I have started to investigate the possibilities of a small Hybrid Amaryllis Show here in Downey, and wonder if any of the members within reach of Downey would be interested in helping to put one on.

The foregoing was all ready for typing when an extreme hot spell hit us in late August. The temperature rose to 110 degrees on one day and reached above 100 on each of about ten days. Most of the *Amaryllis* leaves wilted down, and were badly scorched. Heavy irrigation apparently saved the bulbs, although some of them may be set back a bit.

Fig. 22. La Forest Morton greenhouse, front view.

It was close. In addition to that near fiasco, there was a bad accident with the cuttings. I had been cutting up bulbs for about six weeks as I had time, and had two hot beds filled—about 4000 pieces. About a week after the last cuttings were set, the thermostat was found to have gotten out of order in some way, the temperature was way up and the cuttings were cooked—literally.

After checking all the flats, a few hundred cuttings were found to be in good enough condition for re-setting, but the balance are gone completely. I had to start cutting again, fortunately there was enough stock

to practically fill the beds, but won't have so many of the good bulbs for blooms next year. All of which has made an enormous amount of extra work, and I haven't time to do anything about trying to work up interest in an Amaryllis Show. I was discouraged for a while, but there will be a lot of new bulbs blooming next year for which I have great hopes. Some of them will be blooming in less than five months now.

GROWING AMARYLLIS IN A GREENHOUSE

Mrs. W. D. Morton, Jr.

Is there an indoor gardener who has not sometime longed for a greenhouse, but looked on it as a luxury which only millionaires could afford? Modern material and manufacturing methods have made it

Fig. 23. La Forest Morton greenhouse, side view.

possible to produce greenhouses in a low price range. Prefabricated models save a lot in construction cost. We had planned a greenhouse for several years. My hobby is Amaryllis, and last winter the weather was so changeable and bad that it marked the turning point. Luxury or no luxury, we had to have a greenhouse.

We chose one of the prefabricated models, and saved in construction cost, as you do not need skilled labor to do the work. My husband supervised all the construction and in a few week-ends we had a lovely greenhouse (Figs. 22 and 23).

The ventilation is perfect with a small window in both front and back at the top, and a larger window lower in the back, and a Dutch

door. We have an electric fan to take out the excess heat in summer. We used laths to strip the top, which gives us 50-50 sun and shade. We have trees that shade the greenhouse the rest of the day.

We use a thermostatically controlled electric fan heater, to circulate the warm air. It is the most convenient, and practical way of heating, as we do not have much cold weather in the South. The heat is efficient and automatic. My husband is an Electric Engineer, and thus our lighting and heating is well done. We use fluorescent lighting for plants and seeds.

The doors and windows are screened to keep the bees and butterflies from pollinating. The benches are made of the best grade of cypress, and just the right height for comfortable working.

As I said above, my hobby is Amaryllis, and I am looking forward to Spring when my greenhouse will be an object of beauty. Am planning many experiments, and maybe later will tell you of my findings in "Growing Amaryllis in the South in a Greenhouse."

BRIEF SURVEY OF THE PANCRATIEAE

LEN WOELFLE, *Ohio*

This article is written partly in the hope of interesting other amateur and professional growers in the possibilities of further improving—what in my opinion is the most exotic and stately group of plants in the natural order of Amaryllidaceae—by hybridizing; partly in an effort to clarify some of the confusion now existing even among the more widely grown species and hybrids of *Hymenocallis;* and to pass on to those interested in these plants, my own personal observations of those that have come to my attention.

The list is far from complete, and many species have been omitted purposely, because their inclusion would rather have added to than helped to clarify the already existing confusion. There are of course many species yet to be introduced into cultivation and many which have been lost to cultivation. There are also many species and varieties under cultivation at present which defy positive identification because information in some of the older texts is sketchy or incomplete.

Nevertheless a number of species may be rather definitely identified and it is with these that this article shall deal.

CALOSTEMMA: This genus so far as is known, is limited in natural distribution entirely to Australia. It consists of two species presently under cultivation, one additional species definitely identified, and perhaps another on which information is very incomplete. Bulbs are rather small compared to some of the more robust growers in the Amaryllis family like Crinum, etc., being somewhat oval or sub-globose, the largest perhaps three inches long in the vertical diameter and an inch and a half to two inches in the horizontal diameter, in *C. purpureum.* Bulbs of *C. luteum* are slightly smaller and more globose. In pots *C. purpureum* will remain in slow growth the year around. *C.*

luteum seems to have a definite resting period in summer. Both species bloom freely in early fall and usually set ample seed with hand pollenation. *C. luteum* is fairly stable in characteristics, but according to Mr. David Chandler of Tecoma, Victoria, Australia, who has seen many of these plants in their native habitat, there is a great deal of variation in *C. purpureum,* which ranges in color from a rather muddy purple to lavender, pink, and even white.

There is at least one other species growing in Northern Australia, *C. album,* which differs from the more southern species in that it has wider foliage, showing an affinity to *Eurycles* another closely related genus growing in that region, and a pure white flower. Both *C. luteum* and *C. purpureum* have narrow, erect foliage up to 18″ long in well grown specimens. The flowers of these species resemble miniature daffodils with a slender obconical, bicolored staminal cup, greenish yellow with a reddish crown in *C. luteum,* and purplish below with a yellow crown in *C. purpureum.* Blooms are about two inches across in both species and the slender cup perhaps three quarters of an inch deep and barely a half inch in diameter at the opening, topped off with erect filaments about a half inch long, bearing oval anthers with bright yellow pollen. Flowers are somewhat drooping, carried on slender pedicels up to two inches long, on a scape which may stretch to thirty six inches long, sometimes angular below, but usually round and tapering. Both species may have one or two scapes of blooms. *C. purpureum* carries up to 35 blooms per scape, and *C. luteum* up to 15. *C. luteum* has a definite walnut-like fragrance.

The writer knows of no hybrids between the species of *Calostemma.* However since both *C. luteum* and *C. purpureum* bloom together and are morphologically very similar and seed freely possibilities of hybrids should be excellent. Mrs. John Schmidhauser, (née Thelma Ficker), informed the writer that both have 39 somatic chromosomes, 2n = 39, indicating further their close genetic affinity.

EUCHARIS. There are a number of species in this genus, but apparently only one *E. grandiflora* (syn. *E. amazonica)* is available at this time commercially. The beautiful waxy white blooms are used extensively in corsage work and bridal bouquets and are grown commercially in some areas for this use.

Eucharis is not of the easiest culture, but given proper treatment and a congenial atmosphere, may be brought into bloom several times a year by alternate periods of rest and vigorous growth. They seem to require much water in growth, little while resting, and a warm, humid, partially shaded location. The blooms, usually four to an umbel are carried on round, green, tapering scapes about 16″ high. They have a delightful fragrance, and a texture rivaled only by some of the Aroids and the more distinguished of the Orchids. It makes an excellent house plant and although not one of the easiest, certainly worth the effort to grow it well. Foliage is petiolate, the oval dark green blade about three to five inches broad and twice as long.

Index Kewensis lists two hybrids, *E.* x *stevensi,* apparently an inter-

specific hybrid, and *Urceocharis* x *clibrani,* a bi-generic hybrid between *Eucharis* and *Urceolina.* Neither hybrid seems to be in cultivation today. According to Darlington's Chromosome Atlas of Cultivated Plants, *E. grandiflora* has 69 somatic chromosomes, 2n = 69.

EURYCLES. This genus is little known in cultivation, with only two or perhaps three identified species, *E. cunninghami* from Australia, *E. sylvestris* from northern Australia, New Guinea and the Malay peninsula, and *E. nuda* from the East Indies. *E. cunninghami* is rather easy as a house plant, blooming early in spring with new growth. It has many white, perfectly formed Amaryllis-like flowers, of a delicious fragrance, about two and a half inches in diameter, carried on slender pedicels on round, tapering scapes some 16 to 18 inches in height. Foliage is dark green, petiolate. The blade of the leaf is oval about six inches broad and eight to nine inches long. Propagation is by the many seeds produced with hand pollenation, or by offsets from mature bulbs. The staminal corona is quite inconspicuous in the center of the bloom, barely exceeding the recurved tepals and is characterized by half-inch bifid teeth between the erect half-inch long filaments. Pollen is yellow, anthers oval. The plant is evergreen, but rests in winter.

E. sylvestris has foliage which is roundly cordate, usually broader than long. I have never seen the bloom of this species.

I know of no hybrids in the genus *Eurycles.* According to Mrs. Schmidhauser, *E. cunninghami* has 20 somatic chromosomes, 2n = 20.

ELISENA: This is a small genus of strong growing bulbs from South America, closely related to Hymenocallis *(Ismene* section).

HYMENOCALLIS (ISMENE SECTION): Closely allied to *Elisena,* but characterized by larger cups and now considered a sub-genus of Hymenocallis.

HYMENOCALLIS: This is a rather large genus of bulbs, with many known species, most commonly referred to as CHALICE LILIES. Some are hardy, others nearly so, but for the most part sub-tropical or tropical in nature. They range in the United States from Virginia westward through Tennessee and Kentucky to Indiana and southward to Florida and Texas, through Mexico and Central America, northern South America, the islands of the Caribbean, with one outlying species from the west coast of Africa.

All have white flowers except *H. amancaes* (Ismene section) from Peru, with deep butter-yellow blooms and *H. undulata* from Venezuela with a red-tinged cup. Yellow also appears in the hybrids involving *H. amancaes* as one of the parents. All are very exotic plants and generally of easy culture, although a few are rather difficult, probably because of a lack of understanding of their requirements.

For cultural purposes they may be divided into four groups, with some over-lapping of cultural procedure between groups #2 and #3.

Group #1. Those requiring a definite dry resting period like *Elisena, Ismene, H. Harrisiana,* and several Mexican species characterized by having very heavy, globose bulbs. This group is generally deciduous.

Group #2. Those which may be kept in slow growth in pots over winter in the north, usually characterized by shiny strap-like foliage, and bulbs intermediate between those of groups #1 and #3. Usually evergreen.

Group #3. Those which will not stand drying off over winter and require some moisture the year around. These are the swamp-growing or water types usually characterized by leek-like bulbs, with green strap-shaped, shiny, foliage. Also those Hymenocallis from the Caribbean area and northern South America which usually have broad, or oval to nearly round foliage.

Group #4. Those which are hardy or nearly so in the north and should be left in the open soil to become properly established, as they resent disturbance. At the present time there are two species collected in Texas and the central south United States. One has somewhat erect, glaucous foliage which disappears in summer before the blooming period. The other has narrower, green, strap like foliage and blooms in spring about the time the seventh leaf makes its appearance. They may be other variants, differing somewhat from this description, but they would no doubt be found in nature in upland locations, or what might be termed "second bottom-lands." The glaucous-leaved type may be found in Texas, Oklahoma, Louisiana and Tennessee. The other may be found in the same area but with a range westward from Virginia to Missouri.

Before going on with the listing of the bulbs in the various groups established above I would like to add a few words of caution and advice to the beginner who wishes to procure some of these bulbs and to try his hand with them. With bulbs, one must remember that all that the nursery can guarantee is healthy stock. They can tell you how they grow them, but cannot insure your success with them. Tilth of soil, alkalinity or acidity, moisture or its absence, temperature or shade may all have a great deal to do with your ultimate success or lack of it, and all these conditions will vary from one locale to another. All plants are wild flowers somewhere and will grow as readily there as weeds, but they cannot adapt to all conditions. In nature they are usually confined to a definite area. How nearly we can simulate the conditions of their native habitat will be the deciding factor as to our success with them.

Hybridizing speeds up the evolutionary process of the plants, mixes characteristics, and generally makes a plant more versatile or adaptable, bringing about in a few short years, changes which might in nature take eons of time. Remember in nature plants don't have far to go, unless they are carried, and do not require a great deal of change. Therefore the species are rather stable.

We can help ourselves by purchasing our bulbs from reputable dealers or collectors who make an effort to classify their bulbs properly. They will do their best. The rest is up to you.

CULTURE OF HYMENOCALLIS SPECIES AND HYBRIDS

Group #1. Hymenocallis longipetala (syn. *Elisena longipetala), H. harrisiana,* the Ismene group, *H. amancaes, H. macleana* (syn. *H. pedunculata), H. narcissiflora* (syn. *H. calathina),* and the hybrids 'Advance', 'Festalis', 'Olympia' and 'Sulphur Queen', may all be planted directly in the garden here in the north, in a well-drained, sunny position when the soil warms up about mid-May, in a soil which would support a variety of vegetables. They require about five months of active growth from May to October. Planted in May they will bloom in June and July. They may be dug in early October and the bulbs stored warm and dry over winter at a temperature above 55 degrees and nearer 70 degrees if possible. The buds formed earlier develop further during this dry period and if the bulbs grew well the previous summer they should be fairly sure to bloom. Offsets should be left attached to the mother bulb until just prior to planting time in spring. This prevents further development of offsets and a relative weakening of the mother bulb. In some parts of southern California they may be left in the garden over winter, but they definitely resent dampness and cold when at rest. Some people say they are gross feeders. I have not found this to be true. Perhaps my soil has enough of the vital elements needed for good growth and bloom.

Group #2. Some of our native *Hymenocallis* like *H. tenuiflora,* having shiny green strap-like foliage may be stored dry like the Ismenes over winter, or kept in slow growth in pots. In some cases where the bulbs dry too severely they may not recover so they should be examined periodically until such time as it is determined just which ones will stand drying over winter. Bear in mind that many of these plants are basically swamp plants. At Ohio State University in Columbus, Ohio, several species are grown in pots partially submerged in tanks of water.

Group #3. All living plants seem to have a definite resting period when little or no growth is made. When active growth stops, watering should be lessened until the plant shows signs of renewed growth. Usually bulbous plants will bloom after this rest period when new growth begins but there are exceptions to the rule, like the liliums which bloom on current growth. *Calostemma* rests in spring and summer and blooms in fall with new growth. *Eucharis grandiflora* may be made to bloom several times a year with alternate period of rest and growth. To force bloom water must be given sparingly during the resting period. Some of the broad-leafed evergreen *Hymenocallis* from the Caribbean Islands and South America bloom in September and grow vigorously for several months in early fall and winter, going into a period of semi-rest over spring and summer. Others may bloom with new growth in the spring. A knowledge of the plant's habits should be obtained whenever possible. Otherwise you would do better to try the easier kinds about which culture is fairly well established until sufficient horticultural progress is acquired to determine a plant's needs by observation.

Group #4. With the hardier species of *Hymenocallis,* little is known of their needs at this time. The bulbs with green foliage seem more

readily adaptable to culture and will grow under varying conditions. This type is usually found near, but not growing in water. The glaucous leaved type seems to be definitely an upland plant. Yet it will not grow in extremely dry locations. Apparently it grows only a short time in the spring and early summer. By August it is usually dormant. Bloom comes in late summer most unexpectedly with one or more rains. Northern limits of hardiness for these two types have not been definitely determined, but both seem fully hardy here at Cincinnati without protection. Both types are known in various places by the common denominator of *"H. occidentalis"*. The glaucous one seems also to be the same as *H. eulae*. The type with green foliage is also known variously as *H. galvestonensis* and *H. liriosme*. The type with the green foliage definitely seems to be the easier of the two to adapt to cultivation.

CEYLON CHALICE LILY — **PANCRATIUM ZEYLANICUM**

WYNDHAM HAYWARD, *Florida*

The amaryllids in which the lower part of the stamens are united and transformed into a cup or chalice are popularly known as the Chalice Lilies. The floral structure of the pancratiums is similar to that of hymenocallis but they differ in seed and other characters. Pancratiums are Old World plants, found from the Canary Islands and Africa to the Far East whereas the species of *Hymenocallis* are confined to America, excepting one species in western Africa. Pancratiums have hard, flat to angular black seeds and those of hymenocallis are roundish or angular, green or whitish and fleshy. The subject of this brief account is a species known to botany as *Pancratium zeylanicum*, first described by the master Linnaeus on page 417, in Species Plantarum, 1753.

There are not many bulbs of the Amaryllidaceae or Amaryllis family in the Old World, and this is one of the prettiest of either the old or new. A slight and lovely thing, one-flowered, with a stem only a few inches tall, but fragile and pure in its crystal white beauty. It reminds one in this quality of the rare and delicate *Leptochiton (Hymenocallis) quitoënsis* of the Ecuadorean slopes.

Pancratium zeylanicum (Fig. 24) was known to the pioneers of the plant world and was figured in the Botanical Magazine under Plate No. 2548 more than a century ago. The bulb is small, 1½ to 2 inches in diameter, roundish, with short neck, and requires Ismene (deciduous *Hymenocallis)* culture for success in Western areas. William Herbert reported in 1837 that it is "very liable to perish here" (England). The same is true today if its needs are not met with care and affection.

Bulbs are usually obtained from India, and in winter. Planted in spring in a sandy loam, slender light green leaves soon appear and in a few weeks or less the single flower puts itself up on a short stem above the gracefully arching leaves, which are a ¼ to ½ inch in width. The flower may be two inches across and the tepaltube two inches long. The

tube broadens at the top with frilly bifid teeth between the free tips of the filaments, which extend an inch or more above the flower. The habitat of this charming miniature Amaryllid extends widely over South Asia, presumably in areas of lesser rainfall, as it seems to resent excessive rain in Florida. The vegetative and blooming period is short, a few weeks only, and then the bulb goes dormant again, exactly like the Latin American *Leptochiton* previously mentioned. All fall and winter into late spring, the bulbs stay dormant in their pots if left outside, but being tender tropical subjects the writer believes the bulbs in their

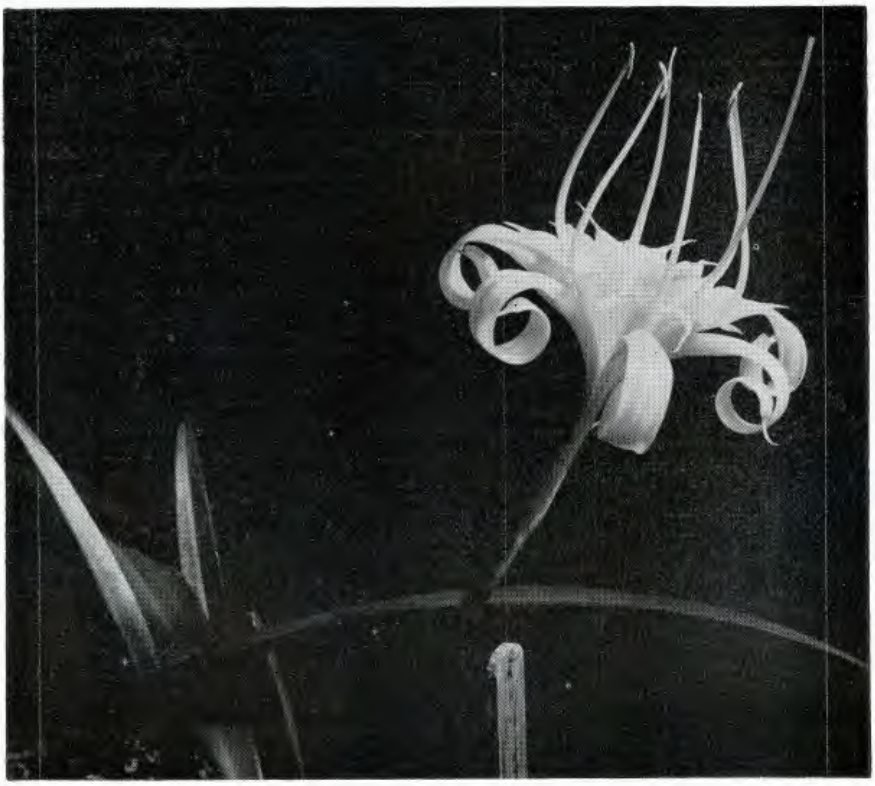

Fig. 24. Ceylon Chalice Lily, *Pancratium zeylaniaum*. Photo—Wyndham Hayward.

containers should be placed indoors or in a shed or dried off under the greenhouse bench until spring comes again.

About three bulbs will do nicely in a 6 inch "pan". Drainage must be extra good, and the soil, a light but fertile sandy loam, with some enrichment of humus or rotted manure. The glossy green leaves are as charming as the flowers.

Baker in 1888 related that the plant was figured by Rumphius, the famous early Dutch botanist of Amboina in the Dutch East Indies, and

by Commelinus, at the beginning of the 17th century. F. W. Burbidge the famous English plant explorer of the middle 19th century, made a figure of it at Labuan, (Borneo), showing the extent of its range eastward.

GARDEN CULTURE OF AMARYLLIS IN THE HOUSTON, TEXAS AREA

Mrs. A. C. Pickard, *Texas*

In our collection of various types of late winter and early spring flowering bulbs none have given us more pleasure than the Dutch hybrid amaryllis. Our collection of these bulbs was begun a few years ago and additions were made each fall so that now our collection, yet modest in size, boasts many of the finest hybrids adaptable to the climate and variations of gardening methods.

Because of their beauty of bloom and foliage, variety of form and wide range of color, they provide a focal point for garden activities and are a good topic of conversation. The hybrids are also the most popular bulb for potting to enjoy in the home. The flowers have 3 or more huge trumpets per scape and 2 to 3 scapes per bulb in cheerful colors from dark velvety red through salmon, orange, pink, rose pink, pure white, striped and varigated patterns and we are all waiting for the pure yellow and blue hybrids. In fact, all amaryllis are good except some are better than others. 'White Giant', 'Doris Lillian', 'Bouquet' are always prize winning favorites.

Many amaryllis fanciers have a high appreciation for some of the smaller blooms. So far the most outstanding strain in our opinion is the true red Gracilis strain with small velvety red flowers so suitable because of their size for house plants. We have found in growing this fine smaller statured amaryllis that it has generously multiplied by offsets as compared with the larger amaryllis.

Individual amaryllis plants vary greatly in their behavior under cultivation. Some are almost evergreen. Others lose all their leaves in the fall and some delay flowering for several months while others have a very short dormant season. We believe these differences can be attributed to inherited factors, to environment and to the kind of culture given during the preceding season.

The hybrid amaryllis has been greatly improved since the first hybrid, *A.* x *johnsonii* bloomed in 1800. It is still found growing in some old gardens although somewhat varied in form and coloring. The Dutch hybridizers continue to give us the most gorgeous hybrids available and the named clones will always be prized possessions. One reason is that when a grower has produced a superior amaryllis the method of growing enough to supply the demand is slow, and therefore your cost of purchase is much higher than for the ordinary amaryllis. But bring the lovely imported Dutch hybrids into flower and you will say it is worth the cost, especially when you take into consideration the long life of the bulb.

Perhaps the most common mistake made by amaryllis fanciers is the purchase of inferior stock. Avoid disappointment by being careful in selecting top size bulbs.

With so many from which to select, it is encouraging to know that the culture is simple. We like to pot our newly purchased bulbs since they are usually late in arriving which makes them get off to a slow start if set directly in the cold ground. Select a pot at least 3 inches wider than that of the bulb. The increased soil space makes a complete repotting unnecessary if the bulb is to be left growing in the pot with the thought of sinking in the ground for the summer. Soak the pot for several hours in water before potting as a dry pot will absorb the moisture from the soil. Use a soil rich in humus, and set the bulbs one half above soil level, water lightly around the edge and store the potted bulb at a temperature of about 60 degrees. Too much heat and moisture force the embryo buds before rooting takes place and this will likely cause the flower to have weak scapes and inferior flowers. Bulbs of the same size and clone will react differently. Many factors are involved in determining the length of time from planting to bloom. Don't be disappointed if it takes several weeks for growth to begin. By potting the bulb many difficulties can be overcome, especially when we are anxiously awaiting that prize bloom for the show. The appearance of buds or leaves perhaps both indicate the plant may be moved gradually to light and watered more steadily. Here on the Gulf Coast, with many bright warm days, the pots may be set outside to encourage more sturdy growth. When flowers begin to open, move to a shady spot to retain color and keep the blooms fresh. Check every day at this period and water often. When the bloom scape is a few inches high a light application of fertilizer will make a better bloom. Removal of the anthers as the flower opens prolongs the life of the bloom and keeps them free from pollen which tends to mar their beauty.

The simplest way to insure summer growth is to turn the bulbs out of the pots in late May and plant in rich soil in a well drained spot. Watering and feeding freely, preferably with liquid fertilizer, will make heavy foliage if they are in vigorous health. If you find a bulb that for some reason made poor growth or failed to root properly, trim it off at the base. Then, to stimulate root growth, dust the base of the bulb with a hormone powder and pot on a bed of coarse sand. Some bottom heat will be helpful. The amaryllis is practically fool proof; thriving very well if the new bulbs are planted directly in the garden although they are a little slower in rooting.

The secret, if there is one, of continued success with amaryllis is to keep the foliage growing vigorously through the summer months. Healthy bulbs increase in size each growing season up to a maximum, having shrunk considerably in size during the blooming period. This points to the importance of a regular feeding schedule in the garden. Partial shade is advisable to protect the foliage from sunburn as our Texas sun "sure do get hot". Mulch protects the bulbs from heat in summer and cold in winter. Plenty of water is needed during the summer,

gradually withholding it from October on during the fall. With a few months rest period the bulbs are ready to repeat the cycle, and amaryllis enthusiasts can indeed look forward to a great future.

AMARYLLIS ROOTING PROBLEMS

WYNDHAM HAYWARD, *Florida*

The factors of root growth are major problems of amateur and professional *Amaryllis* culture, and consequently have always held an important place in the successful growing of *Amaryllis* in the hands of the flower lover or ultimate consumer.

The roots' growth, function and morphology, their seasonal cycles, if such exist, as seems strongly probable at this time, are among the least understood of all the problems of ordinary *Amaryllis* culture.

The hybridizer and grower of bulbs can combine the highest arts of the plant breeder, with the best fertilizing and irrigation equipment to produce under field or lath house or greenhouse conditions the best possible bulbs, but he cannot assure a strong root growth in the hands of the "ultimate consumer", the Amaryllis "fan" who buys the bulb in a department or seed store, florist shop, or from a mail order dealer.

Fortunately the bulb will bloom well in many cases even if it has not developed a new and adequate root system. This saves the situation from a complete loss, in the eyes of the flower lover. He may grow the same bulb for years before it blooms again, largely due to the failure to assure conditions which favor a strong root and leaf growth required for the re-establishment of the bulb.

Root growth is not such a problem in the young bulb, which seems to have an innate vigor which some of the older bulbs lack. In pots or flats or in greenhouse beds or benches (as in Holland) the bulbs progress thriftily from small seedlings until they are blooming size. Then comes the rub, when sold or otherwise disposed of, the new owner who pots up the bulb, follows all the best practices and precepts, but so many times, gets a short-stemmed undersized flower, with no foliage on the bulb and a few if any roots on the bulb. Often the blooming bulb falls clean out of its pot on the floor while being displayed to visitors and other admirers. Nothing is more disconcerting, more discouraging.

Growers meet similar problems in field cultures of the bulbs in California and Florida and presumably elsewhere. In Florida there are suspicious that the newly reported nematode foes of various plants are involved with the cultural difficulties of field growing Amaryllis. The root knot nematode is not likely to be involved, but other soil borne types as the "burrowing" nematode, the "sting" and "lesion" nematodes; all receiving critical attention in Florida horticulture at this time. These can be controlled by soil sanitation, at least in beds and pots.

Other factors are moisture, too little or too much. In Florida there are long dry periods and a likelihood of sudden drenching tropical cloudbursts and hurricane downpours during the main growing season

of April to November in the open air. The dry periods are mainly in the spring, until the start of the rainy season in June. Then watering by irrigation of some sort, hose or sprinkler, is necessary for any important Amaryllis planting of the better hybrids. Otherwise the bulbs may be found to have dried off their roots completely in the sandy ground.

Wet weather in summer is often fatal to the root systems on Amaryllis bulbs in the lower South, especially in heavy soils and soils of general poor drainage. In lower land plantings after heavy rains in September, the height of the tropical storm season in the lower South, bulbs will be found to be loose in the ground with all roots rotted or partially decayed and reddened. Excess moisture is a great foe of Amaryllis and its avoidance requires good drainage at all times in a private or commercial planting. Raised beds are best, as the bulbs can be watered in dry weather and will drain off sufficiently in wet times.

Then too there is the problem of the composition of soils and the true preferences of the Amaryllis itself, which seems a reasonably tolerant plant, thriving when it does thrive, as it can be found, in soils in California above neutral or 7.0 pH and in acid soils in Florida down to 4.5 pH on peaty muck, as long as it is well drained. Growth seems better on the neutral or near-neutral soils, although Mulford B. Foster the plant explorer and Bromeliad expert, reports finding wild species of the Amaryllis growing in low, wet places and in moist heavy types of woods mould, rather loose and friable or compact but porus, and well drained, yet subject to frequent rains, heavy drip from trees and often mist and splash from nearby waterfalls, streams, etc. in South America.

Adequate water is necessary but the drainage must be perfect. In full growth, from June to October, water may be applied abundantly, if the drainage is good, with favorable results. Just what pH is optimum for the common hybrid Amaryllis today is still uncertain. They will stand a limed soil and again a rather acid medium with heavy admixture of leaf mold and peat. Possibly the humus content is more important than the pH within reasonable limits.

Under glass, heavier soils, even clayey types may be used as potting mediums properly mixed, as watering can be done under absolute control by a competent gardener so that there is no danger of flooding the bulbs in their pots. Well grown greenhouse Amaryllis will have beautiful roots when lifted from growing beds or knocked out of the pots in winter. Some Dutch Amaryllis arrived in the United States with magnificent root systems, still almost intact after their long ocean voyage in November and December from the Holland Amaryllis growers.

An experiment station project by some state college floricultural department in charge of an interested and scientifically minded graduate student or research worker is required to help solve some of these problems concerning re-establishment of Amaryllis bulbs and Amaryllis rooting in general. The Amaryllis world needs and deserves more scientific information on the optimum pH, optimum type, quantity and character of the humus content of Amaryllis soils in pots, beds and in the

field; the best forms of fertilizer to use and the best methods of watering and seasonal quantitative requirements of the same.

As reported previously in the 1954 Herbertia, the writer has been experimenting with the use of sphagnum moss in Amaryllis potting mediums. There seems to be a definite inducement to the development of prompt, strong new root system from the use of sphagnum moss—when it is mixed half and half either with sand or clean sandy loam with added fine charcoal particles (poultry size as available at food stores) and dried, pulverized and sterilized cow manure such as is available under the Wizard Brand commercially. Such fertilizing materials are being put up under other brands, such as Swift's cattle manure, Driconure, and so on.

Two words of caution are necessary in connection with the use of the special sphagnum composts for Amaryllis growing. Growth is no better of course than under satisfactory or optimum cultures of Amaryllis in the usual potting and bed mediums, and drainage is just as much an essential or even more so because of the water-holding capacity of the sphagnum moss.

In 1954 and 1955 the writer has been experimenting with the growth of Amaryllis in chopped sphagnum alone, watered with Hy-Gro, Ortho-Gro or similar chemical or organic liquid fertilizer. Particularly good results have been obtained in the growing of Amaryllis bulbs in pure chopped sphagnum in gallon cans with plenty of drainage holes at the bottom, when mulched with commercial dried or composted cow manure. An excellent quality of the composted dairy manure has come on the market in recent years, dark and well decomposed, and effective as a potting soil medium as well as for mulch.

It is necessary to repeat that drainage must be of the best, and if gallon cans are used, clean, fresh cans painted with some rust resistant paint are desirable, as Amaryllis roots seem to find the rusty metal sides of an old tin can very toxic; the roots die off at contact with the sides of the cans and the bulbs make only a reduced growth. Some commercial gallon cans remain in good condition two or three seasons without painting, but others become poisonously rusted (to Amaryllis) in a single season.

A rust resistant paint which can hold up under contact with the potting medium and watering is necessary, and is difficult to find. Gliddens special rust resistant paints have proved effective in the experience of others. The writer is experimenting with "Asphaltum" a Sherwin-Williams asphalt paint product, which is mixed half and half with mineral spirits to thin and 1/12 of a good "drier" added.

The problem of dozens and even hundreds of containers or "pots" is a real one for the amateur or professional grower. A six-inch clay pot is too expensive and too small for the root system of a large Amaryllis bulb under average conditions, and does not provide enough feeding area. A gallon can is inexpensive, obtainable at schools and restaurants, and properly treated against rust, will last for years with good results in the way of producing good root systems. The writer makes six holes

in each can with a beer can opener on the outside of the can, at the bottom, for drainage. He is experimenting with new plastic pots and "pans", 6 and 7-inch sizes, of Union Products, Inc., a plastics firm at Leominster, Mass., this season in growing Amaryllis and will report on the results affecting root growth problems in a future article.

PSEUDOSTENOMESSON VARGASII

EDITH B. STROUT, *California*

Pseudostenomesson vargasii Velarde was one of a group of bulbs received in 1950 from Miss Elaine Breckenridge who had gotten them directly from Peru. Planted in early November, it amazed me not only by breaking its long rest and growing immediately, but by flowering on November 25th.

The plant seems closely allied to the Ismenes, with similar type leaves of from 6 to 12, though usually only a few, from three or four, have developed at time of flowering. There is a 5-inch long neck, with the leaves fanning out at the top. This has led me to think that in its native land it probably grows in thick grassland and that the bulb is rather deep in the soil.

The flower peduncle does not come from the side of the bulb as in amaryllis, but from the center of the leaves, as is so similar to the hymenocallis group, and it is also distinctly flattened and two-edged as with *Hymenocallis*. The peduncle is 10 to 20 inches above the top of the neck, or 15 to 25 inches from the soil.

Pseudostenomesson vargasii is a shy, retiring miss, for she puts on no show, decking herself out in the same green for leaves, stalk and flowers! (Fig. 25) The five to six green tubular flowers are 1¼ inch long, with the same length narrow tube, so the effect is of 2½ inch pendant bells, with the exserted pistil furthering the illusion of the clapper. The only contrast in the flowers is a narrow lighter green midrib on the inside of the petals, and the yellow anthers. The pedicles are very short, ¼ inch, and the spathe 1¼ inches.

Seed set only once, in 1954. The ovary appeared to be 3 celled, and only one cell in each of two ovaries developed into a seed. Considering the small size of the flower, the seed was very large, one was ⅝ and the other ¾ inches in diameter, each being green, round and fleshy. The seed was so heavy the peduncle bent way down to the ground, all ready to drop the seed some 18 inches from the parent plant. If naturalized, there soon develop a ring of seedlings around the parent bulb. One seed was sent to Dr. Traub and the other to Mrs. Polly Anderson, both living in southern California. I shall be very interested to learn at a future time how the seed develops and how long it will take to reach flowering size.

I have my bulb planted in a 10″ pot, in compost and leaf mold. It has never been transplanted, but occasionally a little fertilizer has been given. I had assumed that the stenomessons were winter growing, so planted this in November the first year I received it. I have been very

interested in watching how the bulb has been gradually accommodating itself to its surroundings. It is with hybrid amaryllis in a cold frame, which is covered with cello-glass in winter, our rainy season. Though very damp, there is not a great deal of moisture in the winter time in the frame. In summer, occasional sprinklings with a hose are given, not as much as the bulbs should have, and I feel they are kept on the dry side. The blooming dates of this stenomesson have been steadily advancing, as will be seen from the following: 1950, bloomed November 25th. 1951, did not bloom. 1952, bloomed in October. 1953, bloomed in September. Bulb split into two equal size sections, both sections

Fig. 25. *Pseudostenomesson vargasii.* Photo—Edith B. Strout.

blooming. 1954, August 12, only one of the divisions flowered. 1955, bloomed July 26, both divisions sending up one stalk each. I shall be interested to see where it stabilizes its blooming date. At the present time it seems to be a summer growing and flowering bulb instead of a winter growing one.

It stands our outdoor temperatures here, which go to 20° F., but it is covered and given slight protection. As it is not a showy plant, even when in bloom, and as it also needs considerable room for the bulb is large, it will probably never be popular as a greenhouse subject, but in large clumps might be of interest in frost-free areas as a garden plant.

I wish I knew more about its habits. Its greatest value to me, outside of its rarity, is that it has been the only stenomesson that I can get to bloom regularly, and it seems to thrive on my neglect and is able to accommodate or acclimate itself to its surroundings.

[Editorial Note.—The seed of *Stenomesson vargasii* that Mrs. Strout kindly sent to the writer survived the moving ordeal in 1954 and has grown into a sturdy medium-sized plant in one growing season and will perhaps bloom in 1957 after another growing season. Thus it seems to be a plant of easy culture and should become popular in amaryllid collections.—*Hamilton P. Traub*]

REGIONAL PERFORMANCE OF DAYLILIES

PHILIP G. CORLISS, M.D.
Somerton, Arizona

Like many other daylily enthusiasts, I saw my first named hemerocallis clones as a corollary of a visit to an iris grower. In my case, it was at Mrs. Thomas Nesmith's Fairmount Gardens in Lowell, Massachusetts. But before my first horticultural hybrid daylilies had even been planted, I had an initiation regarding the regional performance which is so important in any consideration of the garden value of these flowers.

I returned to Arizona having ordered many clones recommended to me by Mrs. Nesmith and Dr. A. B. Stout. My belief that I would be introducing daylilies to the gardeners of our valley was soon dispelled when I found that one of our most capable gardeners had been growing hemerocallis for a number of years. Most disconcerting, however, was being told by him that daylilies would not grow in the Yuma region. The only exception, he said, was 'Sir Michael Foster', which was so satisfactory that he was ordering it in large quantities because of its landscape value. In his garden he showed me many highly rated named clones which had failed to perform well. For the most part they were represented by small stunted fans. My host explained that he had tried every cultural device without avail to encourage better performance. (To my joy, I found that my friend's experience was not completely repeated in my garden.)

My second great lesson in regional performance was learned when I began several years of extensive travel to visit the breeders and growers of all parts of the country in assembling material for my book (HEMEROCALLIS: THE PERENNIAL SUPREME, pub. 1951). In the extreme southeast I was often shown puny plants with a remark such as: "Look at that wretched daylily—it was introduced at an high price in the north. I have thrown away thousands of seedlings better than that."

Even today, the recognition of the importance of regional performance is so poorly comprehended that I am becoming increasingly reluctant to recommend any specific daylily. My luck in picking clones with a wide range of good performance reached its peak with 'Garnet

Robe', which I pontificated was the best daylily introduction in 1948. (It has been the most highly placed red daylily on the Popularity Poll of The American Hemerocallis Society.) Even in regions where introductions of all the principal breeders will grow, there is such uneven performance that gardeners express surprise at the high rating of certain clones, not realizing that some environmental factor is militating against optimum performance in their garden.

The principal factors (in addition to the cultural practice of the gardeners) affecting performance are: (1) Temperature. This includes the daily swing, soil temperature, night readings, as well as seasonal variation and the occurrence and duration of freezing temperatures. (2) Water. This includes annual rainfall and seasonal distribution of same; drainage and runoff; pH reaction of water used for irrigation. (3) Sun and shade; and (4) Soil condition; including pH, subsoil structure as well as composition of topsoil; degree of salinity or alkalinity and absence of vital elements, minerals, organic matter, etc.

In floriculture, as in every field, "authorities" express OPINIONS which are accepted as FACTS by many. Many erroneous opinions become so firmly established that it is often difficult and sometimes impossible to dispel them. Examples: (1) Dykes and other early writers said that butterfly (spuria) iris preferred acid or at least neutral soils; yet one of the species is I. *halophila* ("salt-lover") and I have yet to find a garden where the butterfly iris thrive as they do in my alkaline soil. (2) It was said that daylilies will not bloom well in shade: some varieties offer outstanding refutation of this premise. (3) It was also said that daylilies are not subject to fungus, virus, bacteria, or insect pests! (Shades of 1920, before the gladiolus thrip showed up!)

EFFECT OF THESE FACTORS ON DAYLILY CHARACTERISTICS. Let us now consider briefly how certain characteristics of daylilies are affected by the factors listed above:

VIGOR OF GROWTH: Certain clones multiply prodigiously in regions to their liking while they remain a single fan in others. This performance is not necessarily limited to climatic regions but may be noted in different parts of the same garden where environmental factors vary. In the extreme south, where no period of cold-dormancy occurs, many northern-bred clones bloom well the first year when husky plants with heavy fleshy roots are received. In succeeding years, some of these plants fail to bloom; their foliage diminishes; finally, after lingering for perhaps several seasons and being reduced to the size of blades of grass, they disappear completely.

HEIGHT: While there are many exceptions, it is as true of daylilies as it is of daffodils and bearded iris that those clones which are bred to withstand cold dormancy and a minimum of extreme heat will be forced into bloom in hot climates before they have had time to develop stalks of expected height. Conversely, southern-bred varieties in the north achieve heights not expected in the gardens of their origin.

SIZE OF FLOWER: The same factors which affect height operate to produce the size of the flower. The ten-inch mastodons of the south

may not be impressive in the north, but even more distressing is the lack of size in southern gardens of the northern-bred clones.

PROLIFERATIONS: In the south, proliferations on the bloom scapes are commonly called "aerials". The many reports of lack of proliferations or multiplicity of them in certain years suggests how sensitive they are to environmental factors.

RECURRENT, (REMONTANT), OR CONTINUOUS BLOOM: A second blooming period is usual in but few clones in the north. Most hemerocallis, when established and well-cultivated, repeat at least once each season in the far south (but not all of them do!). The single bloom period in the north results in scapes with greater numbers of flowers, while the repetition of the cycle in the south may give scapes with less branching and fewer flowers. I have frequently regretted the tendency of northern growers to breed for late-season bloomers instead of using parents which will produce early but recurrent bloom. My preference for high close branching is accepted by some but disputed by many. I dislike the heavily-branched scape with the last flowers blooming low and surmounted by stumps and/or pods. The recurrent bloomers with high branching provide good cut flowers (and such use will stimulate their cut-and-come-again habit) and are also more attractive in the garden—the daylily is gradually overcoming an established prejudice based on the erroneous belief that it is not a satisfactory flower for cutting use. Of interest is the increasing number of introductions which have a habit of producing new flower buds at the terminal ends of the scapes.

COLOR: All of the environmental factors are important in the production of the color of flower and foliage. Deficiences or excesses of many of the factors may produce variations in the same garden; but there are differences in regional performance which are constant and striking in many cases. Clones described as pink by their originators may be deep rose or brownish in some regions; red selfs or bitones actually become bicolors in other areas.

INFLORESCENCE: Temperature is the principal factor affecting the duration of the individual flower and its TIME of opening and closing. In cold weather (even in my climate) most flowers will hold blooms open for two or more days. I have no liking for flowers that remain open so long that they lap the flowers which follow them—the old flowers are faded or perhaps marred by mechanical trauma of wind, man, animal, or insect. Many gardeners, like me, had presumed that flowers open on the first morning inspection of the garden but not blooming the preceding evening, had opened at sunup. Actually, many classed as "diurnal" bloomers open before midnight or at some hour shortly thereafter. Such flowers are spent at the end of the day and are accused of fading or closing early. Such a flower is the indispensable 'Show Girl' (Wheeler) which opens usually an hour or two before midnight.

Flowers which remain open in cold climates or cold weather until

[DAYLILY PERFORMANCE—DR. CORLISS, continued on page 161.]

PLANT LIFE

VOLUME 12

[Nos. 2-4, incl., Apr., Jul. & Oct.]

1956

GENERAL EDITION

EDITED BY
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THE AMERICAN PLANT LIFE SOCIETY
Box 150, La Jolla, California

PREFACE

In this GENERAL EDITION of PLANT LIFE the readers are favored with a number of interesting articles. L. Maurice Mason contributes a charming report on the Ghent Floralies and the Chelsea and Southport flower shows. Mr. James writes about his vacation trips and the Big Trees and Redwoods of California, with illustrations. Mr. Hayward contributes articles on the culture of the Arborescent Philodendrons, Helicondias and Curumas in Florida, and Pete Sulen favors us with the first article on the Banana to appear in Plant Life. Mrs. Wyler reports on the Amaryllis and Bulb Society Show, 1955, in New Orleans. THE PLANT LIFE LIBRARY (book reviews) completes the edition.

December 15, 1955,
5804 Camino de la Costa,
La Jolla, California

Hamilton P. Traub
Harold N. Moldenke

THE EDITOR'S MAIL BAG

The members are familiar with the excellent tropical and subtropical plant collections of Lakemount Gardens, Mr. Wyndham Hayward, prop., Winter Park, Fla., and Mr. Mulford B. Foster, 719 Magnolia Ave., Orlando, Fla. They will be pleased to hear that a similar collection has been built up through the years in the Southwest by Mr. Bavid Barry, Jr., proprietor of California Jungle Gardens, 11977 San Vicente Blvd., Los Angeles 49, Calif. A copy of the first catalog, 1955-56, has just been received and it was a revelation to page through this first issue. The plant material selected for listing is of the highest quality and covers a very wide range from Bromeliads, Alocasias, gingers, bananas, ferns, philodendrons, and so on. Mr. Barry is to be congratulated on his excellent taste in choosing his plants. The illustrations in the catalog are of the finest quality.

The Yuma Valley (Arizona) Iris Society is sponsoring a one-day tour of Yuma iris gardens on April 23, 1956, with lunch at the home of Dr. and Mrs. Corliss, for members of the AIS going to the annual meeting in Los Angeles. For reservations, write: Mrs. E. E. Evans, Route 1, Box 100, Somerton, Ariz.

GHENT FLORALIES, AND FLOWER SHOWS AT CHELSEA AND SOUTHPORT

L. Maurice Mason, *England*

This year the writer was lucky enough to visit three of the loveliest and almost certainly the largest flower shows in Europe. He refers to the Floralies at Ghent, which was held towards the end of April, the renowned Chelsea Flower Show towards the end of May and that at Southport towards the end of August. The Floralies at Ghent is perhaps primarily a Commercial Growers flower show and there undoubtedly the finest Indica Azaleas in the world can be seen, some of them pruned and trained in almost fantastic shapes yet covered with flowers so densely that it is not possible to put a twig in without touching a bloom.

The Floralies perhaps is most remarkable for the fact that it is laid out in an over-all pattern, with a vast centre hall one blazing mass of Azaleas and from it radiating halls, some containing masses of orchids and what are known as stove plants in Europe and others containing collective exhibits from many European Countries. The main hall this year was out lined round the sides with groups of ferns, palms, figs and one very lovely woodland garden staged by the Commercial growers of this country. This latter caused perhaps a special stir as it was so widely different from the majority of the exhibits. It showed what one might expect in a leafy glade in the South West of England in May, and with its primulas, rhododendrons and many other typical woodland plants made a pleasing, quiet, scene which contrasted well with some of the blazing colours of the Azaleas. Perhaps the introduction of stuffed pheasants and wild birds was a mistake but the over-all effect was picturesque to a degree and was much admired by the many hundreds of thousands of visitors to the Exhibition. I do not know where else in this world one could see so many orchids grouped together as there were in the orchid hall where wide water falls tumbling down in many tiers, surmounted by magnificent plants of *Medinella magnifica* from the Belgium Royal Gardens made a most wonderful effect. It would be invidious for the writer to pick out any firm's exhibit as being outstanding as they were almost all professional and reach that degree of perfection which now a days is so seldom seen. Cypripediums, Odontoglossums, Vandas, Phalaenopsis, Miltonias, vied with one another in their brilliance of colour and the excellence of their condition. A superb group of Bromeliads possibly covering two thousand square feet with huge Platyceriums amongst it caught one's eye but wherever one turned there was something new and interesting to see. It was difficult when the show was opened to stand and admire any particular group so large was the attendance. A German Exhibit of Cypripedium species was outstandingly interesting and the writer who was lucky enough to be judging orchids had perhaps a better opportunity of studying them than

most visitors. He was startled to hear one exhibitor remark that he was taking back almost as many plants as he was exhibiting as he had not room enough for them in his group. It can well be appreciated that under these circumstances nothing but the very finest was on view. The exhibitors at this show and in this section made great use of small pots of ferns and Selaginellas and the more common Bromeliads to provide finishing touches to a group, and the whole effect is artistic in the extreme. In another section were the collective groups from Holland, from France, and from Switzerland and as can be imagined the Dutch Florist Flowers were indeed superb; huge vases of lilacs, carnations and tulips dominated the scene and the pots of *Saintpaulia ionanthe* and *Cyclamen persicum* hybrids were of a size that perhaps was almost too big. So much so that it was a relief to turn to a cactus garden where strange Euphorbias, weird Opuntias, and other peculiar freaks of nature reared their ugly yet strangely attractive heads. As a strictly commercial show it can be appreciated that some of the groups perhaps lack interest, containing as they did fifty to a hundred examples of one single plant. To quote, for instance, *Ficus elastica* so commonly grown as a pot plant on the Continent, would be shown in a group with each plant exactly the same and all obviously in the peak of health, but to one who is more used to the English Flowers with their endless variety these did appear somewhat monotonous. Another hall was almost entirely devoted to a group of plants from the Brussels Botanic Gardens, featuring as was inevitable plants from the Belgian Congo and other possessions which are seldom if ever exhibited. The difficulty of transporting plants and their containers that weigh several hundred pounds can only be appreciated by one who has seen the group being erected or who has taken part in it.

Another feature of this show is the number of competitive classes of which there were several hundred and where in some cases the prize money ran to very considerable amounts. The task of judging these was difficult in the extreme but was carried out in a most efficient manner by panels of three to five judges all experts in their own particular line. As the result while judging commenced at 9 o'clock in the morning by 3 p. m. in the afternoon every exhibit had been judged and the prizes awarded and the cards fixed to the stand itself.

To turn from this exhibition to the world renowned Chelsea Flower Show was a contrast indeed, for here at Chelsea is exhibited in one vast marquee covering three acres almost every plant and vegetable which can be grown in England either under glass or out of doors. Perhaps to a stranger among the most startling exhibits must be those of the vegetables. For here are vast piles of Peas and Carrots, Beans and Potatoes, many out of season yet all appearing in perfect condition and all eminently fit to eat. The arrangement is always superb and the competition between the various professional growers intense to a degree. I think the point which strikes me most is always the beauty of the arrangement because when standing a few yards back from one of these huge groups a beautiful over-all picture is obtained.

Orchids are not so much in evidence at Chelsea nowadays as the expense of growing them in a heated glass house is rather too high, but there are always six or eight very lovely groups. The high light of the Chelsea Flower Show is usually one of the beautiful primula and rhododendron gardens which are put up either by the Royal Horticultural Society itself or the Commissioners of Crown Lands from Windsor Great Park or from one of the noted private gardens of this country. They tend to form rather the same over-all pattern and are usually laid out as a Woodland Walk, and are perhaps most remarkable for the diversity of plants which they contain. Here can be found primulas from the high Himalayas as well as lowly primroses from the English country side. Rhododendrons which may have come from China or Thibet or Northern India and many rare lilies which can be found in no other country in the world. But these are by no means the only outstanding exhibits at Chelsea, where the huge groups of annuals containing many thousands of plants in pots massed together to form one vast mass of colour and with most entrancing scent are superb to a degree; the groups of annual plants such as cinerarias which can only be grown in green houses in this country are also very large and of a most striking brightness of colour and showing the great care which had been exercised in their cultivation. This year a gold medal was awarded to a group of strawberries from one of the women's Horticultural Colleges and another was awarded to a group of cacti put up by a man who had spent most of his life as a professional soldier. Here too can be found many hundreds of stands exhibiting all sorts of Horticultural requisites from books to lawn mowers. These form an avenue outside the tent itself and are always crowded with visitors for the five days that the show is opened. I should have mentioned in passing that the marquee itself is the largest single tent erected in the world. There are many formal and informal gardens too which give great pleasure to the visitors and must be extremely costly for the exhibitors who lay them out. Some are arranged as rock gardens with alpine plants, trickling streams and a small pool; and some as pure, formal gardens with stone paths and a summer house and perhaps a fountain with a stone figure beside it. Some of the exhibitors retard their plants in cold storage rooms and bring them out at the peak of perfection for the time that the show is on. Some others are forced into premature flowering so that the rather unusual sight of flowering cherries and dahlias side by side can be seen. Tulips too are always exhibited in great quantity although these from the fact that they have had to be retarded are not usually at their best by the end of the show. On the other hand sweet peas which have been forced into flower always seem to be at their very best and hold their dainty freshness throughout, and superbly arranged, are in many ways one of the more attractive features of the show itself.

There is however, so much to admire at Chelsea and so much to see that it is difficult to pick out which is the exhibit that pleases most, some enthusiasts spending all their time round the many small table exhibits of alpine plants, while others who make roses their special fancy

will find many of every species, variety and hybrid there to attract them. I should emphasise again that it is the diversity of this Chelsea Flower Show which is so remarkable, and which can but emphasise the fact that the English are a race of gardeners perhaps pre-eminent in the world. There are no formal competitions at Chelsea except the flower arrangement classes which are very popular in this country, and for which purpose many societies have been formed. Here it is by no means always the most expensive and elaborate arrangement which wins the premier award, but it may well be a simple vase containing flowers and leaves which can be picked from any hedge side.

To pass from Chelsea to the Southport Flower Show is not too easy for the latter is held at the end of August at a seaside resort in Lancashire, and while not on the same scale as the other two which I have mentioned is still very remarkable. This year the writer was judging tender plants, begonias, and carnations all of them exhibited by amateurs. Carnations were superb and the task of picking out the finest was nearly impossible, and it would have been indeed difficult to have given satisfaction to the many exhibitors. While it is possibly the same with the large flowered begonias with their huge heads of striking colours and their perfection of growth which showed what time and care had been lavished on them. There was one unusually interesting group, and that was of various fruit trees all in fruit and all grown in pots. Any one who has tried this will realise how difficult it is, particularly if they have to be transported as happened in this case, a distance of nearly 250 miles. But the fruits arrived unblemished and with their bloom still on them, and were greatly admired, as much for the number of varieties which were brought as to the excellence of their condition.

The modern hybrid gladioli almost always of Dutch origin are shown extensively here and make a wonderful picture with their huge spikes, perhaps a little stiff and formal, arranged in vast containers. One or more of these groups must have been over one hundred feet long and ten feet deep, and some idea of the number of spikes required can be easily imagined. Chrysanthemums too are always shown at their best here and rival the huge heads of dahlias which are arranged in serried rows along sides of the marquees.

The specialist looking for orchids or ferns, or bromeliads here would be disappointed as there are only very few groups, and those are not of particular merit. Herbaceous plants too have rather had their season but the many thousands of visitors who attended this show obviously had all their money's worth, and every group was packed with admiring visitors, at times it was scarcely possible to move at all. The show was held during an unusually hot period and at one time the temperature soared well over the hundred, and conditions were almost unbearable.

THE SEQUOIAS —THE CALIFORNIA BIG TREES AND REDWOODS

WILFRED MCD. JAMES, *California*

The trees comprising the Sequoia group are of ancient origin. Although only two species are living now, in relatively restricted areas almost entirely in California, fossil remains of several species have been identified. Near Calistoga, California, is a spectacular geologic oddity. A petrified forest covers an area of almost three-quarters of a square mile. This is an ancient redwood forest half buried in volcanic ash. Some trunks which have been exposed are eighty feet long and twelve feet in diameter. Petrifaction was accomplished by silica-laden water replacing the wood structure. It is on the slopes of Mt. St. Helena, which is in an area of ancient volcanic action and a series of folded lava flows, although no cones were built. It is not nearly as spectacular as the Petrified Forest in Colorado, but it is evidence of the antiquity of the genus Sequoia. Fossil remains of the Tertiary period found in many European countries from Italy northward to Spitzbergen, and in Greenland, the mouth of the McKenzie River in Alaska, Vancouver and southward along the Pacific Coast to California indicate that these trees were once widely distributed over the northern parts of the earth.

The genus *Sequoia* Endl., belongs to the Gymnosperms and is included in the Taxodiaceae along with seven other genera with one to three species each which are widely scattered over the earth. Of this group, *Taxodium, Cryptomeria, Cunninghamia, Sciodopitys* and *Metasequoia* are cultivated in California.

Sequoia gigantea Dec., commonly called Sequoia and/or Big Tree locally, inhabits a relatively restricted narrow strip on the western slope of the Sierra Nevada Mountains. This runs from Placer County on the north southerly to Tulare County, a distance of two hundred fifty miles and includes an area of about fifty square miles.

In the northern half of this region, the "Big Tree" is always mixed with other coniferous trees, but is mostly restricted to very definite localities of limited extent which are called groves. These groves, which occupy locally favorable spots, are few in number and very much isolated north of King's River. In the basins of the Kings, Kaweah and Tulare Rivers the trees are more numerous, more widely distributed through the forest and may be said to form an interrupted belt. In the northern part they are found at altitudes varying from 47 to 5800 feet, and in the south from 5000 to 7500 feet. The average rainfall is 45 to 60 inches, the snow becomes two to ten feet deep and lies on the ground three to six months of the year.

Sequoia sempervirens Endl. (Fig. 27) is commonly called Redwood now. In the old Spanish days it was called Palo Colorado (Red Stick). An isolated specimen in Palo Alto (Tall Stick) was called Palo Alto by the Spaniards and gave the town its name. It was visible for thirty miles and was used as a monument or base for the early Spanish land

surveys. It is still standing, but is in poor condition because of the smoke from many commuter trains which pass close by daily. The

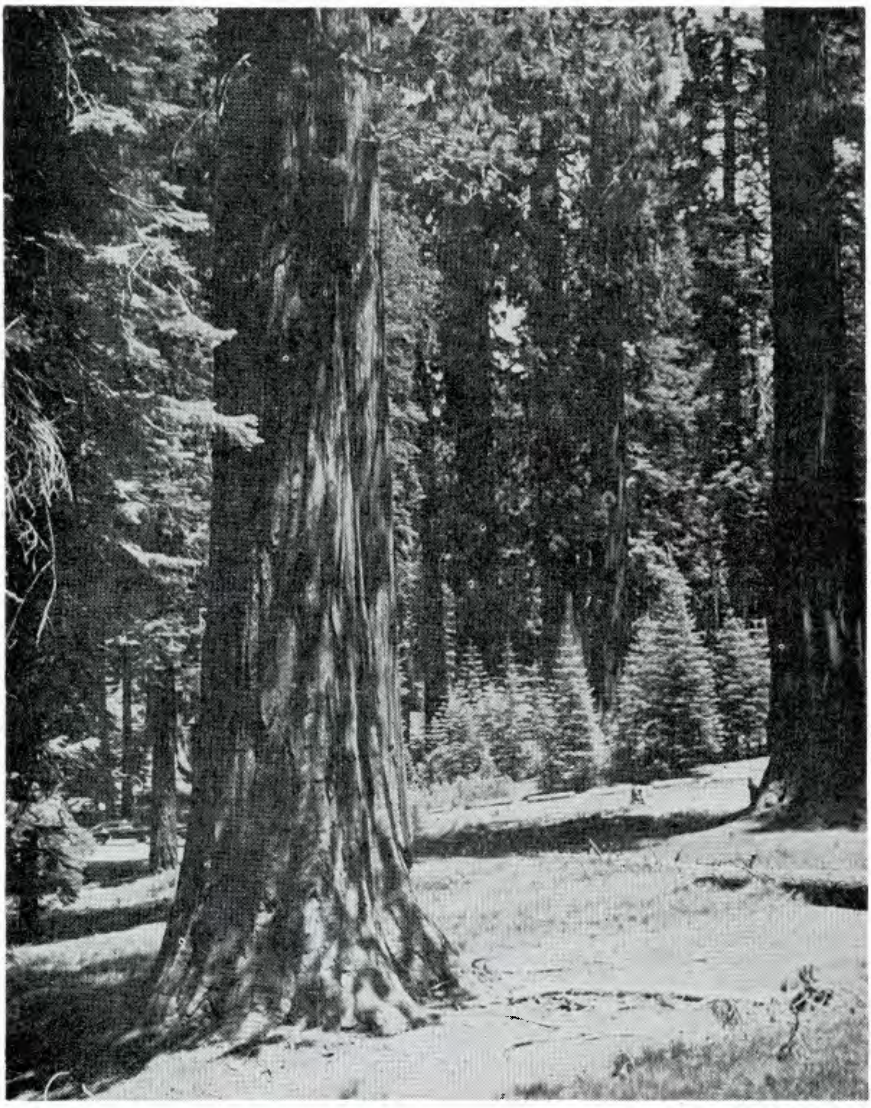

Fig. 26. Young *Sequoia gigantea* in Mariposa Grove at Yosemite National Park. Photo—W. M. James.

"Redwoods" inhabit the humid coastal region of the south-west corner of Oregon and of California from the northern border to Monterey

County in a narrow strip 450 miles long and averaging twenty miles in width. In the belt proper the trees grow on the slopes of canyons and

Fig. 27. *Sequoia sempervirens* in Big Basin National Park. Photo—W. M. James.

the river flats of streams belonging to the outer or seaward Coast Range facing the ocean.

The main "Redwood" body occurs in a belt which begins in Del

Norte County, California, on Smith River and extends southward through Humboldt and Mendocino Counties to southern Sonoma. The Redwood Highway runs through part of this region where the "Redwoods" almost completely monopolize the alluvial benches of the river bottom lands. These are said to be the heaviest stands of timber in the world.

Farther south the "Redwood" occurs in the deep canyons of southern Marin County, just north of San Francisco, and to the south along the western slopes of the Santa Cruz Mountains. The Redwood Belt in these mountains extends from the San Mateo County line nearly to the Pajaro Valley, a distance of twenty five miles. Several localized groups of outstanding trees are found in this region. Most of the area was cut in early days.

There is a gap between Monterey and the Santa Lucia Mountains where almost none of the *Sequoia sempervirens* are found, because of unfavorable soil and climatic conditions.

In the Santa Lucia Mountains the scattered remnants of the "Redwood" are confined, on account of the excessive aridity of the region in general, to the canyons cut out of the abrupt western slope overhanging the ocean. These canyons are deep and narrow with very precipitous slopes (see "Abies venusta", PLANT LIFE, Vol. 11 page 116). The trees are mainly individual specimens and are not as large as those farther north. The southern-most trees are in a gulch just north of Salmon Creek Canyon twelve miles south of Punta Gordo (Cape San Martin).

The rainfall in the northern part of the "Belt" averages fifty inches annually with isolated areas getting up to twice as much. The average decreases southward to twenty seven inches at Santa Cruz and fifteen inches at Monterey. Again, isolated areas in these regions receive more than the average. Summer fogs are more prevalent in the southern part and help provide the humid atmosphere that the "Redwood" likes. The "Big Tree" is the larger of the two, being 150 to 340 feet high with 80 to 225 feet to the first limb and 5 to 30 feet in diameter six feet above the ground. The "Redwood" is the taller, being 100 to 350 feet high with up to 100 feet to the first limbs in dense forests, and 8 to 20 feet in diameter eight to twelve feet above the greatly swollen base.

Both kinds of trees are heavily buttressed and are very deeply furrowed at the base. The bark is very similar except that of the "Big Tree" is a slightly lighter color and with larger ridges and deeper furrows. (Fig. 28) It is often 12 to 18 inches thick at the base of both kinds and is very soft, almost spongy, being composed of fine fibers.

The wood is similar in some respects. The earlier growth of both kinds is coarse grained and the later growth fine grained. Both have a brilliant rose-purple color when first cut, becoming more and more dull purplish red-brown. The "Big Tree" wood (Fig. 29) is lighter in weight and more brittle than that of the "Redwood". Both woods are noted for their long endurance without protection. The white sapwood of both decays quickly. Both the bark and wood of each kind are high in tannic acid, which makes them disease and pest resistant. The bark is some-

what fire resistant and many large trees have had the center burned out and resemble a living pipe on end.

Both *S. gigantea* and *S. sempervirens* produce quantities of seed which grows readily, but the percentage of germination is low, especially with *S. sempervirens*. Very few seedlings are found in the "Redwood" forest, probably because the shade is too dense. However, this kind

Fig. 28. Base of *Sequoia gigantea* showing ridges and bark texture. Photo—W. M. James.

stump-sprouts readily. The "Big Tree" forest is more open and young trees of all ages are plentiful. Both trees grow readily in cultivation and have been used in landscape developments where conditions are favorable both here and abroad for many years.

The age of the Sequoias is difficult to determine, but many calculations indicate an age of 3500 to 4000 years for a "Big Tree" thirty feet in diameter. An actual ring count of a "Redwood" nine feet in

diameter was 2200. In general the "Redwoods" are not considered as old as the "Big Trees."

I first saw *Sequoia gigantea* in its natural habitat in the summer of 1910. An uncle living in the Sierra foothills near Springville took his son and me on a two weeks horseback and pack trip. We started up the Middle Fork of the Tule River and went north on the eastern slope of the first range. Coming back to the western side through a 10,000 foot pass, we dropped down to a grove of "Big Trees" in the southern part of Sequoia National Park. Most of the details of that trip have been forgotten, but the first sight of those famous trees, and the incredible number of felled trees is still very vivid in my memory.

Fig. 29. Relatively small logs of *Sequoia gigantea* brought down from the mountains for milling. Photo—W. M. James.

One of the large trees was still standing on the stump after it had supposedly been cut off from the stump—and it stood that way for many years. It is down now, but I do not know whether a storm blew it over or somebody made a big enough undercut to throw it off balance. Another large tree had been cut and only one short piece taken from the butt end for an exhibit at a National Exposition.

Dry lumber from these trees is relatively light, but growing trees are exceptionally heavy because of the water that they contain. Also

the wood is relatively brittle, even more so than that of the Coast Redwoods. When these "Giant Sequoias" are felled, they often break up so badly—even though a deep cradle of bark is laid for them to fall on—that very little is left suitable for the sawmill. This accounts for the many trees which I saw lying on the ground. And they do not splinter when they break like other kinds of trees do, but break more like a candy cane does when it is dropped flat on a hard surface. I have since heard that some of these old trees have been split into fence posts and grape stakes, but the dry wood does not split readily.

I visited "Big Trees" the next time in the summer of 1943. Starting from Springville, we drove over a fire control and lumbering road to an old sawmill site in another part of southern Sequoia National Park. There were many scattered trees, but no spectacular ones in this area. The Forest Service was doing some thinning, and we were fortunate enough to see a few trees being worked into fence posts and grape stakes. These were the last that were to be cut in that area.

Mariposa Grove in the southern part of Yosemite National Park is an outstanding group and easily accessible. It is a fairly large group in a relatively small area. One of these trees is over the road and has a tunnel cut through it which is large enough for the passage of sight seeing busses. The Grizzly Giant is near this group. It is one of the largest trees, but statistics are of little help in realizing the true size of them. Sixty or seventy years seems a long time to most of us—but some of these trees were a thousand or more years old at the time of Christ.

Another easily accessible group is in the Calaveras Big Trees State Park. This group may have been seen earlier by hunters, but credit for discovering it in 1852 goes to A. T. Dowd. Most of the other larger groups were found at about this time. The tree supposedly seen first by Dowd was felled to provide souvenirs for visitors. It was three hundred two feet high and thirty feet in diameter at the crown. After twenty five days of work, the tree was blown over by a sudden gust of wind while the workmen were eating lunch. Records say that the noise was heard for fifteen miles and that the ground rocked as in an earthquake. The stump was smoothed off and was, and still is, used as a dance floor. In 1854 a tree in this grove was stripped of its bark to a height of one hundred sixteen feet in order that a reproduction of the tree might be erected and exhibited in the Crystal Palace in Sydenham, England. The dead tree is still standing, although fire scarred and with a present diameter of twenty feet.

Probably the best of the trees in Sequoia National Park have recently been made more easily accessible by the opening of a road in Kings River Canyon. I am looking forward to traveling that road and hope that I will be able to recognize some of the first "Big Trees" that I have seen.

I haven't seen the so-called Redwood Empire in the northern part of California where the *Sequoia sempervirens* grows in such heavy stands. I hope to visit it soon because I do not see how any one can tire of visiting these trees.

The Santa Cruz Mountains west of San Jose were heavily wooded with "Redwoods" at one time. Logging started in this area in 1847 and it was almost entirely cleaned off. Some second growth from stump sprouts is being cut now. Santa Cruz Big Trees State Park and Big Basin National Park are two places that were not cut, and the trees can be seen in all their majesty. The "Redwood" is more tapering than the "Big Trees" and most of the tops have not been broken out. Winds of high velocity in the Sierra Nevadas have broken the tops out of most of the "Big Trees".

One very striking thing about these coastal trees is their habit of stump sprouting. An almost exact circle of trees one foot to one and one-half feet in diameter and in number from a few to twelve or fifteen will be growing around an old weatherbeaten stump five to six feet high and up to fifteen or more feet in diameter. It is almost uncanny to see the regularity of growth and spacing of the young trees in some of these circles. I haven't yet tired of stopping to look at them.

Besides the uniqueness of the trees themselves, they—especially the *Sequoia gigantea*—are found in a geologic wonderland. Not too far from the Calaveras Grove is a formation called Tuolumne Table Mountain. It extends for several miles and was formed by a lava flow filling a stream bed some time during the Miocene period, millions of years ago. This "mountain" is partially cut through occasionally by former streams. and in places down to the level of streams crossing it now. It is almost impossible for human imagination to realize the amount and extent of erosion which would cut a plain that was on a level with this mountain top down to the present conformation. And Yosemite with its glacial history never fails to interest people. About opposite Yosemite on the eastern side of the Sierra is a place called the Devil's Post Pile. It is what is left of a large flow of molten basalt which crystalized into long five and six sided columns. This must have been under or very near a glacier, because most of the flow has been completely removed. On one side these long columns have been bent just as a blacksmith would bend a piece of hot iron. The tops of the upright columns are polished as smooth as glass and have scratches from the rocks that were dragged over them. All the gopher mounds in this area are about one-half pumice.

The geologic features in the Coastal section are not as spectacular as in the Sierra Nevadas. The mountains are of sedimentary origin and not as high as the Sierra Nevadas. It is interesting to cross a deep, narrow canyon on a high bridge near the Ocean and feel that you can almost reach out and touch the tops of the tall "Redwoods" growing in the bottom.

At Felton, near Santa Cruz, there is a group of low, rounding mountains that are almost pure sand with a shallow covering of soil on top. It is screened for use in plaster, but for all other purposes is used just as it is dug from the mountain. The present size of the excavations is surprising.

And so on. Something different around every corner. Besides all this, along with the Sequoias are found a wealth and variety of flora that have attracted plant explorers and botanists from all over the world for more than one hundred years.

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PROPAGATION OF ARBORESCENT **PHILODENDRONS**

WYNDHAM HAYWARD, *Florida*

The newly popular Arborescent Philodendrons, which comprise a dozen species more or less, previously cited by the author in an article in PLANT LIFE 1954, page 113-16, include several species and hybrids which have become extremely popular with nurserymen and growers for the trade in Southern California and Florida, in recent years.

This increasing popularity has stemmed from the discovery of the generous seeding capacity of these plants, (seed by the thousands can be produced from a single season's bloom on one plant by careful hand pollination) and the acquisition of suitable techniques by growers for multiplying their stocks.

Conceivably, however, in future times, easy methods of vegetative propagation may be desirable and worthy of study and research. Some of the reasons would include the fact that the new hybrids, which are in some ways more desirable and popular than the original species, are of course only obtainable as of the present time from seed. In other words, the original cross has to be repeated every time a new crop of the hybrid seedlings is wanted for propagation. Due to the vagaries of *Philodendron* bloom, weather conditions, cold, frost, rains, etc., it is conceivable, also that in certain years there might be a reduced crop or an inadequate one, of a certain type or types of the hybrid seed produced.

Also the ownership of certain arborescent types and species of the giant Philodendrons is limited to a very few growers, at least in large size plants, of blooming age and suitable for use in hybridizing. Only a comparative few growers in the United States as yet have a stock of old and established plants of the arborescent Philodendrons to assure themselves of adequate annual crops of seeds of the species and hybrids. This has created a windfall of lush business for these few. Little seed is available on the general trade market as yet, and that still expensive. During the summer of 1955 a few advertisements of *Philodendron selloum* seed, the most common variety in Southern California have offered the seed at prices from $15.00 to $25.00 per 1,000 in the trade papers. One thousand seed of *P. selloum* is hardly a rounded teaspoonful, as the seed are comparaticely small, like radish seed.

In good commercial practice, the seed can be sown in flats in the

greenhouse or outside exactly like flower seeds, or perennials, like Gerbera or Pansies, preferably under muslin shade, the flats being raised off the ground on benches. The seeds germinate in a few days to a few weeks, and more light should be provided as they grow taller. At one or two inches in height they can be transplanted to other flats or 2-inch pots. In a few months they are big enough for 3 or 4-inch pots and in a year's time have been grown to fives and sixes. All this requires abundant labor, attention, careful watering and protection from cold, rains, hot sun and wind.

Fig. 30. The hybrid arborescent *Philodendron* x *fosterianum*. Photo—Wyndham Hayward.

By the time the little seedlings are in three or four inch pots they can stand half sun in a lath house and are able to withstand ordinary rains. Heavy downpours may, however, dislodge a few from their pots at this stage. The plants seem healthier when grown in the open air than inside greenhouses, where insects and fungus troubles may occur. Under lath house conditions, with adequate light, and proper spacing, they seldom have troubles beyond an occasional chewing insect, grasshopper or cricket which may eat the leaves.

Once the plants are six inches high and in 4-inch pots they are

tough and sturdy and should give the grower little trouble provided he attends to a few simples: adequate spacing, ventilation, occasional feeding with liquid manures or soluble fertilizer, clean or sterilized soil for planting and transplanting as Philodendrons are known to be subject to attacks of certain injurious nematodes (although just what damage this may cause is not yet known definitely), protection from heavy frosts (mature plants of some of the hardier species as *P. selloum* and *P. bipinnapifidum* can take 10 degrees of frost with little damage if in fully dormant condition in winter). Young plants can be severely "scorched" by frost and the species *P. undulatum* and possibly *P. speciosum* are known to be tender to all frost and badly damaged when exposed to it.

The vegetative propagation of these Arborescent Philodendrons was the only method of propagation known for them before seeding technique was introduced in 1949 by M. B. Foster. This involved nothing radical and nothing extremely new, as the technique follows in general that of all Aroids, as caladiums, alocasias etc., where the female flowers mature before the male flowers on the same plant shed their pollen. However, the facts of Aroid flowering morphology and hybridization techniques have been mostly well guarded secrets in professional horticultural circles for many decades. Propagators in some cases have been chary of giving out the information to new growers, to restrict competition and to help their own business advantages.

Before seedlings were common, plants of giant Arborescent Philodrendrons were very rare in the United States and perhaps were obtained from plant dealers in Europe at great cost, where they have been grown for generations in botanic gardens and conservatories. *(P. selloum* was growing in the Berlin Botanic Garden in 1850-1855 when first described by Koch.) Or in California once in a while some grower would chop off the tip of an over-all specimen, root the tip in a tub to make a new plant, and dispose of it, for $100 or $200. The base of the old plant would subsequently produce one or two or more suckers, which could be removed and established in pots in the course of time.

In Florida the writer has noted side sprouts or suckers forming on plants in pots and occasionally on those planted in the garden or open ground. There is a report of a grower who obtained a large crop of suckers from a commercial collection of *P. selloum* plants which were hit by severe cold, and while not seriously damaged, being in perfectly dormant state, were severely shocked by the cold. This may have created a systemic or metabolic upset within the plants which demonstrated itself in the heavy production of sucker or offset plants.

Research into the production of such suckers on cold-treated plants would be very worth while at some properly equipped institution.

The writer had half dozen plants of *P. undulatum* in 6-in. pots hit by frost in his lath house in the winter of 1954-55, when they were exposed to temperatures of around 28° to 30° F., for a few hours on several nights. Most of the foliage was killed on the plants or died away in a few weeks. One plant died entirely. Three grew from the old crown and

did not produce new sprouts, but two put out side sprouts below the crown as the central bud of the old crown was killed. These sprouts have been separated and replanted in pots, by dividing the old crown with a knife vertically, retaining a few roots with each new sprout. Three sprouts was maximum and the other plant had two. The replanted sprouts are growing rapidly and will make nice plants in another season.

P. undulatum is one of the smallest of the arborescent species, only about three to four feet tall at maturity, and more tender to frost although reputedly native to Paraguay, in Southern South America. The farthest South of this species, whether it extends into Argentina and the most severe climate of its Southern range is worth investigation, and the author would like to hear from any readers having information on these field matters.

In Florida at the present time, vegetative propagation is employed only in a casual and experimental way by the commercial growers. Leading growers such as M. B. Foster of Orlando and John Masek of Apopka ("John's") are growing these Philodendrons in many thousands from their own and from imported seed.

[Editorial note.—The editor has propagated arborescent philodendrons by severing the stem between nodes thus making cuttings with only one leaf attached. These were planted in a rooting medium of equal parts of sphagnum moss and coarse sand. Up to the present only a limited number have been propagated due to lack of stock to experiment with. He plans to carry out more extensive experiments as soon as stock becomes available.—*Hamilton P. Traub*]

THE MAJESTIC BANANA

PETE SULEN, *Florida*

Anyone can have beautiful banana plants for use in landscaping and as a decorative house plant since they are easy to grow and maintain and have no major enemies under Florida conditions.

When we moved to Florida in 1938, we bought a fish camp. Before long we realized that we needed ditches in which to keep our live bait, but with all the rains we have in Florida, we were faced with the problem of erosion on the banks of the bait ditches. Immediately we started setting out banana plants, spacing them 10 ft. apart and by the end of the second year, so many new shoots had sprung up, they were nearly touching.

Our faithful bananas not only kept our banks from washing away with their interwoven roots, but also attracted tourists from far and near with their majestic tropical appearance and huge stalks of fruit. They were amazed and could not resist taking pictures of the lush growth and immense bunches of fruit, often totaling over 200 bananas per stalk.

Bananas as grown by Pete Sulen, Lady Lake, Florida, along drainage ditches to control erosion of the banks.
Plate 2

As time went on, we kept setting out new shoots as soon as they were rooted well enough, until we now have over 1,000 plants.

Fig. 31. Fruiting banana plant of the clone 'Green Orinoco'. Photo—Pete Sulen.

CULTURE

In the temperate north, bananas can be grown like cannas—planted outdoors after danger of frost is over, and storing the crowns like those

of the canna in the cellar or other frost-free place during winter. Bananas may also be brought indoors in winter to be used as an attractive pot plant. 'Cavendish' is one of the best clones for growing under glass, and it will fruit in the northern states. Its short medium sized height requires only modest overhead space, and it will mature fruit from time of planting several months sooner than other clones.

Bananas can also be grown outdoors in protected areas in the Gulf Coast, Southern Texas, Southern Arizona, Southern California and Southern and Central Florida.

The banana is of easy culture and a soil and fertilizer suitable for an Irish potato should meet its requirements very well. Plenty of organic nitrogen, animal manure, leaf mold and mulch of all sorts in addition to an abundant supply of water are required for light soil. The banana is a very cooperative plant, rewarding the owner with its offspring (offsets) and delectable fruit at a rapid rate.

CLONES

There are several banana clones under culture here but the most delicious is 'Cavendish' with a medium sized plant. When fully ripe, the flavor is very mellow and delicious and the skin is very thin. The plants reach a height of 6 to 8 ft.; have extremely wide leaves, often over 2 ft. wide and make excellent landscaping and patio plants.

Another clone is 'Lady Finger', which attains a height of from 12 to 15 ft. and doesn't have as wide leaves as 'Cavendish'. The fruit lives up to its name, small and dainty like a lady's finger and has exceptionally thin skin, even thinner than in 'Cavendish'. The flavor is similar to that of 'Cavendish'. Other clones grown here are 'Red Banana' and 'Gros Michel', and also one of the Plantains.

'Green Orinoco', the tallest of all clones often reaches a height of 20 to 25 ft. Its towering height, graceful sweeping leaves and great stalks of fruit give it a most dignified and stately appearance. The fruit from this clone has a slight apple flavor.

In conclusion, anyone with a natural love of growing plants can raise the majestic banana with gratifying success.

[Editorial note.—Those interested in banana culture should write directly to Pete Sulen, Griffin View Fish Camp, Lady Lake, Florida.]

CALIFORNIA VACATION TRIPS, 1955

WILFRED MCD. JAMES, *California*

Leaving Sarasota our route was over Pacheco pass into the San Joaquin valley down to the first stop at Fresno to collect some seeds. The bare, brown, almost treeless hills on the eastern slope are just as interesting in the fall as they are in the spring when covered with green grass and patches of yellow mustard, poppies and lupine.

The next stop was overnight at Springville, in the Sierra foothills east of Porterville. There is a sawmill there. It was really fascinating

to watch an eight foot pine log end up in a pile of lumber. It is almost uncanny the way one of these heavy logs is moved around on the saw table.

There is always strife between the log haulers and road-law enforcement officers. The truck men claim that they can not make a profit hauling an overload and the officers know that the overloads break up the

Fig. 32. *Yucca arborescens (Cleistoyucca arborescens),* old Joshua Tree with juniper bushes in the background. Photo—W. M. James.

roads. In this locality very large trucks haul a load up to seventy tons from the logging camp to the public road and dump it. Even though there is a stream of water running on the truck brake bands, the lining has to be replaced about once a week.

The logs are then loaded onto smaller trucks for the trip over a public road to the sawmill. This place is called a reload station and no logs can be brought in from the logging area after the winter weather starts

because of ice and snow on the roads. They can haul to the sawmill until the stock pile is used up. The men here told us an interesting "redwood" story among other things. The cutting is being done on private

Fig. 33. Fine specimen of *Pinus torreyana* alongside old highway where it leaves the seashore. Breakers are dimly visible in the background. Photo—W. M. James.

property. The mill needed some redwood lumber, so they decided to cut the last *Sequoia gigantea* that was on the property. Rather elaborate preparations were made with bull-dozers to provide a cradle for the tree to fall in that would reduce the possibility of breaking when the tree

fell. Somebody miscalculated and the tree fell in the wrong direction. It completely flattened a cabin and broke up so badly that they couldn't get any saw-logs out of the whole tree.

Our next stop was at Fort Tejon, near the town of Lebec on the Ridge Route between Bakersfield and Los Angeles. This fort was established in the early eighteen fifties and maintained about ten years to protect Amerindians in the vicinity. The nearest source of supplies was quite distant over a rough terrain with a hot dry climate with very little water available. A herd of camels was brought from Arabia to facilitate transportation. It was a failure, principally because the soldiers could not handle the camels. The State of California has pur-

Fig. 34. *Pinus torreyana* showing effects of summer trade winds from Pacific Ocean. Erosion is typical of that found wherever softer strata are exposed. Annual rainfall is about 8 inches. Photo—W. M. James.

chased this area for a Park and is restoring the old adobe buildings of the Fort. There is a grave here marked "Peter Lebec, killed by a bear in 1837." The soldiers of the Fort had trouble with bears stampeding their horses. It isn't exactly botanical, but a book by Harry Carr, "The West is Still Wild," gives a very interesting account of the Southwest in the older days.

We took a side road to Lancaster instead of following the main road over the Ridge Route to Los Angeles. This follows the western edge of the Mojave Desert. The principal vegetation is Joshua Trees and Juniper bushes. We were sorry to find this land being cleared, mile after mile of it. Water is pumped from deep wells and good crops are grown on the very fertile land. There is a National Monument of Joshua

Trees east of Coachella Valley, but it is not as accessible for many people as this area. It is depressing to see these picturesque trees pile up in front of a bull-dozer.

The Joshua Tree (Fig. 32) belongs to the Agavaceae. It has been known as *Cleistyucca arborescens* and *Yucca arborescens*. Jepson (Silva of California) favors *Yucca brevifolia* Engelmann. It is a tree twenty

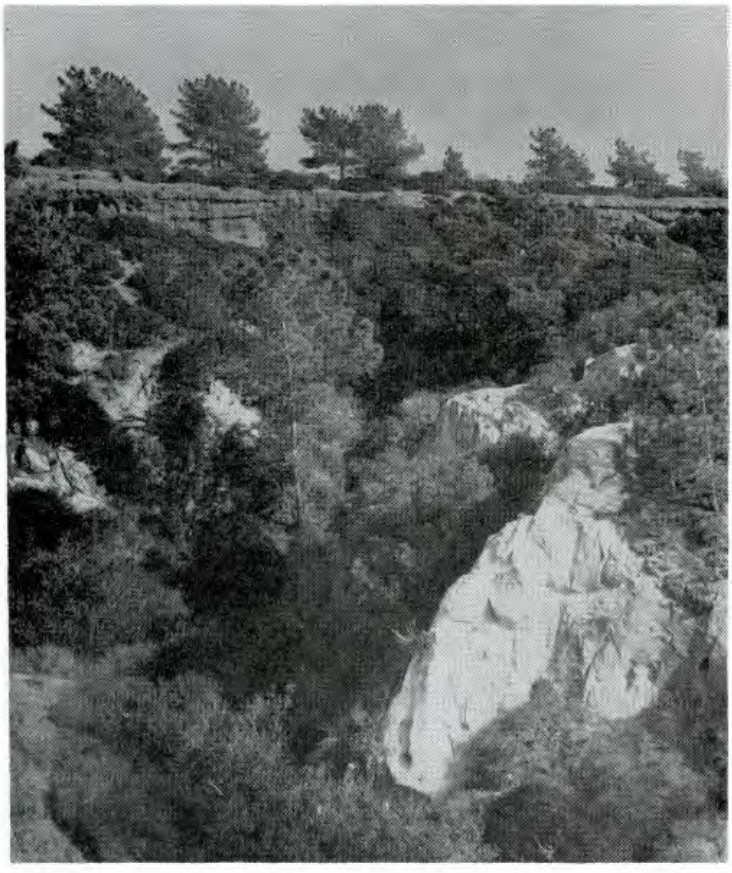

Fig. 35. *Pinus torreyana* in a steep barranca (deep ravine) which leads down to the Pacific Ocean. Photo—W. M. James.

to thirty feet high with an open crown of arm-like branches. The flowers are greenish white. The stem does not branch until after the first flowering. It is densely covered with stiff spiny serrate leaves all of which point upwards. After the first flowering and on later branches, the old leaves die, turn outwards and downwards, falling off in one or two years. New branches start from lateral buds beneath the terminal flower bud. These branches grow irregularly and give the Tree a grotesque appear-

ance. The Joshua Tree is dependent upon a certain moth for fertilization of the flowers, like many of the other Yuccas. The moth works at night gathering a ball of pollen. She then flies to the flower of another plant, deposits her egg in the ovary and then climbs to the style and pushes the pollen ball down inside the stagmatic tube. The larva destroys many seeds, but there are generally quite a few good ones left.

Juniperus californica Carr is a shrub or small tree much-branched from the base and growing two to even thirty feet high. It is common in dry areas from four hundred to four thousand feet elevation. It adds to the attractiveness of the landscape and the wood is used for fuel and to some extent for fence posts.

I was much impressed with the outstanding plant collection at Mr. Barry's Tropical Plant Nursery at Los Angeles. Dr. Stoutemeyer, of the University of California at Los Angeles helped make our Los Angeles trip enjoyable by showing us the old Vavra Estate and the Arboretum at the University.

And then on to La Jolla to visit Dr. Traub. If one can spare just a little time, there are many points of interest to investigate along these California roads. For instance there is Dana Point where dried cow hides were tossed over the cliff to be picked up by sailors and lightered to a sailing vessel anchored off-shore. It is named after Dana, who wrote a detailed account (Two Years Before the Mast) of the two year trip of a sailing vessel going around the Horn for a cargo (mostly cow hides) from California. Except for short, detailed accounts of the handling and management of a sailing vessel under various conditions, the story is very interesting and informative of the earlier days.

A little south of Del Mar, near the mouth of the Soledad River we find the Torrey Pines. The trees are relatively small and are interesting mainly because of their isolation. They are found only on the eastern end of Santa Rosa Island (Santa Barbara Channel Islands) and from Del Mar south about eight miles and inland about one and one-half miles. *Pinus torrevana* Parry (Figs. 33, 34 and 35) is mostly fifteen to twenty feet tall with widely spreading branches forming an irregular crown. The cones have a peculiar, roundish shape.

The old Highway is kept in good condition and although it is steep and narrow, the route is through the middle of the area where these pines are growing and is well worth traveling, with occasional stops and short walks to look around. The main grove of *Pinus torreyana* is owned by the City of San Diego and is maintained as a Park. The trees should thrive and exist indefinitely in this protected natural reserve.

A visit with Dr. Traub is always interesting and informative. He is just getting all the plants in the ground and likes the new home very much. And it was pleasant visiting Dr. Whitaker, who is in charge of the U. S. Horticultural Station near La Jolla.

A short stop in Santa Barbara found Mr. and Mrs. Orpet in good health. He is not quite as "young and supple" as he was once, but his memory and interest in plants is just as keen as ever. And it is always pleasant visiting with Mrs. Orpet.

And then on home to find fall is definitely here with the Toyon berries on the hills turning red and the Madrone fruits just about ready for the birds. And they really take advantage of them. I have been reading about and looking at the Southern half of California for several years, but there seems to be always something new and/or interesting "Just around the corner."

HELICONIAS INVADE FLORIDA

WYNDHAM HAYWARD, *Florida*

The addition of several species of *Heliconia* to the garden flora of Central and South Florida in recent years has been greeted with enthusiasm by those horticulturists who esteem the strange and exotic in tropical and sub-tropical ornamental plants. The Heliconias have been known in the state to a limited extent for 25 years or more, but little attention was paid to them because they seemed temperamental and not reliably hardy.

Now, however, at least one species, *Heliconia latispatha* Bentham (Fig. 36) is a striking visitor to Central Florida gardens in the vicinity of Sanford, Orlando and Winter Park and will bloom well after warm winters, warm enough so that the stems are not cut down. Being members of the banana family, the Musaceae, the Heliconias are tender, some of them ultra-tropical and possibly hopeless except in the most frost-free areas of south Florida, but others are beginning to show what they can do as ornamentals from Miami North for 300 miles or so.

Recently the Fairchild Tropical Garden at Cocoanut Grove has acquired a collection of Heliconias, and there have been articles in the Miami newspaper garden pages about *Heliconia humilis* Jacq., with its showy red bracts. *H. humilis* is reported native from Trinidad to Brazil. *H. latispatha* is found in Central America, Guatemala, Panama and also Columbia. Mulford B. Foster, the plant explorer of Orlando, Fla., reports the most sensational and gorgeous species of *Heliconia* that he has encountered are in Colombia, many of them apparently unknown to botany, at least with any certainty.

The species *H. latispatha* is the only one to date which can be recommended for general planting in the Central Florida garden and around the Gulf Coast in reasonably protected places. While some Heliconias are fatally stricken by even a breath of frost, *H. latispatha* will endure temperatures down to 30 degrees for a short time with only slight injury to the giant banana-like foliage. If the four to six-foot leaf stems are not injured by the cold, the plants will bloom the following summer. This occurred in 1953 and 1954. The severe cold of the 1954-55 winter froze down most *Heliconia* stalks of whatever species, and few blooms have been observed in the summer of 1955.

The Heliconias range from a small species like *H. psittacina*, one of the tender beauties of the genus, which is only two or three feet tall at

blooming, with odd crabs-claw-like orange flowers, to giant species with huge pendant inflorescences several feet long, which look like boiled

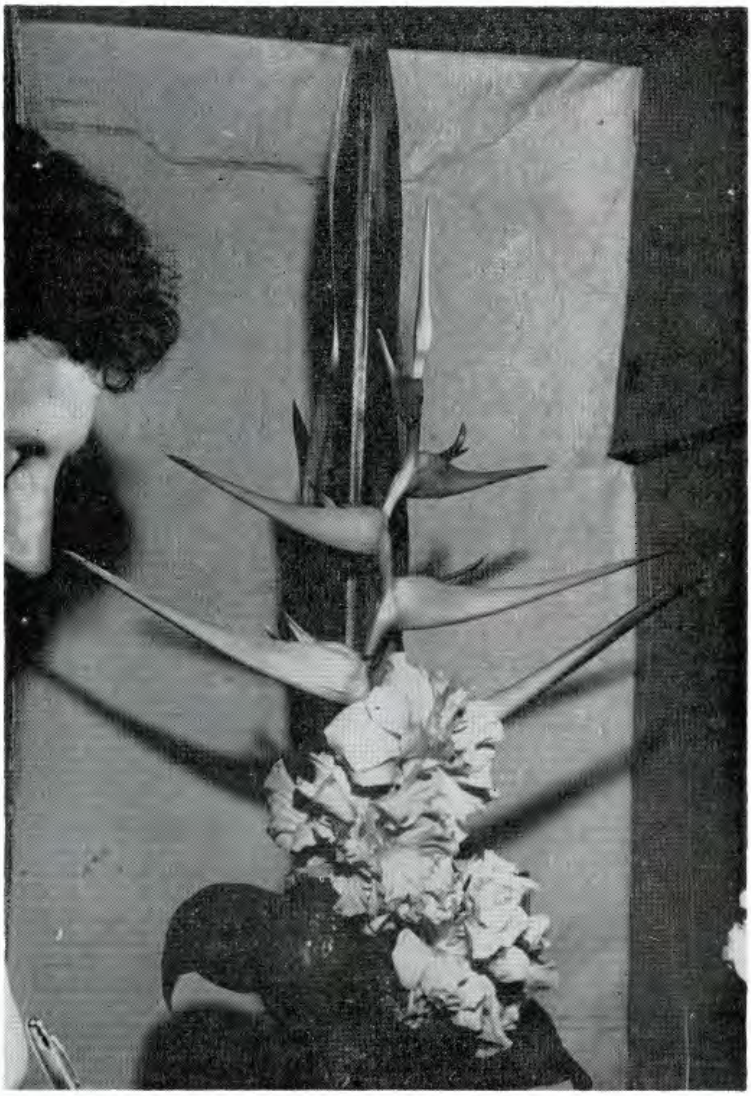

Fig. 36. Flower stem of *Heliconia latispatha* in flower arrangement by Mrs. Leonard Toy. Photo—Wyndham Hayward.

lobster claws hung on long stems. "Lobster Plant" is perhaps their most popular name.

The leafy stems are stiff but slender, like those of *Alpinia,* and the inflorescence is terminal, upright in a few species, as *H. latispatha,* and pendant in the most showy of the tropical forms. In Hawaii, where frosts do not occur outside of the mountain tops, the Heliconias are common, and are called "False Bird of Paradise" according to Kuck and Tongg in "The Tropical Garden." In Hawaii's favorable climate they grow a dozen species, among them *H. aureo-striata, H. elongata, H. humilis, H. latispatha, H. metallica, H. littoralis, H. psittacorum, H. collinsiana, H. spectabilis, H. illustris, H. aurantiaca,* etc.

Most of the species are tall plants, the stems rising out of the ground and renewing every two or three years. Sprouts arise from rhizomes and stolons at the base, soon forming a large clump. In full shade and when well fed and watered the plants become higher than is advantageous. They seem to thrive on about 50 per cent shade and sun. The flower stalks and the bracts and sheaths are the showy part of the "flower" or inflorescence, as the true flowers are usually quite hidden in the angles of the sheaths. The leaves may be seriously whipped by winds and should have protection from that injury as well as the cold. Otherwise they are almost foolproof once they find a place to their liking. Propagation is by seed and root divisions. The seeds of *H. latispatha* are blue-black like certain Amerindian corn grains.

H. latispatha, the only species which has made itself at home in Central Florida, has orange reddish colored spathes and rachis or stem. The stalk goes straight up and the long boat-shaped bracts point out horizontally in stop-like regularity, first one side, then the other, a few inches apart. The top of a large inflorescence and leafy stem may rise to 10 feet above the ground.

Popular and common species in the West Indies and South America, widely spread, are *H. caribaea* and *H. Bihai.* The name *Bihai* was given to the genus by Plumerius before the time of Linnaeous, who assigned *Heliconia* to it in 1771 in his Mantissa, II, page 147. The genus is part of the subfamily Heliconieae of the Musaceae and the standard monograph is by Dr. K. Schumann, in Das Pflanzenreich, Heft 1, Part IV, 1900. At that time Schumann accepted 29 species and at least that many more have been recorded in the Index Kewensis since.

One of the curious situations in the Heliconias is that there are several East-Asian species recorded, or rather Oceanic, including the Dutch East Indies. These were grouped under *H. Bihai* in the monograph by Schumann, although found in New Caledonia, the Solomon Islands, Samoa, New Guinea and the Moluccas. But the most recent student of the Heliconias, Irwin E. Lane, now on Fulbright scholarship in Europe for botanical research into the genus, reports there are "at least five distinct species in the old world."

Mr. Lane, through the kindness of the Smithsonian Institution and the Gray Herbarium of Harvard, who are cooperating in his studies, made the identification of our Central Florida species as *H. latispatha,* which Mr. Foster says has been hanging around in our gardens without a name for 25 years! Lane reports it is a common species throughout

Central America and possibly into South America. He explains that *H. latispatha* is found in color phases, "both of solid red or yellow, and red or yellow with the other color on the margins and tips of the spathes. Our *H. latispatha* plants in Winter Park have red markings or edgings on the orange-yellow spathes.

R. G. Wilson of Miami, a commercial rare plant grower, reports he has the reddish strain of *H. latispatha* under the name *H. distans,* and he cites others of the hardier types as *H. angustifolia* (?) and one called *H. rostrata* which "stands cold well." These are all worth further garden study in the lower South.

AMARYLLIS AND BULB SOCIETY SHOW, 1955

Mrs. Louis J. Wyler, *Louisiana*

The 8th Annual Flower Show of the New Orleans Amaryllis and Bulb Society was held at the home of Mrs. John J. Palmisano, 1928 Pine Street, New Orleans, Friday afternoon, April 1, 1955. Awards were made in the following classes—Artistic arrangements, horticulture Division (Amaryllis); Louisiana Iris; Bearded German Iris; Calla (Zantedeschia); Tulips; Scilla; Oxalis; Ranunculus; Lily-of-the-Valley; Gladiolus. Mrs. Felix Coltraro won the tri-color award in artistic arrangements, and Mrs. Henry Irion the tricolor in horticulture. Mrs. Louis J. Wyler received two awards of merit in artistic arrangements for her driftwood-amaryllis arrangements, and two awards in horticulture, including the sweepstakes for having the most specimens in the show—being a nationally accredited flower judge, she did not compete officially.

THE TERRA-COTTA CURCUMA, **C. ROSCOEANA**

Wyndham Hayward, *Florida*

The species of "Ginger Lily" we are considering in this piece is one cited as "Mr. Roscoe's Curcuma" in the Botanical Magazine where it is illustrated and described under Plate No. 4667, dated Sept. 1st, 1852, making this handsome pot species no novelty to the horticulturist that knew his way around 100 years ago.

Actually it had been described previously by Dr. N. Wallich, in his Plantae Asiaticae Rariores Vol. I, page 8 Plate 9, a very rare and hard-to-find work of 1830 describing numerous choice Eastern subjects which were new and outstanding at the time.

The plant was discovered in the Irriwaddi section of India, the place name being Syon, near the habitat of the better known "Queen Lily," *Curcuma petiolata,* known as the orchid-pink ginger. *C. roscoeana* was named in honor of W. Roscoe, another famous East Indian botanist

The Terra-Cotta *Curuma roscoeana* as grown by Wyndham Hayward at Winter Park, Florida. Photo—Shockley.
Plate 3

and plant explorer of the time. The exact habitat of the plant is stated as "Pegu, and the coast of Tenasserim." Those acquainted with the Indian scene will be able to place this better than the writer.

At Syon it is said the plant flowers in July, and here at Lakemont Gardens the showy spike of terra-cotta-colored bracts rises in the midst of the leaves in August and September. It seems to bloom later in pots, than when grown in the ground. It prefers a light sandy but fertile loam and good drainage, also half shade is essential. A few tubers that were planted on moist mucky beds which are eminently suited to *Curcuma latifolia, C. zedoaria* and *C. petiolata,* were a miserable failure and most of them lost entirely.

The plant in the photograph was grown in a six inch pot, the small rhizome planted about May 1st and the bloom appearing in August and September 1954. The bloom spike lasts in good condition for weeks. The entire plant may be two feet tall at optimum to the top of the leafy stem, usually less. The spike on large specimens can be eight or ten inches tall with many bracts, in the form of the typical *Curcuma* pockets or pouches. The color appeals to all who see it, and women are enchanted with the color of the flower spike when used as decor for a "Chinese room."

Unlike other Curcumas, *C. roscoeana* is not difficult to bloom. In fact it never fails with any kind of good culture, even from a small piece of tuber. The large size tubers of this species are about as large as a big English walnut, with one or two small side rhizomes which can be removed at planting and potted up separately. The writer knows of no other species of *Curcuma* so sure and easy to flower for the amateur, and so showy when in flower, considering the size.

A potting soil of one half sifted carex peat and one half coarse building sand, with a small amount of rotted cow manure added, suits them admirably in lathhouse or greenhouse culture. After blooming the plants go dormant in winter and are repotted in spring. The writer does not recommend growing them in the garden until roots are available in greater quantity at a lower price. At present the small rhizomes bring $3.00 each even in Holland where the grandparent rhizome of the plant in the photograph originated. It is one of the desirable treasures buried in the text of the Van Tubergen bulb catalogue.

The bloom of this *Curcuma* species is terminal, borne at the center of the sheathing leafy stem. *C. petiolata* is similar, but the spike on *C. roscoeana,* while not as large, shows up better against the leaves than the other. The leaves are a foot to a foot and a half long, with gentle plaiting effect. The hollow of each orange bract contains two or three flowers, bright yellow and scarcely showing over the top of the bracts. The plant in bloom is striking and even at the leafy stage only, is a handsome specimen. The orange spike when cut makes a showy centerpiece for a flower arrangement and several of them in a bowl will be a conversation piece for a diplomatic dinner. They can be cut with two or three leaves attached, without injuring the plant materially.

PLANT LIFE LIBRARY

VEGETABLE PRODUCTION, by Paul Work and John Carew. 2nd ed. 1955. John Wiley & Sons, 440 4th Av., New York 16, N. Y. pp. 537. Illus. $4.72. This second edition of a standard text for schools and colleges has been designed as an introduction to vegetable production and marketing; its content is grounded on the principles of basic science and is illustrated from practical operations. The first 15 chapters are devoted to general considerations of crop production and marketing, and the rest of the book to the major vegetable crops. This stimulating text is highly recommended.

PRACTICAL HORTICULTURE, by J. S. Shoemaker and B. J. E. Teskey. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 374. Illus. $4.20. This easily readable text on the culture of ornamental trees and shrubs, vegetables, flowers, fruits and other plants has been written for students of vocational agriculture, and to "meet the needs of gardeners for a reference text and guide to the how, when and why of horticultural operations." Highly recommended.

SOIL FERTILITY, by C. E. Millar. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 436. Illus. $6.75. This book on the interrelationships of soils and growing plants has been written for students taking a course in soil fertility and as a reference book for students in soil-management courses. The author's main objective is to "deal with fundamental principles that can be applied to crop-production problems when local conditions are taken into consideration." This text by an outstanding authority is indispensable for students in the fields indicated.

LIFE SCIENCE, by T. S. Hall and F. Moog. John Wiley & Sons, 440 4th Ave., New York 16, N. Y. pp. 502. Illus. $6.50. This refreshing introductory college text of general biology emphasizes the efforts of observation, speculation and verification through which biologists enlarge the understanding of living organisms. Man appears as a representative type, or as an important agent in the biological situation in the chapters on nerve and organ physiology, and in limited sections on genetics, immunity, evolution and ecology. This stimulating book is highly recommended.

GENETICS AND METABOLISM, by R. P. Wagner and H. K. Mitchell. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 444. Illus. $7.50. This outstanding text has been written mainly for advanced undergraduate or beginning graduate students of genetics, biochemistry or microbiology. The purpose is to bring together facts and ideas from the fields of genetics and biochemistry, and to some extent also from those of physiology, cytology and embryology, in order to synthesize a general outlook on the biochemical basis of inheritance. Highly recommended.

EMBRYOGENESIS IN PLANTS, by C. W. Wardlaw. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 381. Illus. $7.00. Dr. Wardlaw has performed a genuine service in bringing under one roof

the results of extensive researches in the field of embryogenesis in plants. The rest of the book is concerned with detailed discussions of embryogenesis in Algae, Bryophyta, Psilotales and Equisetales, Lycopodineae, ferns, gymnosperms and flowering plants. This stimulating book will appeal to botanists, teachers and research workers.

PHOTOSYNTHESIS, by R. Hill and C. P. Whittingham. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 165. Illus. $2.00. This brief account of the biochemistry and the physiology of photosynthesis was written to provide an introduction to present researches in this field. It is a stimulating book which is indispensable to students of plant science.

ELECTROCHEMISTRY IN BIOLOGY AND MEDICINE, edited by T. Shedlovsky. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1955. pp. 369. Illus. $10.50. This book is based on a symposium on electrochemistry in biology and medicine sponsored by the Electrochemical Society in 1953. Amplified versions of papers presented by 23 authorities are included. The subjects covered include membranes, nerve and plant cells, biologically important ions and applications of polarography, electrocardigraphy and electroencephalography in medicine. This stimulating book is highly recommended.

GREAT EXPERIMENTS IN BIOLOGY, edited by M. L. Gabriel and S. Fogel. Prentice-Hall, Englewood Cliffs, N. J. 1955. pp. 317. Illus. $3.95. The editors present selected scientific writings in the original in order to stimulate interest in the methodology and philosophical outlook on the part of the student. The papers have been selected to show the milestones in the advances of knowledge in the cell theory, general physiology, microbiology, plant physiology, embryology, genetics and evolution. Highly recommended.

A TREASURY OF AMERICAN GARDENING, edited by J. R. Whiting. Doubleday & Co., Garden City, N. Y. 1955. pp. 272. Illus. $7.50. This charming and handsomely illustrated volume will appeal to all who are interested in gardening. The ten chapters are devoted to garden writers, the home gardeners, the gardeners' story of the soil, a pictorial garden calendar, plant breeding, gardens of America, progress in plant science, kitchen garden, and the garden club story.

COLCHICINE in AGRICULTURE, MEDICINE, BIOLOGY AND CHEMISTRY, by O. J. Eigsti and P. Dustin. Iowa State College Press, Ames. 1955. pp. 470. illus. $6.50. This pioneer work brings under one roof the information on colchicine as a mitotic poison and as a tool for biological research. The topics covered include the source of colchicine, its chemistry and pharmacology, its effect on the nucleus, cell-division, and growth; experimental polyploids and aneuploids; and techniques of colchicine treatment in plants and animals. This stimulating text is indispensable to all who are interested in the subject.

THE LANGUAGE OF TAXONOMY, by J. R. Gregg. Columbia Univ. Press, New York 27, N. Y. 1955. pp. 70. illus. $2.50. Taxonomy, the science of classifying organisms according to their natural relationships has developed subtle and effective vocabularies for its descriptions

of plants and animals. In the present book the author shows that mathematical logic offers linguistic techniques of comparable subtlety and effectiveness for the study of taxonomy itself.

VEGETABLE GROWING, by J. E. Knott. 5th ed. Lea & Febiger, Washington Sq., Phila. 6. 1955. pp. 358. illus. $5.00. In this 5th edition of a standard text on commercial vegetable growing, the author has brought the subject up-to-date. The text has been reorganized into three major sections—general considerations, cool season crops and warm season crops. The book is highly recommended to the student of commercial vegetable growing.

GROWING PLANTS UNDER ARTIFICIAL LIGHT, by Peggie Schulz. M. Barrows & Co., 425 4th Av., New York 16, N. Y. 1955. pp. 146. illus. $3.50. This concise and easily readable book on growing plants under artificial light is written by a layman for the layman. The text chapters are concerned with light and house plants, why plants need light, light set-ups, planters, home made set-ups, favorite plants and propagation under lights, growing seedlings indoors, lights in greenhouses, and dealers and supplies.

CLIMATIC ATLAS OF THE UNITED STATES, by S. S. Visher. Harvard Univ. Press, Cambridge, Mass. 1954. pp. 403. illus. $9.00. The objective of the author has been to assemble under one cover the available maps on the diverse climates of the United States. The 1031 maps and diagrams are presented in 34 chapters grouped into seven parts. Five parts embrace the major elements of climate, temperature, wind, sunshine, humidity and precipitation; and the other two, some consequences of climate and weather, and climatic regions and climatic changes. The consequences include those of agriculture, health, soil erosion, soil moisture, soil freezing, lakes, streams and topography. This outstanding contribution is indispensable to all students of the climates of the United States.

VASCULAR PLANTS OF ILLINOIS, by N. Jones and G. D. Fuller, et al. University of Illinois Press, Urbana. 1955. pp. 593. Illus. $10.00. This is a systematic, phytographical and bibliographical enumeration of the native and adventive vascular plants known to grow spontaneously in Illinois, belonging to 54 orders, 156 families, 785 genera, and about 2450 species. The distribution of 1375 species is shown by means of outline maps. This outstanding contribution will be welcomed by all who are interested in the flora of the United States.

A TEXTBOOK OF EVOLUTION, by E. O. Dodson. W. B. Saunders Co. 1953, pp. 419. Illus. The subject is presented for undergraduate students. The five parts of the book include (1) a summary of traditional knowledge on evolution; (2) phylogeny as concerned with the evolution of higher categories; (3) the origin of hereditary variations on which natural selection acts; (4) the origin of species; and (5) retrospect and prospect. This most stimulating, clearly written text fills a definite want and will be generally welcomed.

GENERAL CYTOLOGY, by E. D. P. De Robertis, W. W. Nowinski and F. A. Saez. 2nd ed. W. B. Saunders Co., Philadelphia. 1955. pp. 456.

Illus. This 2nd English edition of an important text was required by the rapid progress in this field of knowledge. The 12 chapters are devoted to the history of cytology; the chemical and physicochemical, the morphological and ctyochemical, and the submicroscopic organization of the cell; morphological and functional significance of cytoplasmic organoids; plasma membrane and cell permeability; structure and ctyochemistry of the nucleus in the interphasic state; chromosomes and cell division; cytogenetics; enzymes and cell metabolism; cytological and cytochemical manifestations of cellular activity; and differentiation, senescence and death of the cell. This stimulating text is indispensable to all interested in cytology.

BURRAGE ON VEGETABLES, by A. C. Burrage. D. Van Nostrand Co., 250 4th Av., New York 3, N. Y. 1954. pp. 208. Illus. $4.50. This charming book on vegetable culture is based on the author's experience. In part I, brief discussions are devoted to quality and rating of vegetables, cooking, storing, processing and freezing, the garden plan and location. Part II is devoted to the culture of vegetables; part III, to greenhouses, hotframes, mulching, tools, soil humus and pests; part IV, to seed lists, planting dates and fertilizers; and part V, to week-end vegetable gardens.

GENERAL MICROBIOLOGY, by W. G. Walter and R. H. McBee. D. Van Nostrand Co., 250 4th Av., New York 3, N. Y. 1955. pp. 345 Illus. $4.75. The objective of the book is to present the subject in such a manner as to encourage a beginning student to relate his daily living to the activities of the microbial world, and at the same time to acquire a scientific outlook on this phase of biology. This stimulating text is highly recommended.

MODERN ASPECTS OF pH WITH SPECIAL REFERENCE TO PLANTS AND SOILS, by James Small. D. Van Nostrand Co., 250 4th Av., New York 3, N. Y. 1954. pp. 247. Illus. $5.00. This stimulating text on the *new* pH is based upon an empirical standard because it is now recognized that what is being measured is not the concentration but the activity of hydrogen ions in relation to the activity of other associated ions. It is written by a botanist who emphasizes the applications of pH measurements to plant and soil research, and also to agriculture and industry. This concise and easily readable text is highly recommended.

EVOLUTION AS A PROCESS, edited by J. Huxley, A. C. Hardy and E. B. Ford. Allen & Unwin, London; and Macmillan Co., 60 5th Av., New York 11, N. Y. 1954. pp. 367. Illus. $4.25. The objective of the book, containing contributions by 19 prominent biologists, is to crystallize the outlook on the various aspects of the evolutionary process in plants and animals. This stimulating book is highly recommended for all students of evolution.

WEEDS, by W. C. Muenscher. 2nd ed. Macmillan Co., 60 5th Av., New York 11, N. Y. 1955. pp. 560. Illus. $10.00. This revised 2nd edition of the authoritative work on weeds will be welcomed by all. No less than 571 weeds are described with suggested control methods; 331 kinds are illustrated in the 135 plates. Part I is devoted to weeds and their

control; weeds of special habitats; and detailed control methods. In Part II. weeds are arranged according to family, together with key. This book is indispensable to all who cultivate plants.

PLANT PROPAGATION PRACTICES, by J. S. Wells. Macmillan Co., 60 5th Av., New York 11, N. Y. 1955. pp. 344. Illus. $7.50. This clearly and concisely written and adequately illustrated text was prepared especially for the young nurseryman. The subject matter is grouped under five headings—setting up and equipping a propagation unit, basic propagation principles, propagating procedures, detailed procedures for propagating a select group of plants, and the propagator's year. This refreshing book is highly recommended.

BOTANY: PRINCIPLES AND PROBLEMS, by E. W. Sinnott and K. Wilson. 5th ed. 1955. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. pp. 528. Illus. $6.00. This clearly and concisely written revised 5th edition of a standard text on plant science will be welcomed by teachers and students alike. The plant is considered as a functioning structure and applications of botanical theory to agricultural problems are emphasized. The introductory chapters are followed by those devoted to plant anatomy, morphology, physiology, ecology, plant distribution, reproduction, heredity and variation, evolution, the plant kingdom, and botany and the future. This stimulating text is highly recommended.

METHODS OF PLANT BREEDING, by H. K. Hayes, F. R. Immer and D. C. Smith. 2nd ed. 1955. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. pp. 551. Illus. $8.50. This 2nd edition of an outstanding text and reference book on plant breeding has been revised in the light of new additions to methodology. The topics covered include the role of plant breeding; genetic and cytogenetic basis of plant breeding; heterosis; mode of reproduction in relation to breeding methods; technique of selfing and crossing; the pure-line method of improving naturally self-fertilized plants; back-cross method of plant breeding; breeding for disease and insect resistance; special techniques; breeding grains, flax, cotton, sorghum, maize, forage crops, and other cross-pollinated plants; and statistical methods in relation to plant breeding. This stimulating text and reference work is indispensable to all who are interested in plant breeding.

IRRIGATED SOILS, THEIR FERTILITY AND MANAGEMENT, by D. W. Thorne and H. B. Peterson. 2nd ed. 1954. Blakiston Co. & McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. pp. 302. Illus. The expansion of research showing that maximum yields from irrigation are dependent on the proper balance of such factors as fertility, plant population, plant characteristics, crop rotation, soil physical properties and soil moisture, was the premise on which the first edition was based, and this has justified the appearance of this second edition. The topics discussed include problems of irrigated regions; soil as a medium for plant growth; soil, water and plant relations; the salt problem; evaluating land for irrigation; source and quality of irrigation waters; measuring irrigation water; planning a farm for irrigation; ir-

rigation practice; drainage; reclamation and management of saline and alkali soils; control of physical and biological properties of soils; maintaining organic matter in soil; mineral and plant growth; fertilizer elements and materials; using fertilizers; soil management for field, fruit, vegetable and specialty crops; and farm planning. This outstanding book is highly recommended.

CRYPTOGAMIC BOTANY, by Gilbert M. Smith. Vol. I. Algae and Fungi. 2nd ed. 1955. pp. 546. Illus. $8.50; Vol. II. Bryophytes and Pteridophytes. 2nd ed. 1955. pp. 399. Illus. $8.00. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.

These revised 2nd editions of the outstanding standard texts on cryptogamic botany are designed for students who have had an introductory course in botany, and who wish to make a more intensive study of plants below the level of seed plants. Chapter I of Vol. I briefly outlines the classification of spore-producing plants, and the following 14 chapters carry the subject through the first 9 divisions comprising the algae and fungi. The 10 chapters of Vol. II are devoted to the five divisions that constitute the bryophytes and pteridophytes. These two concise, easily readable and adequately illustrated volumes are indispensable to the student of the cryptogams.

THE BIOLOGY OF MAN, by J. S. Hensill. Blakiston Co., & McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. 1954. pp. 440. Illus. $5.50. This pioneering introductory college text has been written so as to present the major principles of animal biology as applied to man. The book is planned to impart to the student an understanding of (1) the relation of other organisms to, and the effects of other organisms on, the human organism; (2) the normal, and some of the abnormal, processes involved in the origin and development of human life; (3) the mechanism by which human characteristics are, or are not, inherited; and (4) the place, force, and significance of biological science in our modern society. This stimulating text is highly recommended.

CLASSICS OF BIOLOGY, edited by A. Pi Suñer. English translation by C. M. Stern. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 337. $7.50. The subject is presented in 26 chapters showing the high points of progress in biology by means of brief summaries and excerpts in the fields of physiology, reproduction, heredity, speciation, embryology, evolution, paleontology, causation and design, psychology, and correlation in the whole and its parts. This stimulating survey, written by an outstanding living biologist, will appeal to teachers and students, and also the general reader.

[PLANT LIFE LIBRARY, continued on page 162.]

THE AMERICAN PLANT LIFE SOCIETY

For the roster of the general officers of the Society, the reader is referred to the inside front cover of this volume.

I. THE AMERICAN AMARYLLIS SOCIETY

[Affiliated with the American Plant Life Society]

[AMERICAN AMARYLLIS SOCIETY, continued from page 2.]

(c) REGISTRATION OF PLANT NAMES

Registrars: Dr. J. B. S. Norton, Registrar, and Mr. W. D. Morton, Jr., Registrar of Amaryllis Names.

Correspondence about the registration of plant names should be sent directly to Dr. Norton, *4922 40th Place, Hyattsville, Maryland,* or Mr. Morton, 3114 State St., New Orleans, La. and a self-addressed, stamped envelope should be enclosed if a reply is expected.

(d) AMARYLLID SECTIONS

GENERAL AMARYLLID SECTION

GENERAL AMARYLLID COMMITTEE—Mrs. Edith B. Strout, Chairman
Kentfield, California

Miss Elaine Brackenridge, *Texas*

AMARYLLIS SECTION

AMARYLLIS COMMITTEE—DR. ROBT. G. THORNBURGH, *Chairman,*
517 Professional Bldg., Long Beach 2, Calif.

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FLOWER TYPES AND SCORE CARD FOR HYBRID AMARYLLIS

For classification of flower types of Hybrid Amaryllis see PLANT LIFE (HERBERTIA) 10: 23-30. 1954. For SCORE CARD see PLANT LIFE (HERBERTIA) 1950, pp. 45-46 (for "Elegans" read "Belladonna").

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Prof. H. T. Blackhurst, in charge of Daylily Trial Garden, Division of Horticulture, Texas Agric. Expt. Station, College Station, Texas.

Prof. Ira S. Nelson, in charge of Daylily Trial Garden, Dept. of Horticulture, Southwestern Louisiana Institute, Lafayette, La.

Mr. John E. Voight, RFD One, Box 76, Hales Corners, Wisc., in charge of Daylily Trial Garden, at The Botanical Gardens, Whitnall Park.

Mr. W. Quinn Buck, in charge of Daylily Trial Garden, Los Angeles Arboretum, 291 No. Old Ranch Road, Arcadia, Calif.

Note: Introducers of new daylily clones should send plants directly to the Trial gardens for testing. As soon as practical each trial garden will publish, in HERBERTIA lists of the 10, 25, 50 and 100 best daylilies, on the basis of the clones tested, for the climatic region in which it is located.

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III. PUBLICATIONS OF THE AMERICAN PLANT LIFE SOCIETY

BOOKS

1. AMARYLLIDACEAE: TRIBE AMARYLLEAE, by Traub & Moldenke (including the genera Amaryllis, Lycoris, Worsleya, Lepidopharynx, Placea, Griffinia, and Ungernia; Manila covers; 194 pages, incl. 18 illustrations. $5.00 postpaid.

This is required reading for every amaryllid enthusiast.

2. DESCRIPTIVE CATALOG OF HEMEROCALLIS CLONES, 1893—1948, by Norton, Stuntz, and Ballard. A total of 2695 Hemerocallis clones are included and also an interesting foreword, and explanatory section about naming daylilies. Manila covers; 100 pages (1—X; 1—90), includes a portrait of George Yeld. $2.50 postpaid.

PERIODICALS

(A) **HERBERTIA** [**First series,** 1934 to 1948, incl.], devoted exclusively to the amaryllids (Amaryllidaceae), and the workers concerned in their advancement. A complete set of these volumes is indispensable to all who are interested in the amaryllids. Libraries should note that this may be the last opportunity for complete sets.

Volume 1 (1934). Dedicated to **Henry Nehrling.** Containing the biography of Henry Nehrling, and many valuable articles on amaryllis; with a portrait of Henry Nehrling and 16 other illustrations; a total of 101 pages.

Volume 2 (1935). Dedicated to **Theodore L. Mead.** Containing the autobiography of Theodore L. Mead, and many excellent articles on varieties, breeding, propagation, and culture of amaryllids; with portraits of Theodore L. Mead and David Griffith and 18 other illustrations; a total of 151 pages.

Volume 3 (1936). Dedicated to **Arthington Worsley.** Containing the autobiography of Arlington Worsley, and important articles on description, genetics and breeding, physiology of reproduction, and amaryllid culture; with 3 portraits of Arlington Worsley, one color plate, and 30 other illustrations; a total of 151 pages.

Volume 4 (1937). First British Edition. Dedicated to William Herbert. Containing the biography of William Herbert; the reprint of Herbert's essay, "On Crosses and Hybrid Intermixtures in Vegetables"; Dr. Darlington's essay, "The Early Hybridizers and the Origins of Genetics," and many important articles on description; cytology, genetics and breeding; physiology of reproduction, and amaryllid culture; with two portraits, forty-four other plates and three figures; a total of 280 pages.

Volume 5 (1938). First Netherlands Edition. Dedicated to Ernst H. Krelage. Containing the autogiography of Ernst H. Krelage; the history of amaryllid culture in Holland by Ernst H. Krelage, Dr. Uphof's important article in which the name Hippeastrum is rejected; a revision of the tribes of the Amaryllidaceae; and the species of Amaryllis; outstanding articles on forcing amaryllis by Dr. Grainger and Prof. Dr. van Slogteren; and many other articles on description, cytology, genetics and breeding; physiology of reproduction, and amaryllid culture; with 33 plates and 2 figures; a total of 218 pages.

Volume 6 (1939). Dedicated to the Union of **South Africa,** and containing articles on South African amaryllids, including the history of botanical exploration for amaryllids in South Africa, the distribution of South African amaryllids in relation to rainfall, and a review of the genus Agapanthus by Frances M. Leighton, a review of the Genus Cyrtanthus, with many excellent line drawings, by Dr. R. A. Dyer; other articles—Zephyranthes of the West Indies by Dr. Hume; the Tribe Gilliesieae by Dr. Hutchinson; rating of daylilies for garden value by Mr. Kelso; daffodil articles by Jan de Graaff, and many other items on description, cytology, breeding, propagation, and amaryllid culture; with 44 plates and 10 figures; a total of 258 pages.

Volume 7 (1940). Dedicated to **Latin America,** and featuring articles on Latin American amaryllids; biographies of Drs. Philippi and Holmberg; report by Dr. Goodspeed on the amaryllids collected by the Univ. of Calif., Second Andean Expedition; reports on the flowering of the "Blue Amaryllis," A. procera; and many other important articles on the description, propagation, breeding, culture, harvesting and storage of amaryllids. Of special interest are the important articles on the description, breeding and culture of daylilies by noted authorities. With 45 illustrations—30 plates and 15 figures—and a total of 242 pages.

Volume 8 (1941). First Daylily Edition. The first extensive symposium on the daylily, containing biographies of George Yeld, Amos Perry, Hans Sass, and Paul Cook, and important articles on daylily evaluation, breeding, propagation and culture. Also important articles on Narcissus and other amaryllids. Thirty-eight illustrations—27 plates and 11 figures—and a total of 185 pages.

Volume 9 (1942). First Alstroemerid Edition. Dedication to Harry L. Stinson, the outstanding authority on this plant group, who contributes a summary of his work on Alstroemerid taxonomy, breeding, propagation and culture. This volume contains the autobiography of Prof. Dr. Abilio Fernandes, the Check-List of Amaryllids by Major Pam, and a review of the species of Crinum by Dr. Uphof, and also many important articles on daylilies, Narcissus, Cyrtanthus, hybrid Amaryllis, Ixiolirion and other amaryllids. Thirty-five illustrations—17 plates and 18 figures—and a total of 243 pages.

Volume 10 (1943). 10th Anniversary Edition. Dedicated to Elizabeth Lawrence, the outstanding authority on the use of amaryllids in the garden, who contributes a summary of her work in this field. This volume contains the review of Agapanthus and Tulbaghia, by Dr. Uphof; and article on Brunsvigia rosea and hybrids by Mr. Hannibal; a symposium on Narcissus breeding by Messrs. Powell, Reinelt, Berry and Reynolds; a review of amaryllid chromosomes by Dr. Flory; articles on hybrid amaryllis, daylilies, and many other important articles on amaryllids. Forty-one illustrations—12 plates and 29 text figures—and a total of 205 pages.

Volume 11 (1944). First Allieae Edition. Dedicated to Dr. Henry A. Jones, the eminent American authority on the onion. This is one of the most outstanding issues up to the present for its record making contributions on the systematics of Allium by British authorities, and on onion breeding, propagation, and culture by American authorities. It contains Mr. Airy Shaw's translation of Vvedensky's Allinus of the Soviet Union; Stern's essay on the onion in the Old World and other articles; and articles on onion breeding, propagation and culture by Dr. Jones and his colleagues. There are also important contributions on ornamental Alliums for North America, and Allieae of North America. There are excellent articles on hybrid Amaryllis, Daylilies and various other amaryllids. Forty-three illustrations—25 plates and 18 text figures—and a total of 369 pages.

Volume 12 (1945). First Educational Edition. Dedicated to Supt. R. C. Huey, a pioneer in the use of amaryllids as an educational tool. This volume contains a brief autobiography by Supt. Huey, and an article by him on the use of amaryllids in

teaching plant science; the announcement by Mulford B. Foster of the reintroduction of the sweet-scented Alstroemeria caryophyllaea, and an article by Harry L. Stinson on the true Alstroemeria Ligtu. This issue also contains an article on the origin of Tapeinanthus humilis by A. & R. Fernandes; important articles on Narcissus breeding; Leucocoryne and related genera; articles on various other amaryllids, including valuable contributions on Hemerocallis description and appreciation, breeding, culture, and packing daylily plants for shipping. Twenty-four illustrations—15 plates and 10 text figures—a total of 180 pages.

Volume 13 (1946). First Narcissus Edition. Dedicated to Guy L. Wilson, the noted Narcissus breeder. This volume contains an autobiography of Mr. Wilson, an article on his breeding activities; an article on Narcissus breeding in Australia by Mr. Alston; articles by American Narcissus breeders, including Frank Reinelt, E. P. Powell, J. S. Cooley, C. W. Culpepper and W. R. Ballard; an article on the karyology of the subgenus Ajax of the genus Narcissus by A. and R. Fernandes; a list of parents of hybrid Narcissus by Arno H. Bowers; Narcissus diseases by C. J. Gould; Narcissus insects and mites by E. P. Breakey; Narcissus culture by various authors. There are also articles on other amaryllids—Hemerocallis, hybrid Amaryllis, Habranthus, Crinums, Lapagerias, Agapanthus, Hymenocallis, etc. Thirty-nine illustrations—186 pages.

Volume 14 (1947). 2nd Hemerocallis Edition. Dedicated to Ralph W. Wheeler, the noted Daylily breeder. This volume contains an autobiography of Mr. Wheeler and an article on his breeding activities; and many important articles on Hemerocallis description, evaluation, breeding, etc., from various parts of the country. There are also important articles on other amaryllis—Hybrid Amaryllis, amaryllids in the Holy Land and Mexico, starch in Alstroemeria, the Galantheae, Double Narcissus, Zephyranthes, Sternbergia, Allium, etc. Twenty-eight illustrations—206 pages.

Volume 15 (1948). 2nd South African Edition. Dedicated to Dr. R. A. Dyer. This volume contains an autobiography of Dr. Dyer and two amaryllid articles by him, and other articles on South African amaryllids. There are also important articles on Hemerocallis, Amaryllis, Crinum, Narcissus, Brodiaea Lilies, Alstroemerias and other amaryllids by various authors. Forty-one illustrations—177 pages.

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A limited number of volumes of **Plant Life,** including **Herbertia,** second series, are available, all quotations subject to prior sale.

Vol. 1 (Nos. 1—3). 1945. Symposium on **Narcissus** breeding by various authors. **First Bromeliaceae Edition.** Profusely illustrated symposium on the bromels by Dr. Lyman B. Smith, Mulford B. and Racine Foster, David Barry, Jr., Ladislaus Cutak, and Wyndham Hayward. **25 illustrations—105 pages.**

Vol. 2 (Nos. 1—3). 1946. **Verbenaceae Edition.** Illustrated treatise on the Verbena Family by Dr. and Mrs. Moldenke, the outstanding authorities on this plant family. 9 illustrations—100 pages.

Vol. 3 (Nos. 1—3). 1947. **General Edition.** Containing an illustrated article on winter and spring flowering Gladiolus by W. M. James, and articles on the Dutch Bulb Industry by Dr. A. J. Verhage and J. F. Ch. Dix. 10 illustrations—42 pages

Vol. 4 (Nos. 1—3). 1948. **Aroid Lily Edition.** An illustrated treatise primarily on the genus Zantedeschia (Aroid Lily) containing articles by Hamilton P. Traub, A. A. Longmire, Fred M. Danks, H. M. Butterfield, Wyndham Hayward and Len Mirzwick. 11 illustrations—48 pages.

Vol. 5 (Nos. 1—4) 1949. 34 illustrations, a total of 134 pages.

Gesneriaceae Edition, with important articles on the subject by F. E. Smith, W. Hayward and the Moshers.

1949 HERBERTIA Edition, devoted exclusively to the amaryllids; the **First Australian Edition,** dedicated to Capt. C. O. Fairbairn, with biographies of Australian amaryllid pioneers, and articles on Australian amaryllids, South African amaryllids, the Pink Amaryllis, **A. belladonna** var. **Haywardii,** with illustration, hybrid Amaryllis breeding in South Australia by E. Both, Narcissus culture by Dr. Cooley, Mr. Mitsch and Mr. Ballard, and also important articles on other amaryllids.

Vol. 6 (Nos. 1—4) 1950. 47 illustrations, a total of 162 pages.

1950 HERBERTIA Edition, devoted exclusively to the amaryllids; the Hybrid Amaryllis Edition; dedicated to Mrs. Mary G. Henry, containing Mrs. Henry's autobiography; articles on Collection Amaryllids in South America by M. B. Foster; Amaryllis flower types; double Amaryllis; Amaryllis of To-morrow, by W. Hayward, and other articles on hybrid Amaryllis, Hemerocallis, Cyrtanthus, Blue Amaryllis, South African Amaryllids, Review of the genus Brunsvigia (part I) by R. A. Dyer, etc.

Caladium Edition, with articles on Caladium by W. Hayward, on Winter Jasmine by Prof. Norton, on Bartram's Ixia by W. Hayward, and Plant Life Library (book reviews), the American Plant Life Society, and Seeds and Plants Directory.

Vol. 7 (Nos. 1—4) 1951. 51 illustrations, a total of 174 pages.

1951 HERBERTIA Edition, devoted exclusively to the amaryllids; the **Latin American Amaryllid Exploration Edition,** dedicated to M. B. Foster; containing Mr. Foster's autobiography, and articles on Collecting Amaryllids in Latin America by M. B. Foster, new South American Amaryllis species and other amaryllid species, Amaryllis Exhibition at Cleveland, New Orleans Amaryllis Show, Review of the genus Brunsvigia (part II) by R. A. Dyer, Hybrid Amaryllis trials at Valleevue, by Thos. R. Manley, new pink hybrid Amaryllis, Narcissus culture by Mr. Mitsch, and Dr. Cooley; Hemerocallis culture by Mr. Lenington, Hemerocallis polyploids, and other amaryllid articles.

Gloriosa Lily Edition, with articles on the Gloriosa Lily by W. Hayward, plant growing experiences by W. Allgeyer, Western Trip by Mrs. Henry, Plant Life Library (book reviews), the American Plant Life Society, and Seeds and Plants Directory.

Vol. 8 (Nos. 1—4) 1952, with 34 illustrations, a total of 183 pages.

1952 HERBERTIA Edition, devoted exclusively to the amaryllids: the **Second Alstroemeria Edition,** dedicated to Dr. Uphof, containing an autobiography of Dr. Uphof, a review of the genus Alstroemeria by Dr. Uphof, the Amaryllis Displays at Cleveland, and New Orleans, the Orlando-Winter Park Hemerocallis show, Amaryllis evaluation by Thos. R. Manley, Dr. Thornburgh, C. E. Buck, E. Douglas, and Hermon Brown; articles on Fragrant Alstroemeria hybrids by M. B. Foster, advances in Alstroemeria culture by Harry L. Stinson, Alstroemeria articles by Prof. Bullock, Prof. Ballard, Mr. Ruckman, and E. O. Orpet. The issue also contains descriptions of a new Amaryllis species, and a new Zephyranthes species, and articles on Zephyranthes by Mrs. Clint, on Lapiedra martinezii by Dr. Fernandes, Alliums by B. Harkness, amaryllid garden material by W. L. Hunt and Thad Howard, Narcissus culture by Mr. Mitsch, Crinum zeylanicum by Mr. Hayward, Hemerocallis by Mr. Gilmer, and Mrs. Henry, Hymenocallis by Mr. Woelfle, Amaryllid color by Mr. Hannibal, and other important articles.

Malvaceae Edition, with articles on the Perfect Mallow Marvel by E. Sam Hemming, a new Hybrid Hibiscus, by Prof. Ballard, and propagation of Hibiscus, by Dr. Hava; and a report on plant culture activity in the Southwest Region by Dr. Corliss, the Plant Life Library (book reviews), the American Plant Life Society and Seeds and Plants Directory.

Vol. 9. (Nos. 1—4) 1953, with 32 illustrations, a total of 166 pages.

1953 HERBERTIA Edition, devoted exclusively to the amaryllids; sponsored by the **American Amaryllis Society,** which is affiliated with the **American Plant Life Society.** This is the **Second Narcissus Edition,** dedicated to E. A. Bowles, containing a portrait of Mr. Bowles, and papers on Narcissus: a review of 40 years devoted to Narcissus breeding by Guy L. Wilson, an article on miniatures, naturalizing, decoratives, and a beginners' list by C. E. Quinn, fall-flowering Narcissus by L. S. Hannibal, Narcissus breeding by E. C. Powell, and W. R. Ballard, Daffodils in Piedmont, Virginia by H. I. Tuggle, old naturalized Narcissus in the South by Mrs. Evans, Daffodils in 1952 by Grant E. Mitsch, and Daffodils in northern California by H. I. Johnson.

There are also articles on other amaryllids, including reviews of Amaryllis Shows in New Orleans and Houston, papers on the evaluation of Hybrid Amaryllis by Mr. Manley and Dr. Thornburgh, an article on Allium by R. B. Freeman, Amaryllis species by Mrs. Mary G. Henry, the Orpets, and Mr. Burlingham, Hemerocallis by S. E. Saxton, George Gilmer, and W. R. Ballard, Calostemma by Mr. Chandler, Crinum scabrum by Thad M. Howard, Lycoris by Wyndham Hayward, Hymenocallis by Len Woelfle, and on other amaryllid subjects, including the description of two new Amaryllis species.

Agavaceae Edition, with articles on Dracaena and Cordyline by Mrs. Morris Clint, The Tribes and Genera of the Agavaceae, and Polianthes tuberosa by Hamilton P. Traub, Beaucarnea recurvata by Mulford B. Foster, and sections on The Plant Life Library (book reviews), the American Plant Life Society, a complete list of publications, and Seeds and Plants Directory.

Vol. 10. (Nos. 1—4) 1954, with 23 illustrations, a total of 143 pages.

1954 HERBERTIA EDITION, devoted exclusively to the Amaryllids; sponsored by the American Amaryllis Society, which is affiliated with the American Plant Life Society. This is the **Second Amaryllis Edition,** dedicated to Thomas R. Manley, M. S., and contains an autobiography of Mr. Manley and three valuable articles by Mr. Manley on the evaluation, forcing culture and merchandising of Amaryllis; articles on the Divisions of cultivated Amaryllis by H. P. Traub, evaluation of Amaryllis by Dr. Thornburgh, the McCulloch hybrid Amaryllis by Edith B. Strout and Polly Anderson, Amaryllis and other amaryllid culture by Armyn Spies, Mrs. W. D. Morton, Wyndham Hayward, Mrs. Jo. N. Evans, and Dr. Philip G. Corliss; Amaryllis insects and mites by Dr. Floyd F. Smith and C. L. Burlingham; Amaryllis propagation by

John T. Weisner; Amaryllis flower arrangements by Dr. Philip G. Corliss; Hemerocallis by Prof. W. R. Ballard, S. E. Saxton, and W. Quinn Buck; Narcissus by Dr. Cooley and Prof. Ballard; Alliums and Zephyranthes by Thad M. Howard, the New Orleans and Mobile Amaryllis shows for 1953, and other interesting articles.

The **General Edition,** contains articles on the Giant Aborescent Philodendrons and the Delightful Ginger Lilies by Wyndham Hayward, the genus Nothoscordum by H. P. Traub, a note on the new Code for naming Cultivated plants, the Plant Life Library (book reviews), the American Plant Life Society, a complete list of publications, and seeds and Plants Directory.

Vol. 11. (Nos. 1—4) 1955, with 33 illustrations, a total of 146 pages.

1955 HERBERTIA EDITION, devoted exclusively to the Amaryllids; sponsored by the American Amaryllis Society, which is affiliated with the American Plant Life Society. This **General Amaryllid Edition** is dedicated to Dr. Robert F. Hoover, the 1955 Herbert Medalist, contains the autobiography of Dr. Hoover, and an article that brings the nomenclature of the Brodiaea Lilies up to date. Articles on **Amaryllis** include—evalution of hybrid **Amaryllis,** by Dr. Thornburgh, reminiscences by W. E. Rice, more experiences with Dutch **Amaryllis** by Mr. Weisner, 27 years with **Amaryllis** in northern Illinois by Mrs. Tebban, growing **Amaryllis** in California, by Mr. Stewart; and a report on collecting **Amaryllis** in South America in 1954, by Prof. Ira S. Nelson.

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Vol. 12. (Nos. 1—4) **1956,** with 39 illustrations, a total of 162 pages.

1956 HERBERTIA EDITION, devoted exclusively to the amaryllids; sponsored by the American Amaryllis Society, which is affiliated with the American Plant Life Society. This **General Amaryllid Edition** is dedicated to **E. O. Orpet,** the 1946 Herbert Medalist. A **biography** of Mr. Orpet detailing the contributions made by him toward the advancement of the **amaryllids,** is presented by Mrs. Mildred Orpet.

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[DAYLILY PERFORMANCE—DR. CORLISS, continued from page 114.]

nine or ten in the evening may close at six in hot weather or climate. The performance of some daylilies in response to temperature, however, is erratic—'Night Life' (Register) is said to open in mid-afternoon in the (cold) north, while in my (hot) garden it opens at sundown! I am fond of 'Amur Valley' (Marshall) not only because of its high branching and early and almost continuous bloom but because it opens before noon (not until noon in coldest weather, but about 9 A. M. in hottest) and remains open well into the night, whatever the temperature.

WHAT TO DO ABOUT IT? Performance must be checked under all kinds of environments for correct evaluation. Some clones may be difficult in PARTS of the same garden in some regions. There is a common superstitition about "sticking a cutting" under the "mother" plant to ensure its rooting. Like most superstitions, there is some factual basis for this: The conditions under which the "mother" plant thrived have proved suitable for the clone. When I divide and move a daylily, I have learned to replant a portion at the original site to be sure of its survival: 'Blanche Hooker' (Stout) which is so important in breeding for early and continuous bloom is unhappy in many parts of my garden. Some clones which have succumbed in certain parts of my garden have been replaced and replanted in another bed; some of these, the most notable example being 'Galahad' (Lester), have thrived at the new site, while other clones will apparently not grow in any part of my garden.

While failure in some cases is due to poor cultural practice, there are surely many clones which perform differently under varying conditions. I would like to see each popular named clone rated by growers in each region, with their cultural preferences listed. As with all "Popularity Polls" where gardeners in various regions participate, there may be clones half way down the list which are supreme in the gardens of one region and dismal failures in other regions.

[PLANT LIFE LIBRARY, continued from page 152.]

INDOOR PLANTS AND HOW TO GROW THEM, by A. Bertrand. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 92. Illus. $4.75. The objective of this concise little book, translated from the French by Vera Higgins, is to instruct the amateur in the care of plants in the home. After the brief sections on how plants live, the soil, the pots, watering, soil-less culture, and causes of failure, the rest of the book is devoted to the culture of a number of selected plants. The book is well illustrated, including color plates.

CLIMATES IN MINIATURE, by T. Bedford Franklin. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 137. Illus. $3.75. This charmingly written report on climates of relatively small areas based mainly on experiments carried out by the author with inexpensive apparatus shows how some animals keep warm in winter, the role of different soils and their temperatures, the way to forecast frost and achieve protection against frost damage, the effects of humidity, windbreaks and light and shade on plants, and why the effects of spring are first felt in hedgerow and wood. This utterly fascinating book is recommended for all readers.

CROP PROTECTION, by G. J. Rose. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 223. Illus. $10.00. This easily readable text was written by a British authority for the cultivator—whether large or small—faced with the problem of protecting his crops. The book is divided into four sections: (1) general considerations; cultural control; formulations; dusts, etc.; (2) chemicals; weed killers; insecticides; fungicides; rodenticides; (3) description of applicating machinery; and (4) the protection of stored products. The illustrations are excellent.

PLANTS WITHOUT FLOWERS, by H. Bastin. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1955. pp. 146. Illus. $6.00. From a brief speculative survey of the earliest forms of life upon the earth, the author proceeds to trace the evolutionary ascent of flowerless plants through the slime-fungi and bacteria, algae, lichens, true fungi, mosses and liverworts, ferns, horsetails and club-mosses. This delightful book is recommended for all readers.

THE HOME GARDENING ENCYCLOPAEDIA, new ed. 1955. Philosophical Library, 15 E. 40th St., New York 16, N. Y. pp. 368. Illus. $6.00. This concise reference work by a British editor and intended for British home gardeners consists of brief informative statements about the plants, gardening operations, etc., arranged alphabetically. The American home gardener may profit by using such a British work in connection with the garden reference books which he already possesses.

[PLANT LIFE LIBRARY, continued on page 4.]