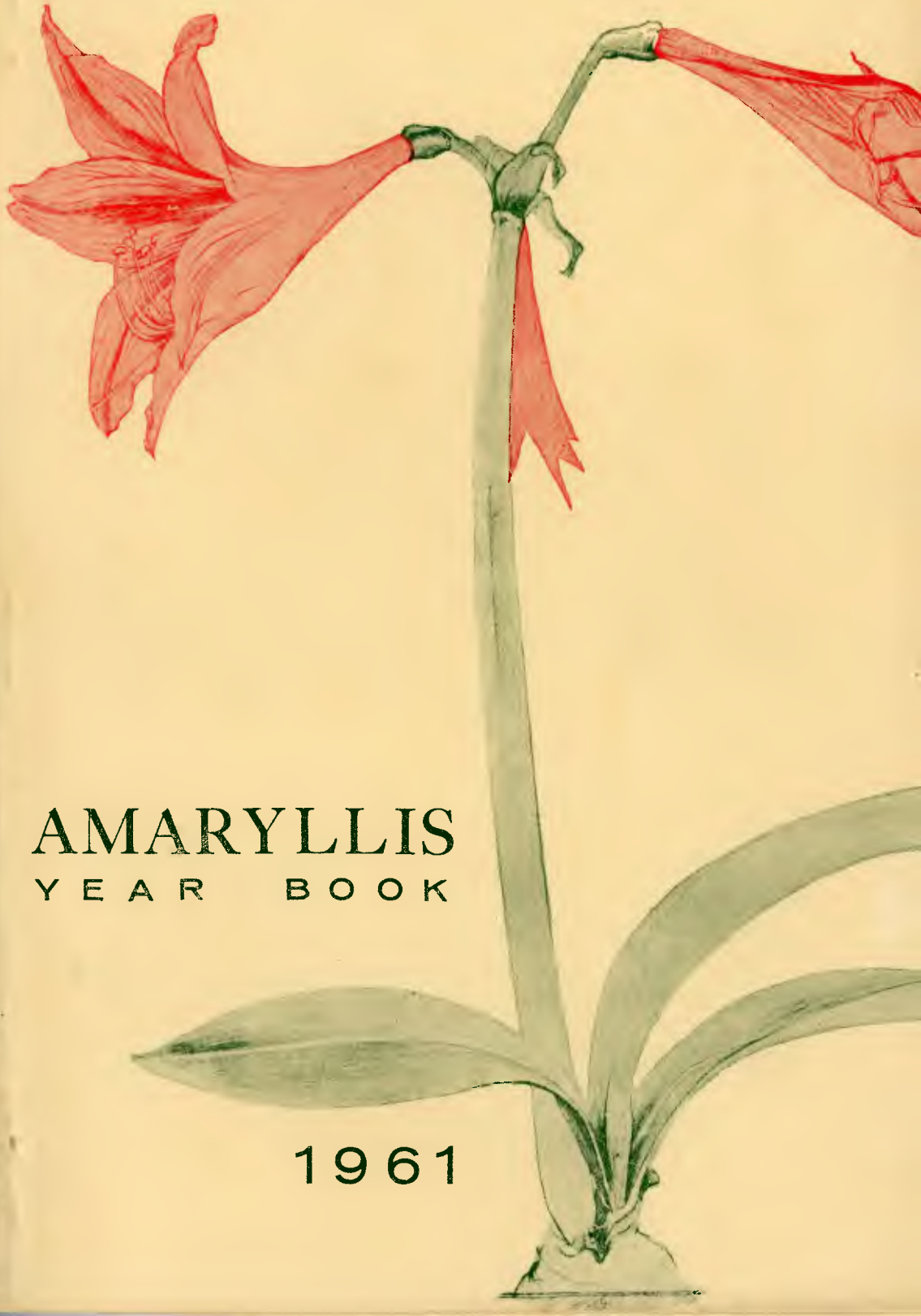
PLANT LIFE, VOL. 17, NO. 1, JANUARY, 1961



AMARYLLIS

YEAR BOOK

1961

THE AMERICAN PLANT LIFE SOCIETY

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PLANT LIFE, VOL. 17, NO. 1, January, 1961

AMARYLLIS
YEAR BOOK
1961

Year Book of
The American Amaryllis Society
28th 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 173.]

PREFACE

Mr. Douglas D. Craft, of the DEPARTMENT OF DESIGN, ART INSTITUTE of CHICAGO, has again favored us with a fine cover design; this time with a drawing, showing *Amaryllis reticulata* var. *striatifola,* which is based on a plant that he bloomed in his own home. These cover designs by Mr. Craft are treasured by the members.

This 28th edition of the AMARYLLIS YEAR BOOK is dedicated to Frederick B. Jones who received the 1961 HERBERT MEDAL AWARD for his contributions toward the advancement of the amaryllids. Mr. Jones is well known for his outstanding work with *Zephyranthes* and its allies. His interest, however, extends also to the other amaryllids. His name is fittingly memorialized in the beautiful yellow *Zephyranthes jonesii.* Mr. Jones contributes an interesting autobiography in the present issue. He is to be congratulated on important accomplishments.

Again, this issue contains important articles on *Amaryllis.* Mrs. St. John writes about her outstanding hybrid *Amaryllis;* Mr. Craft, about his experiences with *Amaryllis reticulata striatifolia;* Mr. Woesik about fragrance and flowering time in hybrid *Amaryllis.* Mr. Leon Boshoff-Mostert completes his interesting article on *Amaryllis* in South Africa; Mr. Buck reports on the first flowering of these in the United States; and Mr. Goedert writes about Hadeco *Amaryllis* hybrids, also from South Africa. Mr. Greenler reports on methods for inducing mutations in *Amaryllis* with X-rays; Mr. Ramelli, on hybridizing green *Amaryllis;* and Mr. Wallis, on breeding white and double *Amaryllis.* Mrs. Tebban writes on her experiences with *Amaryllis* in the Middle West; Mr. Goedert comments on the 1959-60 *Amaryllis* season; and Dr. Joseph C. Smith reports on collecting *Amaryllis* species. Amaryllis notes are contributed by Mrs. McGee, Mr. Burlingham, and Mr. Homfeld.

The other amaryllids are also adequately covered. Mr. Hunt writes on *Crinum virgineum;* and Mr. Hannibal on *Crinum* hybrids. Mrs. Anderson reports on X Crinodonnas and hybrid Brunsvigias. There are also articles on the genus X *Crinodonna* and X *Crinodonna* breeding. Miss Dormon writes about native Louisiana *Hymenocallis;* and Mr. Craft about *Eucharis fosteri.* Mr. Hunt reports on a Giant Late Hoop-Petticoat Daffodil; and Miss Dormon on *Narcissus bulbocodium.* Mrs. Menninger brings the Catalog of *Nerine* Cultivars up-to-date. Mr. Korsakoff reports on doubleness in *Habranthus;* and Mr. Hunt writes on *Rhodophiala* x *huntiana.*

Dr. Brewer contributes a most interesting article on a winter-rainfall garden in California; and Mrs. Henry reports on the naturalizing of *Agapanthus africanus* in Pennsylvania. Mrs. Schumann writes on outdoor culture of amaryllids in Michigan. Prof. Davis reports on *Cyrtanthus* and other small-flowering amaryllids for Louisiana; Mr. Hannibal writes about two *Haemanthus* species; and Mr. Hunt describes a new *Lycoris.* Dr. Brewer reports on germinating seeds in vermiculite.

Mr. Percy-Lancaster contributes another interesting Southern Rhodesia Newsletter; and Mrs. Abendroth writes about *Amaryllis* in the

Organ Mountains of Brasil. Mrs. Haydel reports on a western trip; and there are reports on the local Amaryllis Shows of 1960. There are other interesting articles.

Contributors for the 1962 issue of the AMARYLLIS YEAR BOOK are requested to send in their articles by August 1, 1961, in order to insure earlier publication of that edition. Unless articles are received on time, publication will again be delayed to June or July or even later as with some issues in the past several years. Your cooperation toward earlier publication will be greatly appreciated.

October 25, 1960,
5804 Camino de la Costa,
La Jolla, California.

Hamilton P. Traub
Harold N. Moldenke

CORRIGENDA

PLANT LIFE, VOL. 16. 1960

Page 37, under "Nothoscordum neriniflorum", 3rd line, for "Long." read "Lond."

Page 74, upper part of page, end of line beginning "[PLANT LIFE LIBRARY . . .", change "178" to "180".
Page 87, 16th line from top, change "(stripe)" to "(stipe)".
Page 162, last line, bottom of page, change "179" to "184".
Page 178, bottom of page, delete last line beginning "[PLANT LIFE LIBRARY . . ."
Page 179, top of page, delete first line beginning "[PLANT LIFE LIBRARY . . ."
Page 180, bottom of page, last line, change "184" to "74".
Page 184, 14th line from bottom, change "180" to "162".

See page 64 for additional Corrigenda.

Griffinia rochae Morel, **sp. nov.**

Holotype: Georges M. Morel specimen, in herbarium, Station Centrale de Physiologie Vegetale, Versailles, France.

Syn.—*Griffinia rochae* Georges M. Morel, in Baileya 8: 133, 135, fig. 55. 1960 (1961), published January 16, 1961, without indicating holotype.

According to Article 35, Int. Code, 1956 ed., "the name of a new taxon of recent plants of the rank of order or below is valid only when the nomenclatural type is indicated." Thus it is necessary to validate the name.—*Hamilton P. Traub.*

DEDICATED TO

FREDERICK BUTLER JONES

Herbert Medalist — Frederick Butler Jones, M.A.

FREDERICK BUTLER JONES, M.A.

AN AUTOBIOGRAPHY

I was a farm boy, the oldest of six children born to parents who came to Texas from Tennessee to try their hand at farming. Arriving in 1908, my father leased a farm near Gregory, San Patricio County, on the lower middle coast. There I was born August 31, 1909. Before long my parents bought land of their own a few miles to the west, and it was here in a newly emerging farm community that I spent most of my happy, close-to-nature childhood.

Looking over the autobiographies of other recipients of the Herbert Medal, I note that most trace their interest in plant life to early experiences and influences. Such was certainly true in my case. Our farm was surrounded on all sides by brushy pastures which stretched as far as the eye could see. The birds, mammals, insects and particularly the plants greatly intrigued me. At an early age I began collecting seeds and pressing wild-flowers.

After finishing high school in the nearby farm town of Taft, I entered Rice University and because of an adeptness at drawing, began a course in architecture. The mathematics courses proved so trying, however, that any idea of becoming an architect was forgotten, and at the end of the third year, I transferred to the University of Texas and began majoring in history. Taking an M. A. in 1935, I went on to Cornell University with the intention of making history teaching a profession. The next three and one half years were spent largely in research for my dissertation on early 18th century pacifism and internationalism. About half of this time I held an assistantship in history and by no means was unhappy with this work. Yet, increasingly I became dissatisfied with the prospect of becoming a teacher, and without writing my dissertation returned to Texas to enter farming.

Some of my happiest moments at Cornell were spent on the campus of the College of Agriculture looking over horticultural displays and experimental plots, browsing through seemingly endless shelves of books and periodicals relating to horticulture and botany. So, back in Texas, where it soon became evident that I had plenty of time for pursuits other than farming, I became absorbed in a multitude of plant projects, to such an extent, in fact, that my family and friends probably marvelled that I managed to keep my farm operation going. For several years, inspired by the early Florida horticulturists, Simpson and Nehrling, I worked on problems relating to plant adaptability to local soil and climatic conditions. In my acre-size garden plot, grew a large number of species and varieties, some brought in from distant places. Native plants fascinated me just as they did in childhood years, and the pastures were searched for kinds which seemed worthy of being brought into cultivation. Lending invaluable help was the librarian of the Massa-

chusetts Horticultural Society who freely loaned me numerous books which would not have been available otherwise. To her I am most grateful.

In 1944, I married Emma Lee Butler of Knoxville, Tennessee, acquiring not only a most gifted wife having a deep appreciation of nature, but a young step-son, Wally. Before many years had passed, we had also four endearing youngsters of our own: Carolyn, Patricia, Bruce and Phyllis.

It was my intention, during these years of intense experimentation, to make my findings available to the local gardening public in the form of a pamphlet or garden book. This idea was dropped, at least for the time being, when I learned that the accomplished garden editor of the Corpus Christi newspaper had in preparation just such a work and was assured that leading civic organizations would support its publication. I did contribute several short items to *The Corpus Christi Garden Book* (1949), a booklet of real merit which has no doubt served its purpose well, but the bulk of my research notes made in the 1940's gathers dust.

About this time, my interest turned more to bulbous plants and to botanical exploration. Returning from a visit to Tennessee in 1948, I had the good fortune to meet Mr. Mulford Foster, author of *Brazil, Orchid of the Tropics,* at his home in Orlando, Florida. Thrilled at the sight of the fine collections of plants growing in his gardens, and stimulated by his conversation, I returned to Texas intent on doing more in the way of exploration. Within a year I had discovered two *Zephyranthes* new to science, one of them, *Z. Jonesii* (Cory) Traub, growing within a mile of my farm, the other, which was actually the first one to be found, in an old yard in Laredo on the Mexican border. Aware of Wyndham Hayward's enviable knowledge of rain lilies, I wrote him about the Laredo plant. Unable to place it, he referred me to Mr. V. L. Cory, then field botanist of the herbarium at Southern Methodist University, whose observations on the Texas *Zephyranthes* had been published in *Herbertia* in 1936 and 1937. Cory considered the plant an undescribed species, but not knowing from whence it came to the Laredo yard, hesitated to publish a description of it. As a tangential result of this correspondence with Cory, Dr. S. W. Geiser, head of the Dept. of Biology at S. M. U. invited me to send any plants that I might collect in southern Texas to Dr. Lloyd Shinners, Director of the Herbarium, who would be glad to make determinations in exchange for the plants. This was the beginning of my herbarium of several thousand specimens, now housed in my garage, which includes nearly all of the native and naturalized flowering plants of the Coastal Bend area of Texas.

With the publication of *Z. Jonesii (Field & Laboratory,* XVIII, 1 (1950)), and my own note "A New Rain Lily from Texas" which appeared in the 1953 *Herbertia,* correspondence began to develop with persons far and near having interests similar to my own, these leading not infrequently to bulb exchanges and highly valued friendships. It was my privilege at this time to become personally acquainted with Dr. Thad Howard of San Antonio and with Mr. and Mrs. Morris Clint of

Brownsville, all leading students and collectors of the *Amaryllidaceae.* Mrs. Edith Strout of Kentfield, California, for many years prominent in the American Plant Life Society, asked me to join her Amaryllis Robin, and it was through membership in this group of Amaryllis enthusiasts, that I formed rewarding friendships with Mr. Armyn Spies of Belleville, Illinois, Dr. Robert Thornburgh of Palos Verdes Estates, California and Dr. Joseph Smith of La Mesa, California, all well known to readers of *Herbertia.* Besides, there were profitable exchanges of bulbs and information with Mrs. U. B. Evans of Ferriday, Louisiana and with Prof. Ira Nelson of Southwestern Louisiana Institute, both closely identified with the accomplishments of the Louisiana Society for Horticultural Research. To Dr. Walter Flory of Blandy Experimental Farm, University of Virginia, I sent living material of various amaryllids for cytological investigations.

Among bulb exchanges with persons abroad, a most fruitful one was with Prof. Caesar Vargas C. of the University of Cuzco, high in the Andes of Peru. During a field trip to the coast, he collected for me various amaryllids which I was able to try out in my Corpus Christi garden—by this time, 1954, I had moved my family to Corpus Christi where several outdoor beds had been prepared to accommodate my growing bulb collection. One of the packages from Prof. Vargas was labeled "Hippeastrum" but the bulbs in it proved to be of an exceptionally fine *Sprekelia,* a form apparently not much known in the United States, one which ought to be better known if it performs as well elsewhere as on the gulf coast.

In 1954 and again in 1955, I accompanied the Morris Clints to the Mexican plateau to hunt for rain lilies known and unknown. These trips have been reported in some detail in *Herbertia.* We did bring back, among other species and varieties, *Habranthus concolor,* a handsome yellow-flowered rain lily which unfortunately responds poorly to cultivation, at least in my garden. In looking back on these expeditions, I cannot help but marvel at the complexity of the rain lily populations in Mexico, the accurate classification of which will surely require much additional field work, as well as extensive studies of the growing plants, particularly cytological studies.

Meanwhile, in Corpus Christi, I began hybridizing in various genera, including *Zephyranthes,* of which I now had many species to work with. An interesting cross between the two familiar Texas natives, *Z. pulchella* J. G. Smith and *Z. Drummondii* D. Don, first flowered in 1956, added to the accumulating evidence that proposals made by various taxonomic workers that *Cooperia* be combined with *Zephyranthes,* should be accepted. This cross, too, at least suggested the possibility that certain of the Texas species may be of hybrid origin.

In 1958, my botanical work received a boost in the form of proposals made by Dr. Clarence Cottam, Director of the newly established Welder Wildlife Foundation of San Patricio Co., that I join Prof. Chester Rowell of Texas Technological College and Dr. Marshall Johnston of the University of Texas Plant Research Institute, in preparing

an annotated list of the native and naturalized plants of the area, a project to be sponsored by the Foundation. The work would be based to a considerable extent on my field work which was now to be intensified. Taking advantage of this chance to improve my knowledge of the local flora through use of the library and laboratory facilities of the Foundation, I was able to make a substantial contribution to *Flowering Plants and Ferns of the Texas Coastal Bend Counties* due to be published late in 1960 or early in 1961. All of the described amaryllids known to occur in the area will of course be included as well as nearly 1300 other species and varieties of wild plants, perhaps one-fourth of all the flowering plants and ferns of Texas. Many problems concerning the taxonomic status of local species remain unsolved however, and it is with some of these, particularly those relating to members of the *Amaryllidaceae,* that I hope to spend more time. In any event, I hope to continue to do what I can within the limits of my ability, to contribute to the knowledge of plant life, particularly to the botany of Texas.

THOMAS JEFFERSON AND THE AMARYLLIDS

HAMILTON P. TRAUB, *California*

The following account is based on Prof. Edwin M. Betts', "Thomas Jefferson's Garden Book, 1766—1824", published in 1944 by the American Philosophical Society. The "Garden Book" was started in 1766 before the American Revolution when Jefferson was in his 23rd year, and was continued with interruptions to 1824, two years before his death.

Since Jefferson used also memorandum books other than the "Garden Book", including the "Farm Book", "Weather Memorandum Book, 1776—1820", and wrote down important matter on odd sheets of paper, Prof. Betts has incorporated this information in the book that he has edited. In addition he has included gardening and agricultural references from Jefferson's correspondence and other sources.

Prof. Betts points out that "there still remains related material not available for publication. But not until this is released can there be a strictly definitive account of Jefferson's agricultural and horticultural pursuits." However, the main ground work has been laid down in the book edited by Prof. Betts. It is hoped that Yale University will speed up the publication of the complete works of Thomas Jefferson so that the definitive gardening book of this great American may be finally published.

In the following account, page numbers in parentheses ( ) refer to Betts', "Jefferson's Garden Book, 1766—1824" (published by the American Philosophical Society, Philadelphia, Penna., in 1944). *This is an important book that is recommended to the reader.* No attempt is made to refer to the sources that Prof. Betts uses since these are clearly indicated in the book edited by him.

Jefferson's greenhouse and flower beds.—When writing to Bernard McMahan, the Philadelphia seedsman and nurseryman, from Monticello, April 8, 1811, Jefferson explains "You enquire whether I have a hot

house, greenhouse, or to what extent I pay attention to these things. I have only a greenhouse, and have used that only for a few articles. My frequent and long absences at a distant possession render my efforts even for a few plants I aim at, abortive. During my last absence in the winter every plant I had in it perished. I have an extensive flower border, in which I am fond of placing *handsome* plants and fragrant. Those of mere curiosity I do not aim at, having too many other cares to bestow more than a moderate attention to them. In this I have placed the seeds you were so kind as to send me last. In it I have also growing the fine tulips, hyacinths & amaryllis you formerly sent me." (Betts, p. 455).

Jefferson's greenhouse was a glassed-in piazza on the southeastern end of his house (Betts, p. 399). Since Anne Cary Randolph at Edgehill, wrote to Jefferson on Jan. 22, 1808, that she had word that "The green house is not done" (Betts, p. 363), it appears that the greenhouse at Monticello was completed some time later in 1808.

Writing from Washington, Dec. 8, 1808, Jefferson explained the purpose of his greenhouse in a letter to Anne Cary (Randolph) Bankhead, "In fact the *Mimosa nilotica* [=*Acacia farnesiana* Willd., the Sweet Acacia] & orange are the only things I ever proposed to have in my greenhouse" (Betts, p. 381).

Jefferson's amaryllids.—The evidence in Jefferson's "Garden Book" shows that he and his relatives grew amaryllid species from five of the amaryllid tribes recognized today. Each of these will be briefly considered.

THE ONION TRIBE (ALLIEAE)

Jefferson paid considerable attention to the vegetable onions, *Allium cepa* L., but shallots, *Allium ascolonicum* L., chives, *Allium schoenoprasum* Metz, leek, *Allium porrum* L., and garlic, *Allium sativum* L., were also planted. The ornamental alliums are not represented.

COMMON ONION, *Allium cepa* L.

(1) Spanish onion. Among the entries for the year 1767, it is noted that "Spanish onion" seeds were sowed March 23 (Betts, pp. 4, 8, 47 & 58), and again on Aug. 24, 1809 (Betts, p. 389). Betts states that this may be "any of the several varieties of the large-bulbed, mild-flavored, onions; in the United States originally applied only to imported stock but now used more broadly (Betts, p. 8). Another entry shows that "White Spanish" onion seeds were saved in 1794 (Betts, p. 224).

(2) Madeira onion. These were sowed on March 2, 1778 (Betts, p. 75). Betts quotes from Fearing Burr, Jr.—"The field and Garden vegetables of America", Boston, 1863,—"This variety is much prized for its extraordinary size, and for its mild, sugary flavor . . . It requires a long warm season for its greatest perfection". (Betts, p. 81).

(3) Hanging onion. "Hanging onion" was planted April 9, 1811 (Betts, p. 442). Writing from his Poplar Forest estate, Nov. 10, 1816,

Jefferson asks that "some of the small bulbs of the "hanging onion" be sent there. (Betts, p. 562). Betts (p. 448) is of the opinion that this is the same as the "tree onion", but this may not be the case since Jefferson elsewhere refers to "seed bulbs" of the tree onion (Betts, p. 389; see the tree onion below). Apparently, the "hanging onion" refers to the variety that is stored by hanging up long braids made up by intertwining the dry foliage adhering to the bulbs. Dr. Louis K. Mann, of the University of California, at Davis, Calif., (under date of August 1, 1960) writes:—"I have no recollection of ever hearing the term "hanging onion" nor has anyone else in the Vegetable Crops Department whom I have asked. The suggestion that it may be an onion whose tops are braided together and hung for storage seems reasonable."

(4) "White onion". On March 15, 1774, "white onion" was planted. These apparently trace back to stock originally brought from Italy by Philip Mazzei (Betts, pp. 47; 58), and "white onion" was sent from the City of Mexico, March 21, 1824, in care of Mr. W. McAndrews (Betts, p. 615). At this late date, it is not possible to make any further identification on these lots.

(5) Perennial tree, or winter onion *(Allium cepa* var. *viviparum* Metz).—On April 21, 1809, "tree onion . . . seed bulbs", that is bulblets, were planted (Betts, p. 389). Betts explains that "The underground bulb is small and undersized, the bulbils being borne in the flower cluster, and used for propagation" (Betts. p. 399). It should be noted that this plant is also known as "Perennial Tree or Winter Onion", (and sometimes also as "Egyptian Onion"), because it is frost hardy outdoors in the North in contrast to the frost-tender vegetable onions. The plant is classed as an early bunching onion and is eaten mainly as early green onions.

SHALLOTS, *Allium ascolonicum* L.

For 1794, the entry "shalots" appears (Betts, p. 208). Thereafter, similar entries are noted as "Scallions; shalots" for 1813 and 1814.

CHIVES, *Allium schoenoprasum* Metz.

For 1812, "Chives" are indicated (Betts, p. 473), and thereafter again for 1813 and 1814.

LEEK, *Allium porrum* L.

For 1794, "leeks" are listed (Betts, p. 208), and thereafter again for 1812; "Leeks, common, flag R.", and also, for 1813, "Leeks".

GARLIC, *Allium sativum* L.

For 1774, March 15, the entry indicates that seeds of "Garlic" of Tuscany were sown (Betts, p. 47), and thereafter "garlic" is listed in 1794, 1812 and 1813.

ZEPHYRANTHES TRIBE (ZEPHYRANTHEAE)

ATAMASCO LILY, *Zephyranthes atamasco* (L.) Herb.

On Febr. 28, 1812, Bernard McMahon, at Philadelphia, sent "some roots of *Amaryllis atamasco*" [L.] to Jefferson. (Betts, p. 481). This is now known as *Zephyranthes atamasco* (L.) Herb. It is native to southeastern U. S. as far north as Virginia.

SPREKEL'S LILY, *Sprekelia formosissima* (L.) Herb.

On April 2, 1807, Bernard McMahon wrote to Jefferson, then at Monticello, that he is sending "6 roots of Amaryllis formossissina" [L.] (Betts, p. 346). In the entry for April 18, 1807, there is a plan of the oval and round flower beds at Monticello, showing that near the house, on the "s.w.", *Amaryllis formosissina* was planted, and the accompanying list includes the entry "6 Amaryllis formosissima" (Betts, p. 346). On July 6, 1808, Jefferson wrote to Bernard McMahon from Washington, "I have tulips you sent me . . . also . . . tuberoses [*Polianthes tuberosa* L.], Amaryllis . . ." (Betts, p. 373). Again on April 8, 1811, Jefferson wrote to McMahon from Monticello, "I have also growing the fine tulips, hyacinths, ruberoses & Amaryllis you formerly sent me." (Betts, p. 455.)

Amaryllis formosissima L. is now known as *Sprekelia formosissima* (L.) Herb.

AMARYLLIS TRIBE (AMARYLLEAE)

AMARYLLIS L. (sp. unknown from West Indies, Mexico or South America).

On Nov. 9, 1807, Anne Cary Randolph writes to her grandfather, Jefferson, at Monticello, "The tuberoses & Amaryllis are taken up; we shall have plenty of them for the next year." (Betts, p. 352). Since Jefferson apparently received only 6 *Amaryllis formosissima* L. [=Sprekelia formosissima (L.) Herb.] from McMahon in April 2, 1807, these cannot be identical with the ones mentioned by Anne Cary Randolph. Apparently these *Amaryllis* were obtained long before 1807 since she has "plenty of them" which she is storing indoors over winter. Again on Dec. 12, 1808, Ellen Randolph wrote to Jefferson, "there are at least a peck of tuberoses and 12 or 14 Amaryllis roots all packed in bran . . ." (Betts, p. 381).

On May 26, 1811, Jefferson at Monticello, wrote to his granddaughter, Mrs. Anne Cary Bankhead,—"The hyacinths and tulips are off the stage, the irises are giving place to the Belladonnas, as these will to the tuberoses . . ." (Betts, p. 447).

It should be noted that Anne Cary Randolph and Ellen Randolph grew this *Amaryllis* outdoors with winter storage of bulbs, and that the method of storage indicated by the latter is that of packing in bran over winter. These could not have been the Cape Belladonna, *Brunsvigia rosea,* which make leaf growth in winter. Jefferson says that "the

irises are giving place to the belladonnas'' which means that the latter, which follow the Narcissus, are early summer blooming, and thus are an *Amaryllis* L. (syn.—*Hippeastrum* Herb.). This rules out the Cape Belladonna, which is autumn flowering, and which rests in summer. The matter was checked further with Dr. W. S. Flory, Jr., of Brandy Experimental Farm, Boyce, Virginia. Under date of October 16, 1959, he writes,—''*Narcissus* bloom in the early spring, most of our *Amaryllis* L. bloom in the early summer [May and June] and then after a considerable interval the tuberoses bloom [beginning to late August]; in some years they continue to bloom right up to the time of frost.''

We may never know the identity of the *Amaryllis* L. species, or possibly a hybrid, from Latin America, that is mentioned here unless further facts come to light. It could have been an *Amaryllis* species such as *A. reginae, A. vittata,* etc. or a hybrid. *Amaryllis* x *johnsonii (A. reginae* x *A. vittata)* was produced in 1799 in England, and there is a possibility that it could have found its way to America in the early 1800's, but most likely it was a species, which was grown outdoors in summer with winter storage in Virginia.

CRINUM TRIBE (CRINEAE)

CAPE BELLADONNA, *Brunsvigia rosea* (Lam.) Hann.

On August 12, 1786, while in Paris, France, Jefferson wrote to Richard Cary, stating ''. . . They have disappointed me of . . . tuberoses, Hyacinths & Belladonna Lilies [=Cape Belladonna] which I had ordered.'' (Betts, p. 117). It was not until much later (1812) that he received bulbs of the Cape Belladonna.

On Febr. 28, 1812, Bernard McMahon, the Irish-American plantsman of Philadelphia, wrote to Jefferson, ''This morning I done myself the pleasure of sending you by Mr. Gilmer a box containing the following articles.'' In the list is the entry ''2 roots of Amaryllis belladonna [=Cape Belladonna].'' (Betts, p. 481). Again, on Oct. 24, 1812, McMahon wrote to Jefferson, ''. . . with this letter I expect you will receive a small box containing . . . 3 roots of Amaryllis belladonna or Belladonna Lily [=Cape Belladonna]; they belong to the greenhouse; if their strong succulent fibers or roots retain their freshness on receipt of them, do not have them cut off, but let them be planted with the bulbs in pots of good rich mellow earth, the flowers are beantiful and fragrant; their season of flowering is Sept. & Oct.'' (Betts, p. 491).

This is clearly the Cape Belladonna, *Brunsvigia rosea* (Lam.) Hann., under the misapplied name of ''Amaryllis belladonna'' which is properly applied to the scarlet-flowering plant from the West Indies and South America. But Jefferson makes no further reference to these bulbs. It is well known that they do not survive outdoors at Charlottesville, Virginia, and if they were placed in pots in the greenhouse, they might have survived, but there is no record of it. Elsewhere above it was noted that Jefferson had reserved his greenhouse for the Sweet Acacia, *Acacia farnesiana,* and the Sweet Orange. (Betts, p. 381), and that during long absences from Monticello the plants in the greenhouse perished. (Betts,

p. 455). Thus the Cape Belladonna bulbs apparently perished outdoors due to an uncongenial climate, or were lost from neglect in the greenhouse.

GALANTHUS TRIBE (GALANTHEAE)

SNOWDROPS, *Galanthus* species unknown.

Ellen W. Randolph wrote to Jefferson at Edgehill, Apr. 14, 1808, "The third of April snow drops flowered, you have none but I will give you mine if you want them, and have them set out in your garden when we go to Monticello." (Betts. p. 369).

NARCISSUS TRIBE (NARCISSEAE)

NARCISSUS (species unknown).—

On March 23, 1767, Jefferson noted that "Narcissus" bloomed. (Betts, p. 4). Again, in a flowering chart it is indicated that "Narcissus" bloomed during "March-April", 1782. (Betts, p. 94.), and on Febr. 29, 1796, it is stated that "Narcissus are up." (Betts, p. 247). In a letter from Poplar Forest estate, Nov. 10, 1816, Jefferson asks Martha (Jefferson) Randolph to send "daffodils" and "Narcissus" to his Poplar Forest estate (Betts, p. 562). Since *Narcissus* poeticus L. is late-flowering, and the blooming dates of "Narcissus" indicated by Jefferson range from March to April, which is early, it is most likely that these were Trumpet Narcissus, *N. pseudo-narcissus* L., which are early flowering.

JONQUILS, *Narcissus jonquilla* L.—

"Jonquil" is listed as blooming in April, 1782 (Betts, p. 94). This is obviously *Narcissus jonquilla* L.

It is of interest to amaryllidarians today that Thomas Jefferson, in spite of his many patriotic duties, literary and scientific projects, and farming enterprises, still had time to cherish the amaryllids available to him in the early years of our Republic.

SOUTHERN RHODESIA NEWSLETTER, 1960

Sydney Percy-Lancaster,
779 Mansfield Road, Marborough, Salisbury, Southern Rhodesia

Owing to lack of transport and the time necessary to go far into the countryside to collect plants, my son and I have only visited plots within a forty mile radius of the City of Salisbury. The City is expanding and more suburbs are springing up, in consequence land is being cleared and the indigenous flora is retreating further away. This country certainly has a number of beautiful weeds, excluding those plants that are escapes from gardens, among which can be counted *Cosmos*—yellow as well as the bipennatifida types, *Tithonia speciosa* and *Nicandra physaloides*. *Nicandra* flowers—and fruits too—when it is an inch high, in winter, but

will grow well over six feet in the wet months. This (July) is winter in Southern Rhodesia but we have a few bits of colour in *Acacia podalyriifolia,* Aloes in variety, and *Iboza,* the Ginger bush, a labiate with pale lavender coloured flowers. Bougainvilleas still give colour in most gardens but Poinsettias are just giving over. The Jacaranda, of which there are thousands in Salisbury and suburbs, have turned a beautiful golden yellow and the leaflets are falling.

On our trips into the wilds, "bundu" as the grass lands are called in the local vernacular; we have met with many beautiful weeds, some are worth introducing into the garden, for instance *Haemanthus Multiflorus, Buphane disticha, Crinum* in variety, chiefly *C. bulbispermum (capense), Kniphofia,* but the yellow Aroid Lily, *Zantedeschia melanoleuca,* is rather a disappointment, the colour of the spathe is pale yellow and only one flower is produced per bulb. The terrestial orchids in variety, *Lissochilus,* are pretty but not to be compared with the orchids of the Himalayas. Local gladioli are miniatures and not interesting.

The *Clematis* that grows in the bush is only attractive when it is covered with fluffy white seed heads, but *Clematopsis stanleyi,* an erect plant with nodding white flowers, is very striking. Another common weed is called "The Bells of St. Mary", *Trichodesma physaloides,* it bears several flushes of flowers in the year and while the off-white colour of the commonest variety is not pretty, the blue shades, and a pink mutation, are worth a second glance. A lovely yellow flowered *Bauhinia,* that rambles on the hill-side, has the unfortunate trait of forming a huge tuberous root of six or more feet in length. A bush *Thunbergia, T. lancifolia,* bears a large number of flowers, similar to *T. erecta;* this *Thunbergia* dies down in the winter, it is very generous in the way it sets seeds. Labiates are well represented in Southern Rhodesia; *Coleus, Plectanthus, Pycnostachys* and *Iboza,* for instance, provide the lavender and blue shades of flower at different times in the year. What I consider one of the best weeds I have so far seen is *Combretum oatesii,* a dwarf shrub, seldom more than a couple of feet high. It has small bright red flowers generously produced but followed by five angled brilliant red seed pods that make the bush an outstanding feature in the grass. After all, the weeds of one country are grown by another as novelties, though exceptions must be made, I fear, when we note how unwanted *Eichhornia* (Water Hyacinth) and *Lantana* have become. They have taken too kindly to the country of their adoption!

There is an erect, three foot high, legume like a pale mauve Sweet Pea, *Dolichos lupiniflorus,* that is a perennial and worth cultivating. A brilliant scarlet *Loranthus* (?) has been met with and an orange coloured grass parasite, *Striga lutea.* Another very striking weed is *Orthosiphon shirensis* that in addition to the spike of blue-mauve flowers, not too attractive, carries a tuft of purple bracts at the end of the spike. There are two Fox-glove-like annuals that belong to the Pedaliaceae,—*Ceratotheca triloba* and *Sesamum radiatum.* We have many members of the Amarantaceae, one, spreading, with white flower heads having the centre pink; a wild white Scabious, a Sun Daisy, *Berkheya zeyheri,* yellow

flowers with narrow foliage, and many forms of Asclepias. But what is most noticeable in season are the *Gloriosa* in variety, this is the National Flower, (the Flame Lily as it is popularly called), of the Rhodesias, and my son and I have found so many variations that we are devoting a good slice of our garden for a *Gloriosa* plot. The Pineapple Lily *(Eucomis)* is a mere curiosity, *Moraea* (Irideae) are pretty and so far we have only collected one Scitamineae worth cultivating, *Cienkowskia* very close to *C. kirkii.* I hope by the time another letter is due from this part of Africa I will have more interesting news to give.

Editorial Notes.—In the case of the cultivated large-flowering *Gladiolus,* the plants have become much too large and coarse, although the colors are bright and clear. Many have abandoned these large cultivars. Mr. Percy-Lancaster states that the local Rhodesian gladioli are miniatures and not interesting. Might it not be possible to develop a new race of miniature hybrid gladioli that one could live with?

Lantana is notorious for its abuse of the hospitality extended by adopted lands. This is true in Hawaii, and elsewhere—in Southern Rhodesia also. *Lantana camara* L. (which is apparently the species that Mr. Percy-Lancaster refers to) is native to Tropical America, north to Texas and southern Georgia. In Florida, the writer noted that it was kept in check by natural enemies. Thus it might be possible to control *Lantana* in adopted lands by biological control—introducing its natural enemies. In Hawaii counter pests have been introduced for the control of *Lantana.* See page 83, Elton—Ecology of Invasions (1958), John Wiley & Sons, New York.

LETTER FROM THE ORGAN MOUNTAIN REGION, BRASIL

[The following excerpts are taken from a letter, dated Sept. 7, 1960, from Mrs. Anna Abendorth, who lives in Teresópolis, Brasil, to Dr. Joseph C. Smith, of La Mesa, Calif.]

At long last the *Amaryllis calyptrata* seeds burst their pods. I am including herewith only a few. The bulk will follow along with the bulbs I hope to send soon. That is, as soon as they stop putting out new leaves. We have had a rather rainy season . . . The bulbs simply won't rest and are not reducing weight.

In your letter of June 10 you ask if we live near from where the *Amaryllis calyptrata* grows in its wild state. By car we reach virgin forest area in about 10 minutes. A new road is being cut through that particular part of the forest. Friends have taken us several times lately . . . to go collecting plants (orchids and bromeliads chiefly). There were so many *Amaryllis* on the trees that had been cut down, it was a pity to think that they all would go to waste. I took home a few bulbs thinking of you. I shall gladly mail them if you wish, in addition to the

ones I am going to send anyhow, that is another small basket like the one I sent before, not weighing over 300 grams. I will send more if you will pay the postage, which is the only expense I have. But please, don't send money. If it is alright with you, I will rely on you to pay my Audubon Membership (U. S. $6.50) due around the first of next year. Exchange is about Cr. $180.00 to the U. S. $. You will see from the number of stamps on this letter that postage dues have increased for us, almost doubled, on account of continued decreases of the value of the xx cruzeino.

Teresópolis is an hour and forty minutes by car from Rio, just back of the Organ Mountains, 900 meters above sea level. It used to be only a very small town until recently when a direct road was built (in part cut into rock) down to the Capital. Formerly, to go to Rio, we had to go first to Petropolis, an older town also in the coastal mountain range and former summer residence of the Imperial family, and from there down to Rio. It took 3 hours. Years ago we had a direct railway to Rio. Part of it was dented. The trip also took 3 hours, at least on the time table. Actually it took 4 to 5 hours. The new road was a great improvement and has drawn a great number of visitors to our town. New restaurants and hotels were built and also apartment houses, in addition to whole new sections of summerhouses. Those who can afford it spend Sundays and vacations up here where the climate is always pleasant, away from sweltering Rio. World famous is our Organ Mountain National Park, a reservation, at least it was intended to be that. But where many people come, nature is never the same after a while.

I don't think unknown *Amaryllis* species live in the Organ Mountains.*

We are not really in the coffee area—too high. They used to plant coffee in the lower regions of the State of Rio de Janeiro in slave days. Rio coffee has a slightly bitter taste and is not much appreciated. I have seen coffee plantations in the State of S. Paulo, interior. In bloom they are wonderful, miles and miles of rolling country covered with "Christmas" trees. The perfume of the flowers is most impressive. Of course, I have a coffee tree in the garden, as a reverence to the plant that has pulled Brasil out of many difficulties. I even collect berries, hand-treat them and send the beans to our family in the Russian section of the Old Country.

I have not been to Brasilia and don't intend to go. I am sore about her on account of the drastic hardships her cost is putting on all who are not directly profiting from the enterprise. In my opinion there is no sense in putting a capital far away from anywhere in a region that isn't fit to live in on account of the strong winds and barren soil. You should

* Besides **Amaryllis calyptrata,** there are records that **Amaryllis striata, A. correiensis** (vars. **correiensis** and **compressa**), have been collected from the Organ Mountains; search should also be made for **Amaryllis reginae, A. belladonna** L., **A. reticulata,** and **A. psittacina.—Hamilton P. Traub**

[ORGAN MTS. LETTER, continued on page 35.]

1. REGIONAL ACTIVITY AND EXHIBITIONS

OFFICIAL NEW ORLEANS AMARYLLIS SHOW, 1960

MRS. A. J. HAYDEL, *Chairman*

The 12th. Official Amaryllis Show at New Orleans, with the theme "Vacation Dreams," sponsored by the Garden Circle, affiliated with the American Amaryllis Society, The Federated Council of New Orleans Garden Clubs, and The Louisiana State Federation of Garden Clubs, was held April 9-10, 1960 at Eleanor McMain School. Forty eight Garden Clubs and ten Junior Clubs participated in the arrangements. Seventeen Garden Clubs, twenty outsiders, and four schools participated in the horticulture division.

Mrs. A. J. Haydel was Show Chairman, Mrs. John Klein Jr., Vice Chairman and Mrs. W. J. Perrin, Honorary Chairman.

The arrangements were judged by six accredited judges and the horticulture entries were judged by twelve Amaryllis judges.

Mrs. Walter Duplantier of "Bud and Blossom" received the Silver Tray for the most outstanding arrangement, titled "Garden of the Gods" which was the Award of Distinction. Mrs. Vernon Grundmann of the Oak Vista Garden Club won a Silver Tray in the Tri-Color division

Fig. 2. Official New Orleans Amaryllis Show, 1960. *Left,* registrars at the Show; *right,* some prize-winning exhibits. Photos by Mrs. A. J. Haydel.

titled "Charm of the Orient." Miss Jerry Van Hennel of Perriwinkles Jr. Club won the Gold Cup titled "Old West Frontier Land." Mrs. Henry A. Ecuyer won the blue ribbon in the Formal Corsage division titled "Bon Voyage!", Mrs. Margaret Mistretta won the blue ribbon for the Informal Corsage titled "In Orbit!"

Mrs. James Hyde won the Ludwig's Challenge Cup for the best Ludwig specimen, 'Ludwig's Scarlet.' She, also, won The Reuters Trophy for the most outstanding specimen of the show, 'Ludwig's Scarlet.' Mrs. W. J. Perrin was runner-up with second best specimen, 'Bouquet,' Mrs. John Klein Jr. won the Klein award, a Silver Ice Bucket as Sweepstake winner of the Dutch entries in the show with seventeen blue ribbons.

The Garden Circle won the Club ribbon for the most blue ribbons in the show.

Mrs. Harry St. John won the Harry St. John Memorial Challenge Cup for the most outstanding registered American Hybrid 'Harry St. John' (St. John 1957) also the Sweepstake Gold Cup.

Master Doan Madinas won the Gold Cup in the Junior division for the most blue ribbons and Master Paul Baxter was runner-up.

"Mc Donough #7" won the trophy for the most blue ribbons in the school division.

There were six invitational arrangements displayed on pedestals, by Guest Artist, Non-Competitive, who were Mrs. C. L. Sparkman, "Egypt, Land of the Sphinx". Mrs. Charles Hardie, "Hawaiian Holiday, Beach at Waikiki"; Mrs. A. L. Herberger, "Painted Desert"; Mrs. M. A. Bradburn, "Chinatown U. S. A." Mrs. Harry W. Brown, "Crescent City".

The following American Amaryllis Society awards were made: 'Stripped Beauty' (Warmenhoven), Award of Merit, exhibited by Mrs. John Klein Jr. 'Bouquet' (Ludwig) Award of Merit; exhibited by Mrs. W. J. Perrin. 'Harry St. John' (St. John) Award of Merit; exhibited by Mrs. Harry St. John. Most promising crossed Dutch seedling, Award of Merit; exhibited by Master Paul Baxter.

There were over 350 entries in horticulture. Over 700 attended the show including a number of visitors from out of state such as Texas, Kansas, Mississippi, Alabama, Pennsylvania, Georgia, Tennessee, and Minnesota.

Miss Lynn Latapie and Miss Shoran Jacobs were registrars.

8TH GREATER GULF AMARYLLIS SHOW, 1960

W. C. Strain, *General Show Chairman,*
Mobile, Alabama

The Amaryllis Society of Mobile staged their Eighth Annual Greater Gulf Amaryllis Show April 30th and May 1st, 1960 in Mobile, Alabama. This is an Official Amaryllis Show staged under the standards of the American Amaryllis Society.

The theme of the show was "Amaryllis Circle Round" which was carried out with an eleven foot white ferris wheel with eight baskets of dozens of amaryllis as the focal point.

A total of three hundred and twenty two entries were in competition as follows: 88 potted, 151 cut, 52 arrangements, 28 art exhibits and 3 hobby exhibits. A very interesting education exhibit at which cultural information was distributed drew considerable attention.

A new division for new unnamed seedlings and clones was included in the schedule for the first time this year.

Fifteen accredited judges from Hattiesburg, Miss., Pensacola, Fla., and Biloxi, Miss., judged the show. A total of thirteen sterling silver awards were made.

Many visitors and friends from nearby towns and cities swelled the attendance to approximately 1200.

The general show chairman was W. C. Strain, who was assisted by W. R. Lowe and Harry E. McCarn as Co-Chairmen.

MEN'S AMARYLLIS CLUB OF NEW ORLEANS OFFICIAL 1960 SHOW

SANTO N. CUSHINOTTO, *Corresponding-Secretary-Treasurer*

The Third Annual Show sponsored by the Men's Amaryllis Club of New Orleans was held March 26-27, 1960 at the Wm. C. C. Claiborne School. Mr. E. Authement was the chairman of the show, with Mr. Santo N. Cuchinotto as co-chairman.

Many firsts were introduced in this show, open to all garden clubs and to the public for competition. It was the First Official All-Horticultural Amaryllis Show, actually the only all-horticultural, show in the New Orleans area. It was the first time a display of single blooms of registered amaryllis was featured. Last but not least the first time a prominent amaryllis grower was presented to the public of New Orleans, namely, Mr. Leon Boshoff-Mostert, of Balfour, South Africa.

Fig. 3. Men's Amaryllis Club of New Orleans Official 1960 Show. Mr. Santo N. Cushinotto, Co-Chairman, at the winners' table: *left to right,*—Mr. W. Perrin's American Tri-color award; Mr. A. J. Haydel's Dutch Tri-color, 'Bouquet', and Mr. W. Latapie's 'Ludwig's Scarlet', best single bloom.

The nine amaryllis judges awarded gold cups as follows; Tri-Color in Dutch Hybrid Class—Mr. A. J. Haydel; Tri-Color in American Hybrid Class—Mr. W. J. Perrin; Sweepstakes in Dutch Class—Mr. Walter Latapie; President's Trophy, for most blue ribbons won by a member of the Men's Amaryllis Club—Mr. W. J. Perrin; Best single bloom—Mr. Walter Latapie. Mr. Santo N. Cuchinotto was runner-up to Mr. Latapie and Mr. Perrin for the top awards. American Amaryllis Society Awards of Merit were presented to Mr. Latapie for 'Ludwig's

Scarlet', and Mr. A. J. Haydel for his 'Bouquet'. The usual ribbons were awarded for first, second and third place winners.

The showing of Dutch, American, and dwarf Amaryllis, both registered and unregistered, with some un-named varieties, was viewed by many guests. An educational display, along with literature, on the propagation and care of Amaryllis, was another feature of the show.

New Orleans is a city with over 100 garden clubs, many featuring one kind of flower, and the competition is great for presenting the best show. Despite adverse weather conditions, and other factors the show has been termed the best that the Men's Amaryllis Club of New Orleans has presented in its three years of existence.

THE HATTIESBURG AMARYLLIS SOCIETY

Due to the unusually cool weather from February through April, it was necessary to cancel the 1960 Show of the Hattiesburg (Miss.) Amaryllis Society. In place of the show, plans were made to show the Amaryllis blooms in nine down town stores, including also the two largest banks.

Plans are however being made to stage a regular Amaryllis Show next season. The date has been set for April 22-23, 1961.—*Mrs. Sam Forbert, Show Chairman.*

FIRST OFFICIAL SHOW OF THE HOUSTON AMARYLLIS SOCIETY 1960

Mrs. A. C. Pickard, *Show Chairman;* Mrs. W. S. Wheeler, *Honorary Chairman;* Mrs. Frank S. Bova, *Vice Chairman;* Mrs. Chas. E. Pease, *Staging Chairman;* Mrs. Henrietta Taylor; *and* Mrs. R. A. Fawcett.

There seems to be a great increase in the interest of gardeners in the Houston, Texas, area in growing the Dutch hybrid Amaryllis and species. This was reflected by the first Official Amaryllis Show held in Houston, Texas, April 26-27, 1960, under the sponsorship of the Houston Amaryllis Society, organized in 1957 by Mrs. A. C. Pickard, Judging instructor for the Amaryllis Judging certificate of the American Amaryllis Society.

The Houston Amaryllis Society is affiliated with the American Amaryllis Society, National Council of State Garden Clubs, and Texas State Garden Clubs, Coastal Prairie District IV.

All phases of the show were evidence that the monthly meetings of the Society are rapidly achieving its purpose of promotion and stimulation of knowledge about the cultivation and appreciation of *Amaryllis.*

More than 200 entries were exhibited in conformity to division standards (including sub-divisions). The color variations were classified within each division and sub-division. The cut specimens were all exhibited in uniform containers covered with green paper. The potted

specimens growing in clay pots were not covered by any detracting material.

The educational exhibit on methods of propagation of *Amaryllis* met with public approval. Many flower scapes displayed in their respective color groups, among ferns and palms with an oriental pottery figure as a central axis, gave the garden effect. A section of the show was devoted to arrangements with *Amaryllis* flowers predominating to perfection.

Several hundred visitors viewed the displays, and paused to comment on the varied Dutch named hybrids, and seedlings hybridized and propagated by members.

American Amaryllis Society awards were made—Award of Merit for "Salmon Joy" (Ludwig), the most outstanding potted horticultural specimen, was made to Mrs. W. S. Wheeler. Also the silver trophy was awarded by the Houston Amaryllis Society for the best potted specimen to Mrs. Wheeler.

Mrs. A. C. Pickard received American Amaryllis Society award for an unusual solid pink first year bloom seedling—also second highest award for "Queen of Pinks" (Van Meeuween).

Mrs. Walter Wells won high score in the Gracilis class, Mrs. Frank Bova won high score for American Belladonna type hybrid. Mrs. L. Z. Bean won a high score for named American hybrid 'Cerise Queen'.

In the guest entries, Mr. M. B. Quigles was the high in the class of Dutch seedlings. National accredited Amaryllis judges scored the exhibits.

There were many blue ribbon awards in the artistic division. Mrs. E. L. Bachelor won the tri-color in the Artistic division with an arrangement listed as "Houston in the Spring."

The display will be enlarged and repeated in 1961 with Amaryllis gardens on tour.

Interesting little booklets were given to the visitors to encourage and instruct them in the culture of *Amaryllis* to beautify their homes and gardens and to aid in the beautification of Houston.

OFFICIAL VALDOSTA (GEORGIA) AMARYLLIS SHOW, 1960

The 2nd Official Valdosta, Georgia, Amaryllis Show, under the sponsorship of the Men's Garden Club of Valdosta, and The American Amaryllis Society, was held April 30 and May 1, 1960, at the Crescent.

Top awards were won by Mrs. Leonard Mederer and Mrs. J. C. Poole. Mrs. Mederer won the Tri-Color Ribbon given by The Garden Club of Georgia in cooperation with The American Amaryllis Society for her entry in the Artistic Division, and Mrs. Poole had the outstanding horticultural entry in the show that won the Award of Merit given by The Garden Club of Georgia in cooperation with The American Amaryllis Society, for the best named clone grown in a pot.

Preliminary Commendations for meritorious Hybrid Amaryllis clones were awarded to: Mr. Guy Rice, Valdosta, Ga., for the best unnamed clone grown in a pot; Mr. William J. Culpepper, Valdosta, Ga., for the best entry from the Men's Garden Club; Mrs. O. S. Ware, Valdosta, Ga., for the best entry from the hybridizer's class; and Mrs. Ritchie Rosa, Tallahassee, Fla., for the best unnamed clone grown in a pot.

Blue Ribbons were awarded in the horticultural and artistic classes to a large number of exhibitors.

CORPUS CHRISTI (TEXAS) OFFICIAL AMARYLLIS SHOW, 1960

Mrs. A. S. Meers, *Awards Chairman*

The first Corpus Christi Amaryllis Show, sponsored by the Coastal Bend Amaryllis Society, and the Corpus Christi Council of Garden Clubs, was held on March 26, 1960. The Amaryllis Show was in the nature of a section of the Lola Forrester Flower Show which is sponsored annually by the Corpus Christi Council of Garden Clubs.

There were 26 entries of potted Dutch hybrid *Amaryllis*. Five blue, three red and two yellow ribbons were awarded. One unnamed potted hybrid *Amaryllis* received no ribbon. Three named Dutch cut scapes were exhibited; one red and one yellow ribbon were awarded. One *Amaryllis* species exhibited received a red ribbon. Ten unnamed seedlings were shown, and three blue and two red ribbons were awarded. There were four Belladonna Division entries; one blue and one red ribbon were given. Among 18 of Reginae Division entries, three blue and one red ribbon were awarded. There were a total of 63 entries.

The following American Amaryllis Society awards were made:

Award of Merit to Mrs. H. L. Harris, Corpus Christi, Texas, for the exhibit of hybrid Amaryllis clone 'Apple Blossom'.

Preliminary Commendation (P. C.) to Mrs. H. L. Harris, Corpus Christi, Texas, for an outstanding unnamed seedling #55.

The judges were: Mrs. A. C. Pickard, Houston, Texas; Mrs. L. B. Peckenpaugh, Corpus Christi, Texas and Mrs. Harvey J. Fry, Jr., Corpus Christi, Texas.

THE 'HARRY ST. JOHN' HYBRID AMARYLLIS

Mrs. Harry St. John, *New Orleans, Louisiana*

I would like to tell you about my lovely Amaryllis hybrid and point out its many fine qualities.

In 1955, I attended my first Official Amaryllis Show which was sponsored by the Garden Circle. I brought a scape of four blooms to ask if anyone knew the name of it. After speaking with the late Mrs. La Forest Morton at length, who admired the bloom very much, she said that she had never seen one like it, and asked if the Amaryllis Queen of 1955 could use the scape for the crowning ceremony. This thrilled me very much. Later, I asked Mrs. Morton if she would try to find out something about the hybrid. I had grown it for over 30 years as a

garden plant—potted for the Show exhibits. Evidently it could not be assigned to any named clone, and thus it was open to be named. In the Amaryllis Year Book (Herbertia) of 1958, page 54, it was named in honor of my husband.

In 1956, I entered my first Amaryllis exhibit in the Official Amaryllis Show staged by the Garden Circle, and was very proud when I won top honors. Would like to mention that I sent a bulb and a scape

Fig. 4. Awards received by Mrs. St. John for the Hybrid Amaryllis clone 'Harry St. John'. See text for details about ribbon and tricolor awards.
Top row, left, La Forest Morton Cup, 1959.
Top row, right, Garden Circle Amaryllis Show; 11th Official American Sweepstakes Cup, 1960.
Top row, center, 1959 for blue ribbon, small cup.
Bottom row, left, Harry St. John Trophy Cup, 1959; won again 1960.
Bottom row, right, Newsham-Becnel Cup, 1959.

of the clone 'Harry St. John' to our First Lady, Mrs. Mamie Dowd Eisenhower. The scape had won First Prize. I received a lovely Thank You note by return mail saying that she was going to plant the bulb on their Gettysburg Lawn, and would be looking forward to seeing it bloom the next year.

The record of the clone 'Harry St. John' has been written up in Maud O'Brien's column of our City newspaper. Our Garden Circle has used a bloom of the clone 'Harry St. John' since 1955 for the crowning ceremony of the Amaryllis Queen.

I feel proud to report that the clone 'Harry St. John' has won twenty blue ribbons, five Awards of Merit, three Sweep Stakes, two Tri-Color awards, and five Gold Cups, including the Newsham-Becnel Nursery award at the Men's Official Amaryllis Show of 1959. The Harry St. John Memorial Challenge Trophy which I had given to the Garden Circle Club, which, if won three times over a period, or two successive years, which I did, and am proud. See Fig. 4, for ribbons and cups won by the clone 'Harry St. John'. I wish to report that I will again give another Trophy for the 1961 Show.

Amaryllis Year Book Herbertia) of 1958, page 54, it was named in

The clone 'Harry St. John' (St. John, 1958), is a Leopoldii 5-B, length 5½″ in diameter, and 8—9″ across the face, rose red with deep red velvet throat, tepalsegs pointed and reflexed, overlapping past the middle of the flower; plant 22—26″ in height. The stamens are rose red. The flower is delightfully fragrant; foliage evergreen. It will bloom in February if the winter is not too severe, or in March. It produces offsets freely. It usually has four, sometimes six flowers, very rarely only two. It always produces two scapes almost simultaneously from a single bulb, and often blooms a second time later in the year. When the bloom begins to wane, a sweet-scented honey drips from the blooms. Having all this beauty, it still requires so little care for it thrives in the garden. I grow it among the other flowers; it does not like a soil that is too rich. It grows best when planted deeply in a mixture of river sand and ordinary garden soil. On the south side of the house, the scapes are shorter and the blooms are lighter. On the north side, the blooms are much deeper colored, and the scapes are up to 28″ tall, and bloom two to three weeks later.

Would like to report that our past President, Mrs. A. J. Haydel, who works very hard for our Club, made a trip in company with her husband to California. They visited with Dr. Traub, and also delivered a bulb of 'Harry St. John' to him, so that he can grow it in his trial garden. I hope that he enjoys the blooms as much as I do.

It has been awfully nice visiting with you through the Amaryllis Year Book (Herbertia), and I hope to be asked to visit again.

OUR WESTERN TRIP IN 1960

Mrs. A. J. Haydel, *Louisiana*

I had wanted to make a western trip for some time, and fortunately in the spring of 1960, my husband and I motored to the Pacific Coast, with the intention of stopping off at La Jolla, California, for a visit with Dr. Hamilton P. Traub.

Amaryllis growing is my favorite hobby, and in this connection I am a member of the Garden Circle of New Orleans, which stages the annual Official Amaryllis Show of New Orleans. I am a member of the American Plant Life Society and the affiliated American Amaryllis Society, under whose auspices the annual Show in New Orleans is held. I also belong to several other active clubs.

Our first stop was in Corpus Christi, Texas, where we visited Mr. Fred B. Jones and Mr. & Mrs. H. John Harris. The Amaryllis blooming season was past, but we saw the Amaryllis collections. Mr. Jones has a number of Amaryllis species, but at the present time there was not sufficient increase for distribution.

We next visited with Mrs. Morris Clint, of Brownsville, Texas, who has a most interesting trial garden which contains amaryllids and other plants which she has collected in Texas and Mexico, and plants sent in from other parts of the world. She has a number of *Amaryllis* species but the increase has not been sufficient to warrant distribution up to the present. I plan to make a collection of species *Amaryllis* so that one day these may be displayed at the annual Amaryllis Show in New Orleans. However, up to the present, it is difficult to obtain the species. Any help from *Amaryllis* enthusiasts will be greatly appreciated.

During the drive westward through Texas, New Mexico and Arizona the brilliant cactus blooms were much admired; these are quite different from the cacti that we have at home.

On June 10, we arrived at La Jolla, California, and the most interesting visit with Dr. Traub. As we drove up to his place, we noted the beautiful two-story stucco home, and the amaryllids and daylilies.

I had the opportunity of discussing the staging of the Amaryllis Show, and the judging of *Amaryllis* clones with Dr. Traub. The first rules had been adopted in 1934 by the American Amaryllis Society, and these have been improved through the years. Before the last war, these rules had upheld a very high standard for Amaryllis exhibits, but after the war, the many Amaryllis breeders who had taken up war work did not return to Amaryllis breeding, and the high judging standards were no longer used. At this stage the Amaryllis work was taken up by entirely new groups, and in order to attract sufficiently large exhibits, the standards were lowered somewhat temporarily to allow the blue ribbon for scapes with only two florets to the scape as a minimum. By 1960, the new groups had progressed to the stage where the resumption of the high pre-war standards could again be considered, which allow a minimum of three florets per scape for the blue ribbon.

When the new groups took up the work after the war, the hybrid Amaryllis clones produced since the 1930's had not been registered. There were no exact descriptions on record and names could be duplicated. To remedy these deficiencies, our own late Mrs. W. D. Morton, of the New Orleans Garden Circle, began the registration of hybrid Amaryllis clones as the official registrar of the American Amaryllis Society, succeeding the late Prof. W. R. Ballard. She was assisted by her husband, Mr. W. D. Morton, Jr., who has since carried on as the official registrar. Once the great majority of the Amaryllis clones had been registered, the time had again arrived when only registered *named* clones may receive the full American Amaryllis Society awards. *Un-named* seedlings and *un-named* clones may receive Preliminary Commendations before registration.

I asked about the point system with reference to *fragrance* which is not found in most presently registered hybrid Amaryllis. In the past

many more clones had fragrance, but due to the lack of an incentive, the breeders had paid little or no attention to this character after the war. Since the perfect Amaryllis must also have fragrance, the minimum of 2 points was established for this character. Thus, the breeders are again keeping fragrance in mind in selecting new hybrid Amaryllis clones.

I also asked about a *separate class* for exhibits for potted plants, having scapes with *only two florets,* when exhibited in *groups of three* potted plants. In such groups all could be of one kind, or two, or three different kinds. Exhibits in this special class are for show only, and are not to be judged for any regular awards, but could receive special awards which do not count toward sweepstakes and tricolor awards.

The matter of cut florets, singly or two, exhibited in small glasses, was also mentioned by Dr. Traub. These were not recognized under the pre-war rules, and such exhibits are not to receive the regular ribbon or other awards and may be used in decoration only. However, single, two, or several florets may be used with other materials under flower arrangements.

After finishing the discussion on Amaryllis shows, Dr. Traub took us on a guided tour through his garden. The many Amaryllis species had finished blooming except the tiny *Amaryllis blumenavia.* The highlight in his garden in June was the tetraploid daylilies of which he had hundreds in bloom. The tetraploids are named *Hemerocallis washingtonia* and were produced during the past decade by doubling the chromosomes of the diploids, and then intercrossing the tetraploids. The named clones are worth $100 or more per plant; he has donated the whole collection to the American Plant Life Society for its endowment fund.

While we were on the subject of Amaryllis breeding, I told him about the double hybrid Amaryllis that was obtained by selfing. He was much interested in this work and requested that I write something for publication in the Amaryllis Year Book. However, I did not have any photograph of the doubles, but hope to take some next spring for reproduction in the 1962 issue together with an account of the selfing with results.

Although I took some movies of Dr. Traub's place and flowers, I do not have any that could be developed for the 1961 Amaryllis Year Book.

One thing more about Dr. Traub—he seems to have so much energy and never tires of his work. He tries to be helpful in the case of unidentified Amaryllis species.

After leaving La Jolla, we journeyed north as far as San Francisco. I collected a few liliaceous wild flowers in the mountains.

On the way back, we stopped in Houston to visit with Mrs. A. C. Pickard. She does a lot of Amaryllis hybridizing; she is an Official Amaryllis Judge, and is also an Official Instructor for the Official Amaryllis Judge's Certificate. The landscaping of her garden is attractive. Her Amaryllis are arranged by colors and in between she has many different flowering plants that harmonize with the colors of the Amaryllis. She also has a large collection of begonias and ferns.

On the return from the three weeks of motoring through the west, I felt well repaid with the new knowledge acquired by exchanging ideas with Amaryllis growers in other parts of our great Country.

EDITOR'S MAIL BAG

Your Editor had a most pleasant visit with Mr. and Mrs. Leon Boshoff-Mostert, of Balfour, Transvaal, Union of South Africa, April 18—22, 1960. His interest is primarily in the breeding of superior *Amaryllis* hybrids, and her interest is with irises, and daylilies. While in San Diego, Mr. Mostert gave his lecture on Hybrid *Amaryllis,* including a large number of colored slides of his own hybrids. The Mosterts boarded ship for home after touring the United States from coast to coast.

Your Editor enjoyed the most pleasant visit with Mr. and Mrs. A. J. Haydel, of New Orleans, Louisiana, on June 10, 1960, although it was much too short. There were so many *Amaryllis* matters to talk over that the time was hardly sufficient. The Haydels stopped off for the visit while on a tour of the southwest.

On June 10, 1960, Mr. William P. Carpenter, 333 Grove Way, Delray Beach, Florida, who is a research specialist with Floral Acres, Inc., Wholesale Florists, of Delray Beach, Fla., visited with your Editor. Mr. Carpenter is interested in working out the details for the marketing of *Amaryllis* as pot plants. He is also interested in other subjects such as Delphiniums, stocks, etc.

When Mr. & Mrs. Menninger, of Arcadia, Calif., visited Europe for the International Orchid Show in the summer of 1960, they visited the nursery of "Mr. Simon de Goedo in Elst, near Arnhem, Netherlands, who has about one quarter million nerines. Of course, they were dormant, but very well-grown large bulbs."

T. J. Sheehan and K. J. Howe, Assistant Ornamental Horticulturist and interim Assistant Professor of Botany, respectively, University of Florida, at Gainesville, Fla., presented a paper on "A study of some factors affecting *Amaryllis* flowering" at the meeting of the Florida State Horticultural Society, at Miami Beach, Fla., Oct. 29-31, 1957. The paper is published in the Proceedings of the Florida State Hort. Soc. Vol. LXX: 387-389. 1957.

Mr. R. D. Wescott, General Manager, Paul J. Howard's California Flowerland, 11700 National Boulevard, Los Angeles 64, Calif., writes under date of Sept. 12, 1960, that "the firm of Howard & Smith will no longer continue in the nursery business; Mr. Arthur P. Howard, brother of Fred Howard, will possibly continue some *Amaryllis* breeding.

"Our firm, long associated but not directly connected with Howard and Smith, has acquired much of the breeding stock of the H. & S. *Amaryllis,* and will be in production in the near future. This will be under the guidance of Paul J. Howard, another brother. The date of Mr. Fred H. Howard's death was July 15, 1948."

We have learned from a correspondent that a salmon-pink variety of *Vallota speciosa* is cultivated in Cape Province, South Africa. This is apparently var. *delicata* which is reported to have salmon-pink flowers. This should be a welcome addition to the scarlet of the type; and the varieties *alba; elata,* cherry red; and *eximia,* throat white, rest with crimson penciling.

The Ornamental Horticulture Center, of the UNIVERSITY OF SOUTHWESTERN LOUISIANA, COLLEGE OF AGRICULTURE, at Lafayette, Louisiana, was officially opened on November 1, 1960. The welcoming address was given by Dr. Joel L. Fletcher, President of the University; and addresses were delivered by Dr. F. P. Cullinan, of the U. S. DEPT. OF AGRIC., and the Hon. Bona Arsenault, Minister of Lands and Forests, Quebec, Canada.

Your Editor enjoyed a visit from Dr. & Mrs. Robert F. Hoover, of San Luis Obispo, Calif., on Oct. 16, 1960. Dr. Hoover is the world authority on the BRODIAEA LILIES, which include among others, *Tripeleiopsis, Triteleia, Dichelostemma,* and *Brodiaea,* which have been monographed by him. Dr. Hoover received the 1955 Herbert Medal for his outstanding work on these genera (see PLANT LIFE, 1955).

It saddens us to report the death of Mrs. Sydney Percy-Lancaster at Salisbury, S. Rhodesia, Aug. 11, 1960. We extend condolences to Mr. Percy-Lancaster in his very great loss.

THE NATIONAL AMARYLLIS JUDGES COUNCIL

Mrs. B. E. Seale, Chairman,
4036 Prescott Ave., Dallas 19, Tex.

Mr. W. D. Morton, Jr., Secretary, and Registrar of Amaryllis Names,
3114 State Street Drive, New Orleans 25, La.

OFFICIAL AMARYLLIS JUDGING INSTRUCTORS

Mrs. A. C. Pickard,
1702 N. Blvd., Houston, Tex.

Mr. W. C. Strain,
563 Mohawk Street, Mobile, Ala.

Mrs. A. J. Haydel,
516 Gordon Ave., New Orleans 23, La.

Mr. Robert E. Parker,
3051 Baronne St., Mobile, Ala.

Mrs. Sam Forbert,
117 N. 23rd Ave., Hattiesburg, Miss.

———— *
Corpus Christi, Tex.

Mr. & Mrs. Guy Rice,
606 Gornto Road, Valdosta, Ga.

* To be appointed later.

The Chairman, and Secretary of the Council function also as Official Instructors.

EXAMINATIONS.—Those desiring to take the examination for the Official Amaryllis Judge's Certificate should preferably apply to the

nearest Official Instructor for details about taking the examination. All completed examination papers are to be submitted to the Secretary of the Council for the issuance of the American Amaryllis Society's Official Amaryllis Judge's Certificate. Papers are graded at the Society Headquarters and are kept in a permanent confidential file.

All who have passed the examination receive the Official Amaryllis Judge's Certificate; and they remain official accredited judges and members of the Council as long as they remain members of the Society.

See PLANT LIFE, vols. 13 through 17 for the roster of those who have passed the examination from 1957, when the Council was founded, to the present time.

LOCAL AMARYLLIS JUDGES COUNCILS.—Local Councils are authorized. The first one has been organized by Mrs. Pickard and associates in the Houston, Texas, area.

METHODS OF INSTRUCTION.—Official Instructors are authorized to make up their own instruction courses, always on the basis of the schedule, scale of points, and rules as approved by the American Amaryllis Society.

AMARYLLIS JUDGES CERTIFICATES

Since the last report in the 1960 AMARYLLIS YEAR BOOK (pages 27—28), the following AMARYLLIS JUDGE'S CERTIFICATES have been issued by the AMERICAN AMARYLLIS SOCIETY:

87. Mrs. Frank B. Burns, 8515 Pritchard Pl., New Orleans 18, La.
88. Mrs. R. L. Morgan, 2311 Grant, Houston, Texas.
89. Mrs. R. H. Schmuck, 10707 Shallowbrook Lane, Houston, Texas.
90. Mrs. L. A. Dusek, Box 431, Cameron, Texas.
91. Mrs. A. E. Neumann, 543 Herring Ave., Waco, Texas.
92. Mr. Kermit L. Warnash, 4018 Drummond St., Houston, Texas.
93. Mrs. A. J. Haydel, 516 Gordon Ave., New Orleans 23, La.
94. Mrs. A. L. Hammond, Route 1, Box 278, Angleton, Texas.

REVISED SHOW SCHEDULE FOR OFFICIAL AMARYLLIS SHOWS

I. HORTICULTURAL SECTION

1. Registered named clones, unnamed clones and seedlings, must be judged according to the specifications as to form and color in the Official Divisions of cultivated Amaryllis, Nos. 1 through 9 (see Traub—Amaryllis Manual (1958), Divisions 2 through 8, pp. 70—91 (hybrids); and Division 1, pp. 19-35; 252-299 (species)).

2. The Award of Merit (A.M.) may be awarded *only* for meritorious registered named Amaryllis clones and the Preliminary Commendation (P.C.) may be awarded for meritorious registered named clones, and to unnamed clones and seedlings exhibited by breeders.

3. The usual ribbons—1st, 2nd, 3rd and honorable mention—may be awarded for qualified exhibits of registered named clones, and also *to breeders* for unnamed clones and seedlings.

TABLE 1. SCORE CARD FOR AMARYLLIS (SCALE OF POINTS)

Character scored:	Method of rating	Possible score: single cut specimen	Possible score: potted plants: one or more scapes
1. Perfection of flower shape	Rating is to be strictly within the division standard on the basis of beauty of form.	15	15
2. Conformity to flower color standard	No flower of inferior color is to be considered. Whenever possible rating is to be on the basis of a verifiable color standard (chart) in order to avoid errors due to differences in individual color preception	45	35
3. Flower size	Since flower size is dependent on the flower division, the sizes recognized in the particular division concerned should govern.	15	15
4. Length and character of scape (stalk)	The length of the scape should be considered in relation to the size of the flowers	5	5
5. Number of flowers per scape and number of expanded flowers (number of flowers per scape includes unexpanded and expanded flowers)	Only 3- or more-flowered scapes are eligible. For two *expanded* flowers per scape, allow 3 points; for three, allow 5, for four or more, allow 6 points. In miniatures, 2- or more-flowered scapes are eligible; allow 4 points for two expanded flowers; 6 points for three or more.	6	6
6. Number of scapes per plant	This category applies only to potted plant exhibits. Allow 8 points for one scape; 9 points for two scapes; 10 points for three or more scapes.	—	10
7. Fragrance	Allow 2 points for fragrance, not too faint or too strong; deduct 2 points if fragrance is lacking.	2	2
8. Foliage	This category applies only to potted plant exhibits; for foliage absence deduct 2 points; for foliage not much developed, allow 1 point; for well developed foliage, allow 2 points.	2	2
9. Condition of exhibit	Exhibits in prime condition are to receive the full allowable points; those failing to come up to standard are to be penalized accordingly	10	10
	Total possible score	100	100

4. Potted plant, and cut scape exhibits, with 3 or more florets per scape (umbel), under 2 and 3 above, are eligible to receive the PC and AM awards, and ribbon awards, which may be counted for the highest number of points toward the higher ribbon or other prize awards. The P.C. award is to count 1½ times, and the A.M. award is to count twice, the number of points allowed for the blue ribbon, toward the higher ribbon and other prize awards.

5. Breeders may exhibit unnamed clones and seedlings in the Breeder's Class as potted plants or cut scapes, and may receive the regular ribbon awards, and the Preliminary Commendation (P.C.) award if merited.

6. The exhibits under Division 1, Cultivated wild *Amaryllis* (D-1), from Brazil, Peru, Argentina, Bolivia, etc., are to be judged according to the descriptions of the species and varieties in Traub Amaryllis Manual (1958), pp. 19-35; 252-299.

7. The exhibits under each of the 8 Divisions—Long-trumpet hybrids (D-2); Belladonna hybrids (D-3); Reginae hybrids (D-4a & D-4b); Leopoldii hybrids (D-5a & D-5b); Orchid-flowering hybrids (D-6); Double hybrids (D-7); Miniature hybrids, (D-8); and unclassified hybrids (D-9)—may be grouped under each Division without reference to the country of origin, or they may be separated into classes by countries of origin—American Hybrids, Dutch Hybrids, South African hybrids, India hybrids, etc.

8. There may be a class for non-registered named clones, but such entries cannot compete with the registered clones. Such non-registered clones may receive ribbon awards *of different color* from the regular ribbon awards. Such different ribbon awards cannot be counted as points toward the higher ribbon or other prize awards.

Consult Mr. W. D. Morton, Jr., 3114 State Street Drive, New Orleans 25, La., the Official Registrar, about names of such un-registered named clones. If un-registered names used are already occupied by registered clones, then it will be necessary to rename such un-registered clones.

II. FLORAL ARRANGEMENTS SECTION

Floral arrangements may be staged at Official Amaryllis Shows, but this is not a necessary requirement. The choice is with the Show Committee.

1. The regular type of floral arrangements that incorporate Amaryllis flowers and leaves together with other materials are eligible, and as such may receive ribbon awards, and any other higher awards usually provided.

2. Potted plant and cut scape exhibits with two florets per scape (umbel), may be entered in groups of three or more as a display. Such

group exhibits may receive special awards that do not count as points toward the higher ribbon or prize awards.

3. Displays in glasses of single florets cut from the umbel, in groups of 3 or more, may be exhibited as floral arrangements. Such group exhibits may receive special awards that do not count toward higher ribbon or prize awards.

PRESENTATION OF HERBERT MEDAL, 1960

Prof. Ira S. Nelson, faculty member of the UNIVERSITY OF SOUTHEASTERN LOUISIANA, Lafayette, La., was presented with the 1960 WILLIAM HERBERT MEDAL at a meeting of the HOUSTON AMARYLLIS SOCIETY, Friday evening, January 16, 1960, at the Garden Center. [Fig. 5] The

Fig. 5. Presentation of the 1960 HERBERT MEDAL by Mrs. A. C. Pickard in behalf of the AMERICAN AMARYLLIS SOCIETY to Prof. Ira S. Nelson at the Jan. 16 Meeting of the HOUSTON AMARYLLIS SOCIETY. Photo by Andrew A. Hanson.

presentation was made on behalf of the AMERICAN AMARYLLIS SOCIETY by Mrs. A. C. Pickard, of the HOUSTON AMARYLLIS SOCIETY. As the guest of the evening, Prof. Nelson spoke on his exploration trips to South America, and showed lantern slides of the many plants that he collected. The reader is referred to the 1960 issue of the AMARYLLIS YEAR BOOK for the autobiography of Prof. Nelson.

[ORGAN MTS. LETTER, continued from page 18.]

hear the wails of those who are forced to live there or lose their jobs . . . Still, I admit Brasilia is an interesting venture and probably worth while seeing for those who can afford it.

I shall soon send the bulbs before it gets too cold where you live.

[In an additional letter to Dr. Smith, dated Sept. 19, 1960, Mrs. Abendroth writes about other interesting matters.]

To-day I air-mailed you a small basket containing two *Amaryllis calyptrata* bulbs and seeds of this same species.

These two bulbs we collected in the wilds, on felled trees, some six weeks ago.** In our mountain rain forest, this *Amaryllis* grows often in a crotch of a tree, and sometimes in the layer of humus that covers the forest floor.

In the garden it does well in ordinary soil, in half shade. It blooms during the dry season, June to August. Its No. 1 enemy is the grub of a *Castnia* butterfly (black with large yellow or orange spots, flying very rapidly, in the evening). The butterfly lays its eggs (I counted 250) on the underside of the leaves. After hatching, the grubs will eat their way down the leaves into the bulb and hollow it out. The grub is black and has white rings and an orange head. It, or perhaps the *Amaryllis,* seems to contain some kind of poison, for when I fed its grubs to swiftlets, I was raising at the time, the little birds got limp. They later recovered on mealworms.

The bulbs I have in the garden, and that flowered last season and produced the seeds, are nearly twice as large as the ones I sent and are still full of sap. Each weighs over 500 gms. The parcel I mailed to you should not exceed that much.

** Thousands of **Amaryllis calyptrata** were brought to the ground when the trees were felled to make a highway.

AMARYLLIS ARTICLE AND PAINTING

In the November 1960 House Beautiful (pages 242-243; 253-254), Wyndham Hayward discusses the culture of Hybrid *Amaryllis.* This article is accompanied by a reproduction of a colorful *Amaryllis* painting by Gene McComas.

Fig. 6. **Amaryllis reticulata** var. **striatifolia** as grown by Douglas D. Craft, Chicago, Illinois, in 1959. Drawing by Douglas D. Craft.

2. SPECIOLOGY

[EVOLUTION, DESCRIPTION, CLASSIFICATION AND PHYLOGENY]

AMARYLLIS RETICULATA VAR. STRIATIFOLIA; AND HYBRID, 'MRS. GARFIELD'

DOUGLAS D. CRAFT, *Illinois*

On the 12th May 1958, the author received three blooming sized bulbs of *Amaryllis reticulata* var. *striatifolia* from Mulford B. Foster. They were planted in a soil mixture containing three parts leafmold, one part garden soil, five parts torpedo sand, one rounded tablespoon of bonemeal and one-half additional part sand. A wooden tub was used, eight to nine inches in diameter and seven to eight inches in depth. The tub was filled 1/3 full of drainage rock. To this was added a layer of sphagnum moss and then a layer of sand. Then was added the soil mixture described above and the bulbs were buried to their neck as they would seem to have been previously growing.

The tub is sunk outside during the summertime in the garden to its rim. Bright light but no sunlight is allowed to strike this species at any time during the day. In the past sunlight has seemed to "burn-down" all the leaves on this *Amaryllis*. The author waters this *Amaryllis* quite generously all through the year using discretion, however, when the plant would seem to be in semi-dormancy.

In the first part of October 1959, one bulb started to show a bud which indeed was a thrilling discovery. The one bulb bloomed on Thanksgiving Day—three flowers per umbel, two flowers in bloom at once, the third blooming as one began to fade. It was a lovely red-purple bloom with heavy netting and veining of a deeper red. These were hand pollinated but did not mature seeds.

This one flowering bulb, in the tub of three bulbs, had consequently stood dormant for almost a year when in August 1960 leaf growth started again. Three small offsets were produced in the past year. The early summer, late spring of 1959, all three bulbs showed vigorous and hardy leaf growth. The summer of 1960 very little growth has occasioned except that for the offsets—although there were regular two week feedings of "Spoonit" and liquid fish emulsion.

Conclusions to be drawn are that this is a most temperamental and sensitive *Amaryllis* species. It demands almost absolutely perfect drainage and would seem to enjoy generous waterings, and rather rich, probably forest, soil. Further growing over the years and experimentation may give some answers. Should this species be buried in the soil, should the bulb rest on the top of the soil, or should bulbs be buried to their neck as the author has been growing them? Reports of successes of other growers with this species would be gratefully received.

In addition, the author has two bulbs of the *Amaryllis reticulata* var. *striatifolia* hybrid—'Mrs. Garfield' imported from Calcutta last year. They were each potted separately and grew extremely verdantly last

year even with sunlight. Upon removing to the house for winter, all leaves died down and only now in August of 1960 (after almost a year) do they start to show new leaf growth. It may be that this hybrid goes through very long dormancy periods in this climate. The leaves and flowers of this old hybrid must be lovely and the author would appreciate help from others about growing hints. To date, there has been no bloom.

CRINUM VIRGINEUM

WILLIAM LANIER HUNT, *North Carolina*

The fine white *Crinum* species pictured with my "Notes" in PLANT LIFE: page 101. 1958, has now been identified by Dr. Traub as "near to" *Crinum virgineum* Martinus, in Schultes f., Syst. 7: 885; from south Brasil. I see that I had been hovering over this species in my copy of Herbert, Amaryllidaceae in former attempts to identify it. Dr. Traub says that he once grew *C. virgineum* in Florida in the 1930's but that it never set seeds. What we have may be a clone that requires pollen from another seedling for seed setting.

Apparently, this species might be crossed with its near relative, *C. giganteum*. The latter has evergreen foliage which cannot survive in frost country. Perhaps this method is our best hope for bringing more characters of the tender crinums into hybrids for the colder regions. Bulbs of the deciduous crinums have such a great store of food in them that, if they are not frozen, they will come up in the spring and burst into growth.

A great virtue of *C. virgineum,* aside from its pristine beauty, is the maintenance of the lily-like flowers in an upright position in the hot sun. Many crinums—especially those with the genes of *C. moorei* in them—sulk in the sunshine. They hang their heads down and refuse to open more than half-way in the daytime. For this reason, the majority of crinums that we grow are really effective only in the early morning or in the evening. During the day, they are sad looking indeed.

THE AMBOINA CHALICE LILY, EURYCLES AMBOINENSIS

HAMILTON P. TRAUB, *California*

In the fall of 1950, Dr. Moldenke forwarded to the writer a "flattened ball" of vegetation, apparently representing an amaryllid, that had been received for identification. After this mass of vegetation was soaked in warm water over night and carefully straightened out and re-dried, a fairly presentable herbarium specimen (Traub Herbarium No. 450 (TRA), *Eurycles amboinensis* (L.) Lindl.) was prepared from this unpromising material.

Under date of Oct. 6, 1950, Elizabeth McClintock, Assistant Curator in Botany, California Academy of Science, San Francisco, Calif., wrote

Fig. 7. The Amboina Chalice Lily, *Eurycles amboinensis,* grown in Houston, Texas, from a bulb brought from New Caledonia by a military service-man stationed there after the war. Reproduced from a kodachrome.

as follows: "Some weeks ago I sent a specimen of an Amaryllid to Dr. Moldenke for determination. The specimen, a scrappy thing, had been sent to me by Mr. Edward Teas of Bellaire, Texas, with the explanation that it had been grown by someone in Houston from a bulb brought from New Caledonia by a service-man stationed there after the war. Dr. Moldenke wrote me subsequently that he had sent the specimen to you. Today I received the enclosed kodachrome of the plant which I thought you might be interested in seeing . . . You may keep it as Mr. Teas did not ask to have it returned. I am sorry the specimen was such a poor one."

Fig. 7 is a reproduction of the plant, *Eurycles amboinensis,* in flower from the kodachrome mentioned above.

When the writer wrote to the Teas Nursery a few years ago, Mr. Edward Teas had passed away, and his son could not trace the source of the plant. Thus it was not possible to obtain offsets or seeds of this introduction from New Caledonia(?). It is hoped that this notice will be of service in locating the ex-service man who brought in the bulb since it is important to find out if the bulb was collected in the wild in New Caledonia. If so, then the range of this plant has to be amended to include that habitat. If this illustration with explanation could be published in the Houston, Texas, newspapers, it might be possible to reach the ex-service man.

NATIVE HYMENOCALLIS

CAROLINE DORMON, *Louisiana*

Our native *Hymenocallis* deserve more attention from gardeners for their beauty and adaptability. They are rarely listed in trade catalogs but are advertised in State Market Bulletins as "White Spider Lilies." The name AMERINDIAN CHALICE LILIES, in reference to the native race and the prominent staminal cup, is more appropriate. The chalice is important since it sets the genus apart from *Crinum Americanum* with which it is sometimes confused by the amateurs.

[EDITORIAL NOTE.—The genus *Hymenocallis* is at present divided into two subgenera—(a) subg. *Hymenocallis,* in which the stamens are more or less straight, and distributed from the West Indies to South America, westward to Central America, Mexico and southern Texas, and northward to Southeastern United States as far north as Kentucky and Indiana, and westward to Arkansas, Oklahoma and northern Texas. (b) subg. *Ismene,* in which the stamens are more or less incurved, and distributed in the Andes of South America.

Although Sealy (Kew Bull. 201-240. 1954) has revised the subgenus *Hymenocallis,* his work is based mainly on dried specimens at Kew and the British Museum since he was apparently unaware of the numerous specimens of the southeastern United State species in the Traub Herbarium. These were the result of the extensive field collections of living plants by Mrs. Mary G. Henry. The living specimens were studied in the greenhouse at Beltsville, Maryland, and specimens were preserved.*

* The Holotype of **Hymenocallis palmeri,** by H. P. Traub, Taxon **8:** 195-196. 1956.

Hymenocallis kimballiae Small, emend., by H. P. Traub, Plant Life **12:** 44-46. 1956.

M. E. Jones **Hymenocallis** specimens, by H. P. Traub & R. K. Vickery, Jr., Plant Life **12:** 43-44. 1956.

When this material is brought to bear in a further revision of the genus, it will be possible to arrive at a more nearly definitive picture of the Southeastern United States species of *Hymenocallis*. This is particularly true since Dr. W. S. Flory and

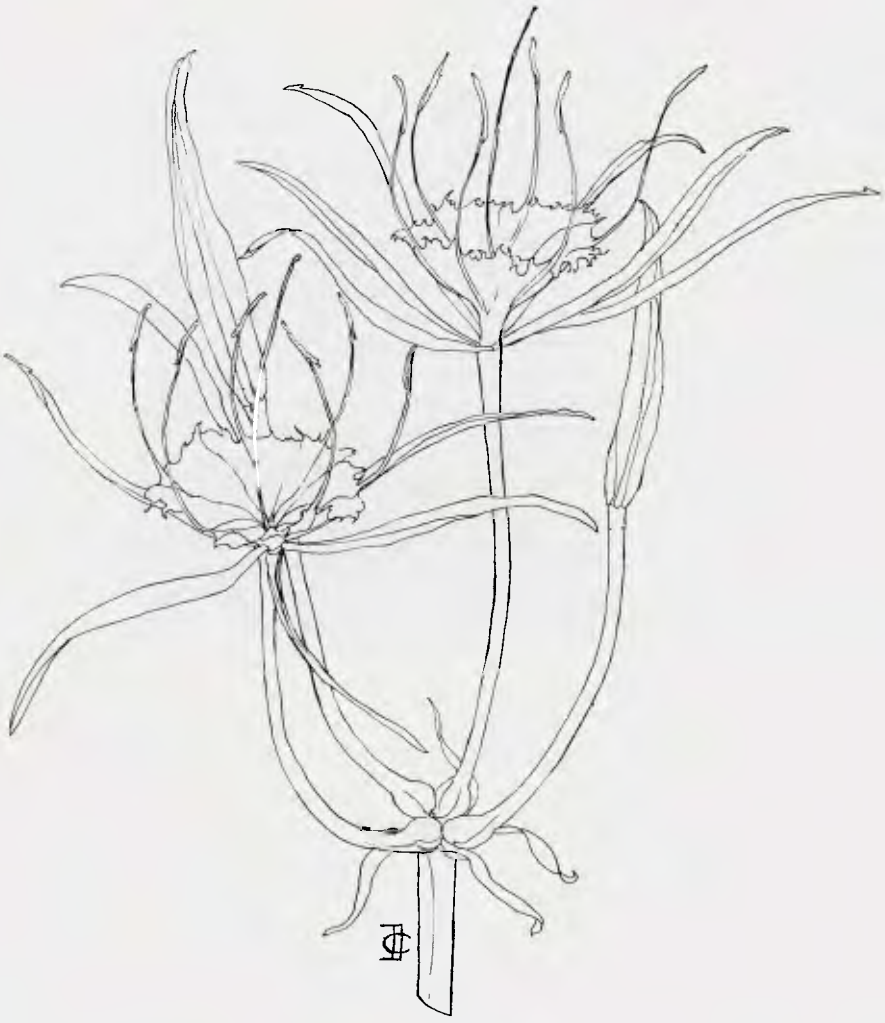

Fig. 8. Amerindian Chalice Lily, **Hymenocallis** sp., from Castor, Louisiana. Flowers white, produced in August. Approx. ½ [0.53] natural size. Drawing taken from **Flowers Native to the Deep South,** by the author.

his associates at Blandy Experimental Farm, Boyce, Virginia, are engaged on a chromosome study of the same material. Living plants of the Mexican species for this project have been collected by Mr. & Mrs. Morris Clint.—*Hamilton P. Traub*]

About thirty years ago, I observed the August-blooming group for the first time. In an open pasture, near Castor, Louisiana, there were

big clumps of these exquisite flowers. I wrote to a reputed authority and also searched every available botany, but *not one* told of a species which bloomed in late summer, long after the leaves had disappeared.

The Castor, Louisiana plant is described as follows:—The broad glaucous leaves, which are quite ornamental, appear in late winter, and die off in late spring. The latter part of August, the showy flowers (see Fig. 8) appear as if by magic. The stems are stout, pale glaucous-green, with an odd twist near the top. They are 2 to 3 feet in height, topped with an umbel of snow-white flowers, each 8 inches from tip to tip of segments. Three segments are folded, three flattened, the latter 1 cm. in width. The staminal cup is 2½ inches in diameter, the edges somewhat lacerate, with sharp points. The flowers are very fragrant, especially at night. This species occurs in heavy soil, near streams that occasionally overflow in spring, but become dry in summer. However, the plants are very adaptable, blooming freely when planted in sandy soil. The leaves and the plant habit will be illustrated in an additional note to be included in the next issue.

The flowers of the spring-blooming species are not so large, but showy when growing in masses. The blooms come with the leaves, which are shining green. Our most widely distributed species, forms a conspicuous feature of the landscape in South-central Louisiana. In April, the sheets of white flowers may be seen from Highway 71, between Lebeau and Alexandria, Louisiana. There is also a dwarf form from the vicinity of Prairieville, with stems only 12 inches in height, and rather narrow shining green leaves. And in Northeast Louisiana there is a much taller species, with flower largest of the spring-blooming forms. All are very fragrant.

Our Louisiana forms may include several species, and we look forward to the further revision of the genus.

Specimens of the local Louisiana *Hymenocallis* species known to me have been sent to Doctors Traub and Flory so that these species may be fully covered in the chromosome studies and the revision of the species. Others in the Southeastern United States are requested by these workers to send in living material to be included in the project.

AUSTRALIAN CHALICE LILY — CALOSTEMMA

HAMILTON P. TRAUB, *California*

Before the last war, *Calostemma purpureum*, *C. purpureum* var. *carneum*, *C. luteum* and *C. album* had been introduced into the United States, but unfortunately due to dislocations of the war, only *C. purpureum* appears to be in cultivation here at present. This brief note is published in the hope that our Australian friends will send us the missing species in exchange for other amaryllids.

Calostemma purpureum R. Brown thrives here at La Jolla outdoors in well-drained sandy loam. It makes upright linear leaves, and blooms in late summer and fall; a single bulb usually produces up to four tall

scapes in succession which arise from the center of the bulb. The flowers are self-fertile and thus the seeds set freely. Although the purple flowers are rather small for such a robust scape, they make a colorful addition to the garden in late summer and fall.

When planted in pots or in clay loam outdoors at La Jolla, *Calostemma purpureum* remains alive but does not bloom. This may be due to the local water supply which is slightly alkaline. At Beltsville, Maryland, in the greenhouse in the 1950's under pot culture, and given the local non-alkaline water, it thrived and bloomed regularly.

Baker (Amaryll., 1888) indicated that the leaves were produced after the flowers but this is not the case under cultivation here where the flowers are produced with the flowers.

The following description of the species is presented for the information of those who are interested in the CHALICE LILIES:

Calostemma purpureum var. **purpureum**

Rootstock a tunicated **bulb; leaves** several, linear, produced with the flowers (in cultivation at La Jolla, Calif.), up to 33 cm. long, green, rather thick, 9 mm. wide at the base, 11—12 mm. wide at the middle, narrowed, rounded at the apex; **scape** solid, spinach green, flattish with rounded edge, sometimes somewhat 3-edged in lower 2/3, 51—66 cm. tall, 9 x 12 mm. diam. at the base, 4 x 6 mm. diam. at the apex; **spathe** 2-valved, lanceolate, 2.3—2.5 cm. long, apex acute; **umbel** many-flowered, flowers fragrant, dianthus purple (HCC-730/3; DCN 254. vivid purplish red), flowers held more or less upright; **pedicels** 1.6—2.6 cm. long; **ovary** roundish, 2.5 mm. long, 3.5 mm.. diam.; **tepaltube** 7—8 mm. long, 2.25 mm. in diam. at the base, 2.5 mm. diam. at the apex; **tepalsegs** spatulate, apex rounded, 1.3 cm. long, **setsegs** 7 mm. wide, **petsegs** 6 mm. wide; **staminal cup** 1 cm. long, two short teeth between the filaments, purplish in lower 2.3, whitish-yellowish in upper 1/3; **filaments** 3 mm long, filiform, **anthers** 2 mm. long, 0.5 mm. diam., **pollen** yellow; **style** white, slightly shorter than the stamens; **stigma** capitate, minute; **fruits** 1-seeded, indehiscent, green overlaid with rusty-reddish in upper part, oblique, usually 10-11-12 mm. long, 10 x 13—11 x 13—11 x 14—12 x 14 mm. in diam, rarely much smaller, 6 mm. long, 5 x 7 mm. diam.; **seeds** oblique, shiny-green, fleshy, placental attachment to one side at the base of the fruit, 9.75—10.75—11.75 mm. long, 9.75 x 12.75—10.75—12.75—11.75 x 13.75 mm. in diam., rarely much smaller, 5.75 mm. long, 4.75 x 6.75 mm. diam.

Specimen: Traub no. 805 (TRA), Aug. 5, 1960, cult. outdoors, La Jolla, Calif.

The genus **Calostemma** was founded by Robert Brown in 1810. At present three species are recognized; all confined to Australia.

CALOSTEMMA R. Brown (Prod. 297. 1810)

Rootstock a tunicated **bulb; leaves** linear or petiolate, produced with or after the flowers; **scape** solid, flowers many in an **umbel,** white, yellow or purple; **tepaltube** narrowly funnel-shaped; **tepalsegs** oblanceolate, spatulate or oblong, equal, ascending; **stamens** inserted at the throat of the tepaltube; filaments united into a **staminal cup** in lower part; free **filaments** ascending; **anthers** small, oblong, versatile; **ovary** by abortion 1-celled; ovules 2—3 per locule; **style** filiform; **stigma** capitate; **fruit** 1-seeded, indehiscent, oblique; **seed** fleshy, green, oblique.

KEY TO THE SPECIES OF **CALOSTEMMA**

1a. Leaves linear:	
2a. Flowers pale to dark purple, or white	1. **purpureum**
3a. Flowers dark purple; tepaltube shorter than the tepalsegs (So. Australia and New South Wales)	1a. **purpureum** var. **purpureum**
3b. Flowers larger, pale purple or white; tepaltube as long as the tepalsegs (So. Australia and New South Wales)	1b. **purpureum** var. **carneum**
2b. Flowers bright yellow: Tepaltube about ½ as long as the tepalsegs; flowers larger than in **purpureum** (Queensland and New South Wales)	2. **luteum**
1b. Leaves petiolate	
Flowers white, conspicuous entire bifid teeth between the filaments. (Gulf of Carpenteria, Queensland and Northern Territory)	3. **album**

FRAGRANCE AND FLOWERING TIME IN HYBRID AMARYLLIS

H. J. N. v. Woesik, *Manager, Ludwig & Company*

[Under date of July 12, 1960, Mr. Woesik writes as indicated below in response to our communication.—*Hamilton P. Traub*]

"Your communication arrived too late for notes on fragrance to be included in our 1960 catalog. By the time it was received, the text of this year's new Amaryllis Catalog was already being printed so that we could not add anything about fragrance, if any is present, in our named *Amaryllis* clones. Some of them indeed have some fragrance, but we never thought much about it. Anyhow, we shall give this serious thought, and add such information in next year's edition of our Amaryllis Catalog. What we have added in this year's edition (which will be published in early August) is the time when our named *Amaryllis* clones flower; that is, the time between planting or potting and the actual production of flowers. This should help a good many Amaryllis-lovers to have our named *Amaryllis* clones in full bloom simultaneously for the Amaryllis Shows."

A MINIATURE AMARYLLID, EUCHARIS FOSTERI

Douglas D. Craft, *Illinois*

This amaryllid was received a short time after receiving *Amaryllis blumenavia* and *A. reticulata* var. *striatifolia* from Mulford B. B. Foster in 1958. Using the same soil formula and potting directions as for above *Amaryllis, Eucharis fosteri* was brought to bloom this June-July (1960) for the first time (Fig. 9). It is easily grown and has increased itself by three offsets already. Its leaves are most ornamental and florets in the umbel opened one at a time. The florets are shaped somewhat like

Fig. 9. Miniature amaryllid, **Eucharis fosteri,** as grown by Douglas D. Craft, of Chicago, Illinois, 1960. Drawing by Douglas D. Craft.

Amaryllis blumenavia, but are smaller. They are pure white; giving a most pristine look to the flower. It is a lovely *Eucharis* and well worth a gardener's loving care. Leaves and flowers both appear almost to be made of wax.

GALANTHIMINE, A NERVE STIMULANT

According to press reports, Mikhail Mashovsky, Head, Pharmacological Dept., Moscow Chemical Institute, has emphasized that the new drug—the alkaloid galanthimine, extracted from the amaryllid *Galanthus woronowii* Losinsk.; see Herbertia 14: 114. 1947 (1948)—is not a cure and cannot restore destroyed nerve tissue, but can be used to stimulate the nerves of polio victims and those suffering from other types of paralysis. (Continued on page 57.)

AMARYLLID GENERA AND SPECIES

HAROLD N. MOLDENKE

[In this department the descriptions of amaryllid genera and species, particularly recent ones, translated from foreign languages, will be published from time to time so that these will be available to the readers.]

Allium cyaneum Regel, (in Act. Hort. Petrop. 3: 174. 1975), var. *stenodon* (Nakai & Kitagawa) Kitagawa in Rep. Inst. Sci. Res. Manch. 6: 120. 1942; in Journ. Jap. Bot. 29: 166. 1954.

Syn.—*Allium stenodon* Nakai & Kitagawa in Rep. First Sci. Exped. Manch. Sect. 4 (1): 18, plate 6. 1934.

Rhizome horizontally creeping, slender, whitish; bulb elongate, cylindric, slightly ovate-swollen at the base, the coat (tunic) dirty-white, mostly dissolved (broken-up) into net-like (reticulated) fibers; stem commonly solitary, to 50 cm. tall, erect but often arcuate at the apex, green, terete, more or less angulate-striate, leafy only at the base; leaves very narrowly linear, flat, supple, shorter than or equaling the stem, green, to 3 mm. wide, gradually acute at the apex, minutely scabrous under a handlens along the margin; capsule-bearing umbels many-flowered, fastigiate or hemispheric; spathe 1-valved, ovate, long attenuate-acuminate at the apex, thin, white-scarious, mostly longer than the pedicels; pedicels green or becoming bluish, 5—9 mm. long, acutely subalate-angular, smooth, naked at the base or bearing minute whitish bractlets; segments of the perigonium blue, elliptic or ovate-elliptic, 4.5—5.5 mm. long, very obtuse, almost entire along the margins, the exterior ones slightly shorter than the interior ones, the mid-nerve more intensely colored; filaments 8—9 mm. long, glabrous, blue, the 3 exterior ones dilated at the base, the 3 interior ones furnished with a lanceolate or broadly lanceolate-triangular acute tooth on both sides; anthers yellow, often becoming bluish, oblong-elliptic. 2—2.3 mm. long; style greatly exserted, whitish, smooth, filiform, not incrassate at the apex; ovary glabrous; fruit unknown.

Japanese common name: ruri-negi, according to T. Nakai.

It grows on the mountain Wu-ling-shan; type collected by Nakai, Honda, & Kitagawa on September 2, 1933.

Allium prostratum Treviranus, in Ind. Sem. Hort. (1821),-Syn.—*Allium satoanum* Kitagawa, in Bot. Mag. Tokyo 48: 92. 1934.

Rhizome horizontally creeping, branched, rather thickened, giving off slender reddish roots; bulb solitary, oblique, ovate-oblong, obliquely rounded at the base, about 1.5 cm. long, 6—8 mm. in diameter, coats membranaceous, the inner ones

whitish and entire, the outer ones becoming reddish, subentire, and more or less irregularly split; stems erect or more or less arcuate at the apex, to 14 cm. tall, 1 mm. in diameter, slender, very obsoletely alate-angled, glabrous, surrounded at the base by the leaf-sheaths; leaves few, shorter than the stem, 1 inner-filiform, obtuse at the apex, slightly more flattened on the upper surface, 1-nerved, 3-ribbed beneath, scabrid-papillose under a handlens along both margins, about 1 mm. wide; spathe scarious, 2-valved, the valves very broadly ovate, slender-nerved, half as long as the pedicels; capsule-bearing umbels many-flowered; pedicels 5.5—6 mm. long, bracteolate at the base, smooth, filiform, the bractlets white-hyaline; flowers campanulate, purple; tepals equally long, 3.5 mm. long, the outer ones elliptic-ovate, rounded-obtuse at the apex, entire along the margin, 1-nerved, membranaceous, the inner ones elliptic-obovate, rounded at the apex, minutely denticulate along the upper margin, 1-nerved, membranaceous; outer filaments manifestly surpassing the tepals, dilated at the base, 1-nerved, entire along the margin, the inner ones broader, scarcely surpassing the tepals, gradually dilated at the base, 1-nerved, entire along the margin; anthers ovate, yellow, dorsifixed; style filiform, glabrous, whitish, 2.5—3 mm. long; stigma capitate-punctiform, scarcely incrassate; ovary obvate-globose, verruculose-scabrous, about 1.3 mm. long; capsule unknown.

Japanese common name: môko-rakkyô (first recorded here).

Type collected by J. Satô in dry meadows at Man-chou-li, Manchuria, on August 20, 1927. Endemic.

Allium tenuissimum L. Sp. Pl. p. 301. 1753. Syn.—*Allium elegantulum* Kitagawa, in Rep. First Sci. Exped. Manch. Sect. 4(II): 98. 1935.

Roots fibrous, simple, becoming darkish, numerous; rhizome creeping; bulbs conic-cylindric, cespitose, few, to 4 mm. thick, the coats membranous, the outer ones dirty-blackish and irregularly split, the inner ones becoming violet and entire; stems erect, straight, very slender, filiform, completely glabrous, very smooth, more or less alate-ribbed-striate, green, leafy only at the base, to 16 cm. tall, as slender at 0.5 mm.; leaves shorter than or surpassing the stem, very narrowly filiform, rather more flattened on the upper surface, few-angular-ribbed beneath, glabrous or slightly scabrous along the margin; capsule-bearing umbels erect, many-flowered, fastigiate; bracts thinly hyaline-membranaceous, 1-valved, almost equaling the pedicel, acuminate-cuspidate at the apex, 4.5—5 mm. long; pedicels smooth, subalate-ribbed, short, naked at the base, 4—5 mm. long; perianth campanulate, 3.5 mm. long; the 3 outer tepals shorter than the inner ones, elliptic, rounded at both ends, white-scarious, 1-nerved, 3 mm. long, 1.8 mm. wide, the 3 inner ones cuneate-obovate, subtruncate at the apex and more or less denticulate, cunneate at the base, 1-nerved, very brightly deep-purple, scarious, 3.5 mm. long, to 2 mm. wide; stamens all shorter than the perianth; filaments white, connate among themselves at the base, the outer ones narrow, slightly dilated at the very base, completely glabrous, 1.7 mm. long, the inner ones narrowed above the middle, completely glabrous, greatly dilated below the middle and minutely-papillose-denticulate along the margin, 2.1-2.3 mm. long; anthers broadly ovate, yellow, about 1 mm. long, the connective extended at the apex into a short obtuse mucro; ovary subglobose, more or less scabrous, purple, 1 mm. long; style white, stigmatiferous at the apex, not incrassate, glabrous, 1.1 mm. long; fruit not seen.

Japanese common name; tigo-rakkyô (first recorded here).

The type was collected by M. Kobayashi (no. 22) on the mountain An-tzo-shan near Hsia-chia-hê-tzu, Manchuria, on August 17, 1934; endemic.

Allium saxicola Kitagawa, in Rep. Inst. Sci. Res. Manch. 2: 288, 1938.—Related to *A. senescens L.* (in the strict sense) and *A. montanum* Schmidt, but easily distinguished from the former by its more slender habit, the rhizome more branched, the stem slender, the narrow leaves surpassing the stem, acute, softer, greenish, the umbels hemispheric, not globose, and the flowers fewer and smaller, and from the latter by the leaves surpassing the stem, more acute at the apex, the umbels more loose, the flowers fewer, and the pedicles longer.

Rhizome horizontally creeping, branched, thick, dark, bearing slender fibrous roots which are simple and pale-fuscous; bulb solitary, almost cylindric, slightly inflated at the base; coats membranous, the inner ones white and entire, the outer ones sordid and irregularly more or less lacerate; stems erect, slender, about 30 cm. tall,

2-edged toward the apex, terete below, greenish, smooth, leafy only at the base; leaves many, shorter or longer than the stem, very narrowly linear, plano-convex, soft, greenish, acute, glabrous on both surfaces, very minutely papillose-scabridous under a handlens along the margin, to 3 mm. wide; capsule-bearing umbels terminal erect, many-flowered, rather densely flowered, hemispheric; spathe not examined; pedicels very slender, angular-alate, more or less scabridous on the angles, few-bracteolate at the base, to 1.5 cm. long, the bractlets minute, white-scarious; flowers rotate, pale-rose; tepals completely glabrous, rather shiny, 1-nerved, narrowly elliptic, the outer ones 4.5. mm. long, the interior ones longer, 5 mm. long, entire on the margin; filaments all toothless, the outer ones subulate, gradually dilated toward the base, 5 mm. long, the inner ones subulate above, rather abruptly dilated below, 5 mm. long; anthers narrowy elliptic, yellow, about 2 mm. long; ovary glabrous, smooth; style filiform, 6 mm. long, glabrous, punctate-stigmatiferous at the apex; capsule 5 mm. long, dark; seeds black, angular-costate, minutely reticulate.

Japanese common name: iwa-rakkyô (first recorded here).

Found in southern Manchuria. The type was collected in rocky places near Lao-hu-tan, prov. Fên-tien, by M. Kitagawa on August 30, 1930, and is deposited in the herbarium of Tokyo Imperial University. It was also collected by M. Kitagawa near Ling-shuei-szu in October 1926, and at the same place by J. Satô (no. 7) in August 1926.

Allium hopeiense Nakai in Jour. Jap. Bot. 19: 316. 1943.—Cespitose-congested; bulb narrow, about 3 cm. long, dark-coated; leaves white-sheathed at the base, truncate at the mouth, the limb flat, narrow, 1 mm. wide, 9—18 cm. long, completely entire on the margin; scape 10—14 cm. beyond the mouth of the sheath, narrow, 1—1.5 mm. wide; bracts hyaline, ovate, 5 mm long, mucronate-cuspidate at the apex; flowers 2—8 per umbel; pedicels 2—3.5 mm. long, glabrous; sepals very broadly ovate, becoming purplish, the midrib deep-purple, 3.5—4 mm. long and wide, concave, rather acute at the apex; stamens 5—6 mm. long; filaments dilated at the base, not winged; anthers 1 mm. long, elliptic, dark-purple; style glabrous, 4.5 mm. long, becoming purplish; stigma punctate.

Japanese common name: hokusi-yamabiru.

The type was collected on the mountain Hsiao-wu-tai-shan, in Hôpeh, China, by Takenaka-Yô (no. 187) in August 1938, and is deposited in the herbarium of the Botanical Institute, Faculty of Science, Tokyo Imperial University.

Allium kungii Nakai, in Jour. Jap. Bot. *19:* 316. 1943.—Rhizome very short, crustaceous; bulbs ascending, narrowly ovate, congested, covered with white membranous coats; leaves sheathing at the base, oblique at the mouth, the limb 9—11 cm. long, flattened or slightly concave, 1—1.2 mm. wide, green; scape 19—25 mm. tall, 1.2—1.5 mm. wide, hollow, very terete; bracts white-membranaceous, very broadly ovate, 4—5 mm. long; flowers polymerous, congested; pedicels 6—7 mm. long; tepals purple, lanceolate, deeply colored on the midrib, 4 mm. long, 1—1.5 mm. wide, slightly saccate at the base; stamens exserted, 5 mm. long; filaments becoming purplish, lanceolate, gradually attenuate above the middle; anthers purple, 0.8 mm. long, versatile; style white, 4 mm. long; stigmas punctate.

Japanese common name: godai-rakkyô.

The type was collected on the mountain Hsiao-wu-tai-shan, in the province of Hôpeh, China, by Takenaka-Yô (no. 190) in August 1938, and is deposited in the herbarium of the Institute of Botany, Faculty of Science, Tokyo Imperial University.

Allium virgunculae F. Maekawa & Kitamura in Acta Phyt. Geob. 14: 148. 1952.—Bulbs aggregate, producing copious stout roots, narrowly oblong, 5—7 mm. wide, 2 cm. long when dry, the outer coats membranaceous, pinkish-white; stem erect, mostly 15 cm. (8—22 cm.) tall, slender, about 0.8 mm. in diameter, terete, striate, glabrous, without leaves; leaves 3—5, spreading, linear, glabrous, dark-green, densely white-punctate, 10—20 cm. long, 1 mm. wide, not hollow; capsule-bearing umbels loosely 2—12-flowered; bracts white, membranaceous, broadly ovate, about 5 mm. long, acuminate at the apex, clasping at the base; pedicels 12—15 mm. long, glabrous; perianth rosy, broadly ovate, 5.5 mm. long, 3—4 mm. wide, obtuse; filaments 6 mm. long, the outer ones simple and subulate, the inner ones dilated at the base and acutely 1-dentate on each side; style long-exserted, 2.5 mm. long;

capsule 4 mm. long, 5 mm. wide, glabrous; seeds compressed, oblong, black, 4 mm. long.

Japanese common name: ito-rakkyô.

The type was collected in wet depressions on Mount Byobu, 100—200 meters altitude, Hirato Island, province of Hidzen, Kiusiu, Japan, by S. Kitamura and M. Tamura on November 15, 1950. It may be distinguished from *A. bakeri* by the smaller bulbs, shorter stems, smaller and not hollow leaves, and fewer flowers.

Allium yesoense Nakai in Bot. Mag. Tokyo 26: 117. 1922.—Related to *A. splendens, A. lineare,* and *A. strictum,* but distinct from all these by its broader leaves, whitish tepals, and shorter filaments.

Bulb covered by reticulated coats; scape 5 mm. thick below and 3 mm. thick toward the apex, hollow, leafy below the middle; leaves 4—7 mm. wide, flat, sulcate at the base; spathe whitish, membranous, very large, slightly shorter than the flowers; pedicels thickened at the apex; tepals ovate, submembranous, whitish, green on the back, 5 mm. long; stamens 6 mm. long; filaments dilated at the base, obtuse; anthers whitish; ovary globose, 3-sulcate; styles simple, shorter than the stamens.

Japanese common name: yeso-rakkyô.

Collected by T. Nakai at Zenibako, province Ishikari, Yeso, in sandy places.

Allium togashii Hara in Journ. Jap. Bot. 28: 62. 1953.—Bulb oblong, 1.5—2.5 cm. long, 6—10 mm. thick; outer coats dark-gray or becoming brownish, finally densely reticulate-fibrous; roots filiform, about 1 mm. thick; rhizome oblique, short, 3-5 mm. thick; false stem 2—4 cm. tall, about 2 mm. thick; leaves distichous, 3 or 4, congested, narrowly linear, fleshy, 12—20 cm. long, 1.2—2 mm. wide, flat, lightly 3-carinate on the back, almost solid, green, flat in vernation; scape 12—25 cm. tall, 1.5 mm. thick, terete; inflorescence umbellate, about 20-flowered, without bulblets; spathe white-membranous, about 5 mm. long; pedicels filiform, ascending, 6—12 mm. long; flowers whitish, more or less open, about 8 mm. in diameter; tepals oblong, concave, slightly 1-carinate on the back, obtuse at the apex, very minutely denticulate, the outer ones about 3.5 mm. long, 1.5 mm. wide, the inner ones longer, about 4 mm. long, 1.8 mm. wide; stamens long-exserted from the tepals, about 6 mm. long, about equally long; outer filaments subulate-linear, flat, the inner ones dilated at the base, about 1 mm. wide, 1- or 2-denticulate on each side almost toothless; anthers about 1.2 mm. long; ovary rounded, about 2 mm. long, 3-celled, with 2 ovules in each cell, with 3 open hollows at the base between the sepals; style subulate, 1—5 mm. long, not divided; capsule rounded, 4—4.5 mm. long, 3—4.5 mm. in diameter; seeds black, more or less compressed, about 3 mm. long.

Found tufted in dry depressions among rocks, at about 700 meters altitude, at Kankakei, on Shôdo-shima Island, province of Sanuki, by M. Togashi on October 5, 1952. The type was cultivated in Tokyo, collected in flower on July 16 and in October, 1952, deposited in the herbarium of Tokyo University.

In the *A. odoratum* group this new species is striking in having small obtuse tepals and long-exserted stamens.

Allium (Schoenoprasum) wakegi Araki in Jour. Jap. Bot. 25: 206. 1950; *Allium fistulosum* (L.) var. *caespitosum* (non Makino 1905) Makino in Iinuma, Sômoku-Dzusetsu ed. 3; 2; p. 475, plate 363 (1910, excel. descript. addend. et Icon. analyt. addend.)

Icones Iinuma, Somoku-Dzusetsu Vi fol. 34 rect.

This new species is related to *A. fistulosum* L., but differs in the plant being much smaller, conspicuously cespitose and the bulbs much smaller and abundantly aggregate. It is also similar to *A. ascalonicum* L., but differs in the stamens surpassing the perigonium and the filaments being without teeth. From *A. bouddhae* A. Debeaux it differs in having the bulbs dormant and the connective of the anthers short-appendaged at the apex.

Perennial herb, dormant after anthesis, densely cespitose, completely glabrous, slightly disagreeably-odorous; roots biennial, fibrous, numerous, white; rhizome very short, yellowish, becoming brownish; dormant bulbs oblique-ovate, acute at the apex. obtuse at the base, 23—35 mm. long, 8—18 mm. in diameter, covered by dark, dried-up, membranous coats; living bulbs with false stems that are rather terete or subterete, slightly inflated below, 10—12 cm. long, the inflated part 0.6—1.2 cm. in diameter, above that 0.5—0.7 cm. in diameter, the underground portion white, often

covered by the dark dried-up coats, the above-ground portion pale green; leaves 3 or 4, radical, distichous, 30—40 cm. long, the sheaths tunicate, obliquely truncate at the mouth, the blades terete-fistulose, attenuate-acuminate at the apex, slightly narrowed at the base, 12—25 cm. long, 0.4—0.7 cm. in diameter, slightly pruinose, green, thin in texture; scapes very few, terminal to the bulb, issuing from the mouth of the sheath, slightly depressed-fistular, solid below, 30—40 cm. long, 0.8—0.9 cm. wide, 0.7—0.8 cm. thick, narrow at the base, below the middle very slightly inflated, gradually narrowed to the apex, very lightly pruinose, bluish-green; spathe saccate,

Allium saxicola Kitagawa, in Rep. Inst. Sci. Res. Manch. 2: 288. 1938.—Related elliptic, caudate-acuminate at the apex, 20 mm. long, 8 mm. in diameter, finally 2-(1—3-) split, membranous, white, with the ribs reddish below, marcescent; inflorescence erect, umbelliform but centrifugal, small many-flowered, finally semiglobose, 1.8—2.2 cm. long, 2—3 cm. in diameter; pedicels filiform, not angular, 8—13 mm. long, 0.5—0.7 mm. in diameter, greenish; buds ovate, acute at the apex, truncate at the base, trigonous; flowers usually sterile; perigonium half-open, campanulate, marcescent; tepals free, the 3 outer ones slightly navicular, ovate, acute to obtuse at the apex, rounded-truncate at the base, 3.5—4 mm. long, 2 mm. wide, membranous, white, with the midribs green, the inner 3 very slightly navicular, oblong, acute at the apex, rounded-truncate at the base, 4.5—5 mm. long, 2 mm. wide, otherwise like the outer ones; stamens 6, finally 7—8 mm. long, greatly surpassing the perigonium, marcescent, often imperfect; filaments filiform, without teeth, dilated at the base, connate among themselves at the base and slightly adnate to the base of the tepals, upwardly attenuate, white; anthers versatile, lateral, longitudinally dehiscent, oblong, obtuse at the apex, cordate at the base, 1.3—1.5 mm. long, 0.6—0.8 mm. wide, yellow, the connective shortly appendaged at the apex, the pollen yellow; pistil 1, equally long as the stamens, 7—8 mm. long; style marcescent, subulate, upwardly narrowed, 5—6 mm. long, 0.4 mm. in diameter, white, stigmas terminal, single, capitulate, minute, white; ovary 3-locular, trigonous-depressed-globose above, emarginate at the apex, 1.6—1.8 mm. long, 2.1—2.2 mm. in diameter, greenish-white; placentae axile; ovules 2 in each locule, ascending.

In the city of Kioto the dormant bulbs germinated in the month of September, the flowers opened up in the month of May.

Japanese common name: wakegi.

Sometimes cultivated on estates in Japan and China; native country unknown.

The type was collected by Y. Araki (no. 16026) on the author's estate in the city of Kioto.

[AMARYLLID GENERA & SPECIES—H. N. Moldenke, continued on page 60.]

REGISTRATION OF NEW AMARYLLID CLONES

Registrar: Mr. W. D. Morton, Jr.

This department has been included since 1934 to provide a place for the registration of names of cultivated *Amaryllis* and other amaryllids. The procedure is in harmony with the INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE (edition publ. 1956) and the INTERNATIONAL CODE OF NOMENCLATURE FOR CULTIVATED PLANTS (edition publ. 1958). Catalogs of registered names, as well as unregistered validly published names, will be published from time to time as the need arises. The first one, "DESCRIPTIVE CATALOG OF HEMOROCALLIS CLONES, 1893-1948" by Norton, Stuntz and Ballard was published in 1949. This may be obtained at $2.50 prepaid from: Dr. Thos. W. Whitaker, Executive Secy., THE AMERICAN PLANT LIFE SOCIETY, Box 150, La Jolla, Calif. CATALOG of HYBRID NERINE CLONES, 1882-1958, by Emma D. Menninger; and CATALOG OF BRUNSVIGIA CULTIVARIS, 1837-1959, by Hamilton P. Traub and L. S. Hannibal published in 1960 Plant Life, with additions to both in the present (1961) edition. In the present issue (1961), the first

edition to THE GENUS X CRINODONNA is published which serves also as a catalog of cultivars. A catalog of Amaryllis names, and also catalogs of the names of other cultivated amaryllids, are scheduled for publication in future issues.

Only registered clones of Amaryllis and other amaryllids are eligible for awards and honors of the AMERICAN AMARYLLIS SOCIETY. Numbers of registered clones are preceded by a prefix, an abbreviation for the genus concerned. Thus, A-390, the "A" standing for *Amaryllis;* Z-1, the "Z" standing for ZEPHYRANTHES, etc.

Correspondence regarding registration of all amaryllids such as *Amaryllis, Lycoris, Brunsvigia, Clivia, Crinum, Hymenocallis,* and so on, should be addressed to: Mr. W. D. Morton, Jr., Registrar, 3114 State Street Drive, New Orleans 25, Louisiana. The registration fee is $2.00 for each clone to be registered. Make checks payable to AMERICAN PLANT LIFE SOCIETY.

HYBRID AMARYLLIS CLONES

Introduced by R. E. Raasch, 345 Deddridge St., Corpus Christi, Texas:

Amaryllis clone **'Florence Raasch'** (Raasch, 1960); reg. no. A-554, 5-4-60. D-4a (Reginae); scape 24-26" tall; spring blooming, foliage present at flowering; umbel 4-flowered; flower length (sideways) 6—6½"; width 7—7½" across face; flowers held horizontally; beautiful rose red (HCC-724), deeper dark glossy rose-red in throat; veined deeper in color; tepaltube rose red; rapid multiplier.

Introduced by Mrs. John F. Cronin, P. O. Box 207, Lutz, Florida:

Amaryllis clone **'Sensation'** (Cronin, 1960); reg. no. A-652, 8-29-60. An outstanding D-5a (Leopoldii), segs recurved; usually two scapes, 22-24" tall; in spring, deciduous; umbel 4-flowered, florets held slightly upright; flower length 3½"; width 10-11"; flower ground color white, with ½" picotee border of penciled rose madder (HCC-23/1 to 23/2) which appears to be solid rose color from a distance; texture creped. Stigma trifid. Parentage: Mead Strain pink ♀ x 'White Dazzler' ♂. Introduced 8-1-60.

Registered by Leon & Frieda Boshoff-Mostert, Kleinskuur, Balfour, Transvaal, South Africa:

Amaryllis clones Reg. #562, **'Alec'**, brick red with currant red flush and white star; Reg. #563, **'Alpha'**, wide rounded segs of self vermilion; Reg. #564, **'Amazon'**, currant red with speckled segs; forceful appearance; Reg. #565, **'Anagram'**, shades of geranium lake, flushed white; Reg. #566, **'Dawning'**, dawn pink with camellia rose influence, flushed white; beautifully balanced bloom, with heavy seersucker texture; Reg. #567, **'Azalea'**, soft pale azalea pink with white central star; Reg. #568, **'Bethlehem Gem'**, brick red with salmon influence, suffused white, very large and impressive; Reg. #569, **'Brocade'**, porcelain rose; tips flushed azalea pink; Reg. #570, **'Capsicum'**, capsicum red, softly fused with white; very attractive; Reg. #571, **'Cardinal Wolsey'**, deep cardinal red self; Reg. #572, **'Cardinal's Choice'**, clear medium to deep cardinal red; Reg. #573, **'Carolina'**, scarlet and white; Reg. #574, **'Cathedral Peak'**, blood red self; Reg. #575, **'Chartreuse'**, complete chartreuse green with scarlet pencil lines and flushed porcelain rose; Reg. #576, **'Cherry'**, cherry red self; Reg. #577, **'Cherry Bing'**, cherry red self; Reg. #578, **'Cherry Flip'**, deep cherry red; Reg. #579, **'Corpus Christi'**, pure white with unbroken fringe of carmine around all segs; Reg. #580, **'Dawn'**, soft empire rose, flushed on white base; Reg. #581, **'Dawn Rose'**, blend of porcelain rose and white with scarlet pinpoints; Reg.

#582, **'Display'**, vermilion with carmine influence; Reg. #583, **'Dixie'**, scarlet on cream base and apple-green throat; Reg. #584, **'Drakensberg'**, blood red self; Reg. #585, **'Eastern Glory'**, very dark mandarin red with blood red influence; Reg. #586, **'Etna'**, fire red self; clear, dazzling blooms; Reg. #587, **'Feline Repose'**, geranium lake in various shades; Reg. #588, **'Florida'**, shades of scarlet with large white star; Reg. #589, **'Francis Drake'**, geranium lake with scarlet and signal red influence; Reg. #590, **'Gerald Ash'**, light geranium red; Reg. #591, **'Ghent'**, azalea pink; Reg. #592, **'Haarlem'**, clear bright vermilion; Reg. #593, **'Hex River'**, mandarin red; Reg. #594, **'Impertinence'**, white base, strongly veined and brushed with a blend of turkey red and blood red; Reg. #595, **'Invitation'**, white base, softly overlaid with camellia rose; Reg. #596, **'Istanbul'**, turkey red with clear white central star; Reg. #597, **'Jasper'**, jasper red self with an overlay of capsicum red; Reg. #598, **'Jean Van Doesburg'**, beautiful begonia color; Reg. #599, **'Jewel Box'**, shades of salmon, brick red, scarlet and jasper red; Reg. #600, **'Juliana'**, clear bright Dutch vermilion with rose influence; crystalline sheen on white blushing and edges of segs; always a favorite with visitors; Reg. #601, **'Kathleen Dobson'**, snow white with faint broken pencil lines of cardinal red on upper petsegs and setsegs; frilled edges; Reg. #602, **'Kismet'**, white, shaded with carmine veining; Reg. #603, **'Lafayette'**, bright Dutch vermilion with distinct small white central star; Reg. #604, **'Lion's Head'**, very large deep currant red; Reg. #605, **'Maluti'**, large cardinal red self; Reg. #606, **'Mandarin's Joy'**, complete dark mandarin red self; large decorative rounded blooms; Reg. #607, **'Mandarin's Pride'**, clear light red with pleasing soft white throat; Reg. #608, **'Marie Ash'**, bright deep scarlet and white; Reg. #609, **'Melanie'**, scarlet self; Reg. #610, **'Paprika'**, capsicum red self; Reg. #611 **'Picardy'**, large poppy red blooms sprinkled with gold dust; commands attention; Reg. #612, **'Pink Azalea'**, azalea pink; Reg. #613, **'Prins Willem'**, shades of salmon, burnt orange and begonia; Reg. #614, **'Radiance'**, deep scarlet self; dazzling bright blooms; Reg. #615, **'Robespierre'**, large showy white with delft rose blushing; Reg. #616, **'Rose Lace'**, bright rose madder with white central star; Reg. #617, **'Sarong'**, Dutch vermilion self; Reg. #618, **'Scarlet O'Hara'**, very large and heavily veined scarlet with large white star, extending along midribs; Reg. #619, **'Shepherdess'**, delft rose overlaid carmine rose; a real pink; Reg. #620, **'Signal Hill'**, similar to **'Lafayette'**, but of clear signal red; Reg. #621, **'Singapore'**, orient red; Reg. #622, **'Skildwag'**, large exhibition type dark vermilion self; Reg. #623, **'Spring Butterfly'**, seersucker white with edges of scarlet and faint eye-lashes of scarlet on segs; Reg. #624, **'Thaba 'Nchu'**, blood red self. Reg. #625; **'Fortress'**, brick red with white midrib towards throat, one of the largest; Reg. #626, 'Rebel', medium scarlet base, sparingly and attractively flushed white; Reg. #627, **'Schooner'**, azalea pink, flushed white; very large and decorative; Reg. #628, **'Time Signal'**, signal red self; Reg. #629, **'Tzaneen'** mandarin red; #630, **'White Belle'**, pure white with pinpoints of crimson on petsegs; Reg. #631, **'Winks'**, begonia with vermilion influence and white star; Reg. #632; **'Wisley'**, azalea pink; large blooms; Reg. #633, **'Bondi Beach'**, deep shrimp red self; Reg. #634, **'Bridal Bouquet'**, cream with delft rose margins; Reg. #635; **'Cherry Liquor'**, cherry red with red throat; Reg. #636, **'Coral Island'**, azalea pink, blends with coral pink and rhodonite red on a complete uranium green base; cream all around margins; Reg. #637, **'Cream Parfait'**, creamy white with jasper red pencil lines; Reg. #638, **'Currant Wine'**, currant red self; Reg. #639, **'Dagbreek'**, deepest blood red with maroon throat; Reg. #640, **'Dallas Bride'**, white self with seersucker texture; Reg. #641, **'Geranium Lake'**, geranium lake in varying shades; Reg. #642, **'Leone Schweizer'**, pure white with blush carmine rose and claret rose around the margins; Reg. #643, **'Magnolia'**, large white; Reg. #644, **'Malay Star'**, deep rose opal, overlaid with crimson, white central star; Reg. #645, **'Meteor'**, dazzling vermilion with mandarin red influence; Reg. #646, **'New Orleans'**, blend of dawn pink, camellia rose and porcelain rose with begonia segment tips; Reg. #647, **'Pink Reflection'**, blend of camellia rose, crimson and rose opal, suffused on white; Reg. #648, **'Schubert'**, azalea pink; Reg. #649, **'Stained Glass'**, porcelain rose with white overlay on all segs; Reg. #650, **'Pirate'**, bright blood red with white star and white blushing; Reg. #651, **'Willem Coetzer'**, lavish brushing of brick red on chartreuse green; Reg. #666, **'Crown Jewels'**, dark red self.

Introduced by M. Van Waveren & Sons, Hillegom, Holland:—

Amaryllis cl. **'Bon Ton'**; reg. no. A653, scape 20" tall, umbel 4-flowered, fls. carmine pink.

Amaryllis cl. **'Christmas Dream'**; reg. no. A-654, scape 22" tall; umbel 3—4-flowered, fls. orange-scarlet self, satin finish in throat, style and stigma orange-colored, fls. 3½" long (Leopoldii, D-5).

Amaryllis cl. **'Decora'**; reg. no. A-655; scape 20" tall; umbel 4-flowered, fls. 8" across face, pure rose with carmine red ribs, and carmine blotch towards the throat.

Amaryllis cl. **'Foster Dulles'**; reg. no. A-656; scape 24" tall; umbel 4-flowered, fls. deep scarlet, 8" across face.

Amaryllis cl. **'General Eisenhower'**; reg. no. A-657; scape 21" tall; umbel 3—4-flowered, fls. with an orchidaceous shade of salmon with darker throat.

Amaryllis cl. **'Haarlem'**; reg. no. 658; scape 21" tall; umbel 3—4-flowered, fls. Bishop's red with satin dark red throat; 7" across face.

Amaryllis cl. **'Orange Beauty'**; reg. no. A-659; very flat blooms only 2" deep (Leopoldii D-5), flowers 7" across face, orange deepening to at the ribs and in throat.

Amaryllis cl. **'Poussin'**; reg. no. A-660; scape 22" tall, umbel 3—4-flowered, 2" in length (Leopoldii D-5), star-shaped, fls. wine red with satin finish, throat crimson with contrasting lime green points.

Amaryllis cl. **'Pure Pink'**; reg. no. A-661; flowers 3" in length (Leopoldii D-5), 7" across face, dark pink, shaded violet, with carmine red ribs and throat, tepalseg margins slightly wavy.

Amaryllis cl. **'Rose Beauty'**; reg. no. A-662; umbel 3-flowered, fls. 6½—7" across face, 2½" in length (Leopoldii D-5), cyclamen rose with red throat; stamens and style rose color.

Amaryllis cl. **'Rosy Cloud'**; reg. no. A-663; scape 18" tall, umbel 4-flowered, fls. 6—8" across face, 3½" in length (Leopodlii D-5), delicate pearl pink, darker pink ribs, flushed carmine towards center of segs, throat lettuce green and white, stamens and style white.

Amaryllis cl. **'Snow Man'**; reg. no. A-664; flowers 3" in depth (Leopoldii D-5), snow white with green throat, stamens and style white; **lily fragrance.**

Amaryllis cl. **'Polar Night'**; reg. no. A-665; flowers 3" deep (Leopoldii D-5), snow white, with green luster, and green throat; stamens and pistil white; 2—3-flowers per umbel; scape 20" tall; flowers 7" across face.

Introduced by Ludwig & Company, Hillegom, Holland:

Amaryllis clone **'Symphony'**; reg. #A-557, 1960. D-5a (Leopoldii); Scape 24"—26" tall; spring (half late) flowering; umbel 4-flowered; flowers round; depth 3½"; 8—8½" in diam.; flower color Delft rose self, deepening in the throat. This is an improved 'Diamond'.

Amaryllis clone **'White Favorite'**; reg. #A-558, 1960. D-5a (Leopoldii); scape 24"—26" tall; spring (late(flowering; umbel 4-flowered; flowers round; depth about 3"; 8" in diam.; flower color outstanding pure white, with somewhat greenish throat, slightly bearded deep in throat.

Amaryllis clone **'Bella Vista'**; reg. #A-555, 1960. D-5a (Leopoldii); scape 22"—22" tall; spring (half late) flowering; umbel 4-flowered; flowers round, 2¾" deep; 7—8" in diam.; flower color bright cherry red (722—722/1) with dark red throat. It is named for the villa of Mrs. C. S. van Til-Zijlstra, proprietor of Ludwig & Co., at Hillegom.

Amaryllis clone **'Flora Queen'**; reg. #A-556, 1960. D-5 (Leopoldii); scape 24"-26" tall; spring (half late) flowering; umbel 4-flowered; flowers 8" in diam.; flower color spinel red (0625) with darker veins, especially in the throat.

Amaryllis clone **'Pamela'**; reg. #A-559, 1960. D-4 (Reginae); scape 20" tall; spring (very early) flowering; umbel 5—6-flowered; flowers 3" in diam.; flower color capsicum red (715) with uranium green star in throat, stamens and style

lighter red, and very light green towards throat; tepalsegs are pointed, elegantly loose reminiscent of an orchid.

Amaryllis clone **'Pixie'**; reg. #A-560, 1960. D-5 (Leopoldii); scape 20"-22" tall; spring (early) flowering; umbel 5—6-flowered; flowers triangular, 2½" in diam.; flower color orange with lighter toward base (Dutch vermilion, 717), stamens and style bright red, throat somewhat greenish. A very free-flowering "Gracilis" novelty.

Amaryllis clone **'Voodoo'**; reg. #A-561, 1960. D-4 (Reginae); scape 16" tall; spring (early) flowering; umbel 4—6-flowered; flowers 3½" deep; flower color scarlet, striped white in shape of star, throat slightly green; flowers trumpet shaped.

HYBRID BRUNSVIGIA CLONES

Introduced by Mrs. Polly Anderson, 4810 Palm Drive, La Canada, Calif.:—

Brunsvigia x. parkeri (American group) clone **'Full Circle' (Anderson, 1961).** Umbel 24-flowered, florets in a full circle, large and open-faced white flowers, with slightly ruffled segs. The apricot color in the throat extends half way up the segs and shows through on the outside; stamens and style apricot colored for half their length; a faint pink blush appears on the fading of the flowers.

Introduced by Hamilton P. Traub, La Jolla, Calif.—

Brunsvigia x parkeri (American group) clone **'Wild Rose'** (Traub, 1961). Early flowering (Aug.-Sept.), umbel 15-flowered, good sized-flowers; the upper 1/4 of the segs colored apple blossom pink, veined deeper pink, large white throat, very light apricot deep in throat; flowers changing to uniform apple blossom pink, veined deeper pink with age. A very charming clone.

AMARYLLID NOTES, 1961

HAMILTON P. TRAUB, *California*

Agapanthus Patens (?)

In JRHS 84: 554-555. 1959, the A. M. was awarded July 21, 1959 to *Agapanthus patents* exhibited by the Hon. L. Palmer. This is believed by him to be the original plant known as *A. mooreanus* and that the many plants now masquerading under this name were probably distributed as seed from the original plant and were variable hybrids; that the true plant has small linear leaves about 1.3 cm. wide and 28 cm. long which are strongly ribbed on the back; scape about 51 cm. tall; umbel is 20—25-flowered; flowers wisteria blue.

Editorial Note.—The above plant may be *Agapanthus africanus* which is sometimes listed as *A. mooreanus*, a synonym.

Amaryllis parodii (Hunz. et Cocu.) Traub, **comb. Nov.**

Amaryllis parodii (Hunz. et Cocu.) Traub, *comb. nov.*, syn.—*Hippeastrum* parodii Hunz. et Cocu., Trab. Mus. Pot., Univ. Nac. Cordoba 2: 1—16, figs. 1—5. 1959.

Brunsvigia rosea pudica (Ker-Gawl.) Hann.

In the writer's *Brunsvigia* garden in 1960, there appeared a scape with a 3-flowered umbel on a small bulb of the Cape Belladonna, *Brunsvigia rosea* (early flowering group). This is similor to *Brunsvigia rosea pudica* (Ker-Gawl.) Hann., Herbertia 10: 64. 1943 [1944]. Thus the problem of placing this plant is solved—Ker-Gawler's plant was apparently depauperate, and as such is not entitled to specific rank. It has to be reduced to *Brunsvigia rosea* (Lam.) Hann., as previous workers have suggested.

In our plant with the 3-flowered umbel, the flowers were light pink, with large white throat, the flower color changing to solid pink with age. The writer has accumulated specimens covering the entire range from the 3-flowered to the 14-flowered umbel.

Traub No. 815 (TRA), 9-11-60, cult. La Jolla, Calif. Umbel 3-flowered.
Traub No. 839 (TRA), 7-27-58, cult. La Jolla, Calif. Umbel 4-flowered.
Traub No. 813 (TRA), 9-11-60, cult. La Jolla, Calif. Umbel 5-flowered.
Traub No. 814 (TRA), 9-11-60, cult. La Jolla, Calif. Umbel 9-flowered.
Traub No. 812 (TRA), 8-30-60, cult. La Jolla, Calif. Umbel 10-flowered.
Traub No. 811 (TRA), 8-30-60, cult. La Jolla, Calif. Umbel 14-flowered.

Plants with umbels up to 18-flowered have been observed, but no specimens have been preserved in such cases up to the present.

Rhodophiala x huntiana Traub, hybr. nov.

Planta inter R. bifidam vel R. spathaceam hybrida; spatha monophylla [solum in lato unico usque ad basem incisal vel bifida; floribus intense rubris usque ad rhodamino-rubellis. Holotypus: Traub no. 817 a+b (TRA) culto La Jolla, California, 12 Septembri 1960.

This hybrid has been named in honor of Mr. William Lanier Hunt, the well-known landscape architect and plantsman of North Carolina who has cherished Rhodophialas in his garden.

Rhodophiala spathacea (Herb.) Traub, **comb. nov.**

Rhodophiala spathacea (Herb.) Traub, *comb. nov.* Syn.—*Habranthus spathaceus* Herb., in Bot. Mag. Lond. 52: sub pl. 2597. 1825.

Amaryllis x mostertii Traub, **hybr. nov.** (Amaryllidac.)

Planta inter 'A. belladonna L.' et species ignotas alias unam vel duas hybrida, in Africa australe elapsa; flore figuro 'A. belladonna L.' plusminusve simile; paraperigonio prominente setis usque ad 2 mm. longis et cum circulo rubro vel ionthis rubris intus in base segmentorum tepalorum ornato; limbo intense flavido-rubello (NCF 5R-6/11) insto 'Begonia' (HCC-619) usque ad lateritio, jugulo albi-asteriscato, ionthis viridi-albidis conjugato, supra irregulariter marginato; stigma distincte 3-lobato, lobis 1 mm. longis. Holotypus: Traub no. 822 (TRA), 10-9-60.

HOLOTYPE: Traub *No. 822* (TRA), 10-9-60, grown from bulb obtained from Balfour, Transvaal, Union of South Africa.

This is apparently a cross between *Amaryllis belladonna* L. and a species of the subgenus Omphalissa (as shown by the red ring at the base of the throat in the hybrid), plus *A. reginae* (as shown by the white star in the throat); otherwise it somewhat resembles *A. belladonna* L. This hybrid is reported as naturalized in South Africa. A similar hybrid is reported as naturalized in Sikkim, India—Specimen: Traub *No. 780a+b* (TRA), 5-26-60, grown from bulbs imported from India by Mr. Robert D. Goedert.

A similar plant is represented by the specimen, A. W. Excell *No. 557* (BM), Principe Island, W. C. Africa, Terreiro Velho, alt. ca. 700 (=218.4 m.), 11. xii. 1932, collected on a plantation. The flower is indicated as scarlet with green stripes down the center towards the base of each tepalseg. It is similar to the India and S. Afr. plants.

Thus, this type of hybrid was apparently distributed by the European colonial officials and their families, and settlers, in various parts of India and Africa some time in the 19th century.

The hybrid is named in honor of Mr. Leon Boshoff-Mostert, the outstanding *Amaryllis* breeder of Balfour, Transvaal, Union of South Africa, who kindly sent us the bulbs that produced the flowers and leaves for the holotype specimen.

Brunsvigia x parkeri W. Watson ex Traub, **hybr. nov.** (Amaryllidac.)

Amaryllis x *parkeri* W. Watson, Gard. Chron. Feb. 6, 1909, p. 92; X *Brunsdonna parkeri* (W. Watson) Worsley, in Jour. RHS *51:* 65-69. 1926; *Brunsvigia* x *parkeri* W. Watson ex Traub, in Plant Life *5:* 134, 1949; *16:* 59. 1960, *anglice.*

Plantae inter B. roseam et B. grandifloram atque B. josephinae hybridae; bulbo ovoideo vel globoso; foliis loratis, cum (in holotypo) vagina folii basali tubulari vel hac vagina desiderata; scapo solido; spatha 2-valvata; umbella usque ad 22-flora; floribus pedicellatis, fuchsino-rubellis (in holotypo) vel albis vel rubellis vel subpurpureis fragrantibus; tubo tepalorum 1.3 cm. longo (in holotypo) vel breviore vel paulo longiore; segmentis tepalorum 10 cm. longis (in holotypo) vel brevioribus vel longioribus; staminibus quam segmentis tepalorum quadrante brevioribus; stylo quam segmentis tepalorum paulo breviore; stigma minute 3-lobato. Holotypus: No. 823 a+b, 10-15-60.

HOLOTYPE: No. 823a+b (TRA), Jack Scavia, 10-15-60; cult. Lakeside, Calif.; grown from bulb obtained from Constable, Ltd., London, some years ago as *Brunsvigia* x *kewensis* Hort.

Brunsvigia x tubergenii Traub, **hybr. nov.** (Amaryllidac.)

"Amaryllis x spofforthiae Herb" in Amaryll. 278-279; 422; 425. 1837, invalidly published name, *(Brunsvigia josephinae* ♀ x *B. rosea* var. *blanda* ♂); *Brunsvigia josephinae* ♀ x *B. rosea* ♂, C. G. Van Tubergen, Jr., Gard. Chron. Lond. Jan. 23, with fig. in suppl. 1909; X *Brunsdonna tubergenii* Hort., Haggag, Hort. Rev. Egypt, No. 39, p. 5, with fig. 1918; Messrs. Van Tubergen, in New Bulbous Plants, pp. 52-53. 1947; X *Brunsdonna parkeri* var. *tubergenii* Hort., Worsley, in Jour. RHS *51:* 66-67. 1926; *Brunsvigia* x *tubergenii* Hort., in Plant Life *16:* 61. 1960, *anglice.*

Plantae inter "B. josephinae Ker" et "B. rosea" hybridae; bulbo ovoideo; folis loratis e bulbo directe productis; scapo solido; umbella usque ad 22-flora; floribus pedicellatis intense rubellis fragrantibus; tubo tepalorum 1.1. cm. longo; segmentis tepalorum 7.7—8 cm. longis, 2.2—2.5 cm. latis lanceolatis acutis; staminibus quam segmentis tepalorum quadrante brevioribus; stylo quam segmentis tepalorum paulo breviore; stigma minute 3-lobato. Holotypus: Traub no. 810 a+b, 8-27-60.

HOLOTYPE: Traub No. 810a+b (TRA), 8-27-60, cult. La Jolla, Calif.; grown from bulb received some years ago by Jack Scavia from Van Tubergen & Co., Haarlem, Holland as X *Brunsdonna tubergenii,* and later presented by Mr. Scavia to Hamilton P. Traub.

Tribe *Pancratieae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Pancratiinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 112-113. 1887, in part.

Tribe *Eucharinae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Eucharinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 110-111. 1887, err. *Eucharidinae;* Pax & Hoffmann, l. c. 2nd. ed. 15a: 411-413. 1930, in part.

Tribe *Eustephieae* (Pax) Traub *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Eustephinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 113-114. 1887; Pax & Hoffmann, l. c. 2nd ed. 15a: 413-415. 1930.

Tribe *Ixiolirieae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Ixioliriinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 109-110. 1887; l. c. 2nd ed. 15a: 410. 1930.

Tribe *Zephyrantheae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Zephyranthinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 106-108. 1887; Pax & Hoffmann, l. c. 2nd ed. 15a: 406-407. 1930.

Tribe *Crineae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Crininae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 108-109; Pax & Hoffman, l. c. 2nd ed. 15a: 408-410. 1930.

Tribe *Haemantheae* (Pax) Traub, *comb. nov.* (Amaryllidac.) Syn.-Subtribe *Haemanthinae* Pax, in Engl. & Prantl, Nat. Pflanzenfam. II(5): 103-105. 1887; Pax & Hoffmann, l. c. 2nd ed. 15a: 401-403. 1930.

Subtribe *Milulinae* (Prain) Traub, *comb. nov.* (Tribe Allieae; Amaryllidac.) Syn.-Tribe *Miluleae* Prain, in Sci. Mem. Med. offic. Army India 9: 25. 1896; Engl. in Engl. & Prantl, Nat. Pflanzenfam. 2nd ed. 15a: 329. 1930.

Tribe *Amarylleae* Endlicher, in Genera Plantarum, pp. 174-175. 1837. (Amaryllidac.) Lectotype: *Amaryllis* L. (syn.- *Hippeastrum* Herb.)

Agapanthus campanulatus albus

This form was exhibited by W. E. Th. Ingwerson at a RHS show in 1960. (Jour. RHS, Dec. 1960, page 526.)

GALANTHIMINE—Continued from page 46.

According to reports in 1960, U. S. Government scientists, following up the report by Russian scientists, have found that galanthamine hydrobromide has been found ineffective in relieving some neuro muscular disorders, but additional studies have shown that several related drugs from *Narcissus* and *Lycoris* bulbs, all derivatives of lycoramine, appear promising.

[AMARYLLID GENERA & SPECIES, H. N. Moldenke, continued from page 60.]

Amaryllis parodii (Hunz. et Cocu.) Traub, in Plant Life 17: 1961; syn.-Hippeastrum parodii Hunz. et Cocu., in Traub. Mus. Bot., Univ. Nac. Cordoba, 2 (no. 7): 1—16. 1959. Macropodastrum; bulb 7.5—8 cm. in diameter, about 11 cm. high, the neck about 5 cm. long and about 3.6 cm. in diameter, the tunics fuscous (brown); leaves green, glaucescent pruinose, 35—55 cm. long and 4.8—6.5 cm. wide during the flowering of the bulb; scape green, pruinose, 43—65 cm. long; spathe about 6.3 cm. long; flowers 5 or 6, not odorous; pedicels 4—6 cm. long, about 0.5 cm. in diameter; perianth 16—16.5 cm. long, the tube greenish or yellowish-green, 8—9.5 cm. long, the segments greenish-yellow or yellow; the sepals mucronate, 6.7—7 cm. long, 2.1—2.4 cm. wide; the petals rounded at the apex, 6.5—8 cm. long, 1.5—2.2 cm. wide; corona inconspicuous, with very minute fringes 0.5—1.5 mm. long; filaments unequal, 5.3—6.6 cm. long; pollen-grains 1-sulcate, large, about 67.5—72.5 μ in diameter in longitudinal section, about 55—60 μ in diameter in transverse section; ovary mostly slightly arcuate, obtusely triangular-prismatic, about 1.2 cm. long, 0.6—0.7 cm. wide; stigma capitate, 3-lobed, longer than high; chromosome number: 2n=22.

Along the edge of Route no. 9 between Villa de Maria and the boundary of Santiago del Estero, at Serranias de San Miguel, at about 600 meters altitude, in the Department of Río Seco, Province of Córdoba, Argentina, November 26, 1958, Hunziker, Cocucci, & Caro 13775; vernacular name: "Azucena del compo." Holotype deposited in the museum at Córdoba.

Fig. 10. *Sternbergia lutea,* as grown by S. Y. Caldwell, Nashville. Tennessee. Photo by S. Y. Caldwell.

REVISION OF STERNBERGIA

Prof. Naomi Feinbrun (of The Hebrew University, Jerusalem) and W. T. Stearns (of The British Museum—Natural History, London), have published a revision of the genus *Sternbergia* in Palestine (Bull. Res. Council, Israel, Vol. 6D: 167—173. 1958). They have provided a key to all of the species.

Sternbergia is a small genus with four or five yellow-flowered species distributed in central and eastern Europe, Transcaucasia, Asia Minor to Northern Iran. The species listed are *S. clusiana, S. colchiciflora, S. pulchella, S. lutea,* and *S. fischeriana.* Of these, *S. fischeriana,* and *S. pulchella* (probably a synonym of *S. colchiciflora)* are not listed as native to Palestine.

The authors are to be congratulated for this important contribution toward an understanding of the genus *Sternbergia.*

At the present time, only *S. lutea* (Fig. 10) and *S. fischeriana* (obtainable from Van Tubergen) are known to be definitely cultivated in the United States. It is hoped that *S. clusiana* and *S. colchiciflora* can be brought into the United States in the near future.

Although all of the species are yellow-flowered, some of them make a brilliant showing—*S. lutea,* in the fall, and *S. fischeriana,* in the spring. In the case of *S. clusiana* and *S. colchiciflora,* the scape does not reach above the bulb-neck, but the tepalsegs in *S. clusiana* are 3.5—7 cm. long, and 1—3.5 cm. wide. Thus there is the possibility of hybridizing with other species to obtain larger flowers with the habit of *S. lutea.*

Fernandes (Plant Life 8: 66. 1952) concluded that "the data from cytology are not in accord with the idea of considering the genus *Lapiedra* Lag. close to Sternbergia [as indicated by Herbert, Amaryll. 1837] from the systematic point of view."

The present writer (undersigned) originally placed *Sternbergia* in the Tribe Zephyrantheae, but after a detailed morphological study of *S. Lutea* and *S. fischeriana,* concluded that this genus belongs to the Tribe Narcisseae along with the genera *Narcissus* and *Tapeinanthus.* It is true that the paraperigone (corona) is lacking, but one has but to look at the plant habit and the capsule (fruit), in *Sternbergia fischeriana* for instance, which resemble those of *Narcissus.* In *Tapeinanthus* the paraperigone (corona) is rudimentary; in *Sternbergia* it is lacking. Dr. Flory and his associates are now making a chromosome study in an attempt to test the hypothesis.—*Hamilton P. Traub*

SENDING AMARYLLID FLOWERS BY MAIL

Hamilton P. Traub, *California*

The writer often receives amaryllid scapes with open flowers for identification. In many cases these are packed in somewhat moist sphagnum moss or newspapers. When received, such specimens are usually in a state of decay, and are worthless for identification purposes.

This note is written in the hope that those sending specimens in the future will follow the directions given below which make it possible to transport flowering scapes of amaryllids in excellent condition.

The first principle to recognize is that amaryllid scapes do not need added moisture during the transportation period, unless it is prolonged. If possible, the scape should be cut after the first flower or flowers have opened. However, they may be sent in the later stages of development. Any buds on the scape will open naturally after arrival when the scape is placed in water.

A pasteboard box long enough to accommodate the scape should be used; the type of container used by florists will serve best, but other types may also be used. The bottom of the box should be filled with loose newspapers or tissue paper. The scape is then placed on top of the loose paper, and is securely fastened to the bottom of the box *by means of string* sewed to the pasteboard; usually it is fastened in one place only, but sometimes it is secured in two places in the lower half of the scape. Some fasten the scape with Scotch tape. More loose paper or tissue is then placed on top of the scape, and the cover is replaced. The package is wrapped, if necessary, and tied for shipment by air mail if the distance to be shipped warrants it. If desired, small openings for ventilation may be provided.

All types of amaryllis may be sent in this manner, including *Amaryllis, Brunsvigia, Crinum, Hymenocallis,* etc., etc. On arrival, the scape or scapes are placed in water, and the buds will expand normally. If leaves are present on the original plant, it is desirable to send along also at least one leaf so that when the herbarium specimen is prepared, this essential part is also present on the finished sheet.

[AMARYLLID GENERA & SPECIES, H. N. Moldenke,
continued from page 50.]

X Crinodonna traubii Moldenke, **hybr. nov.** (Amaryllidac.)

Plantae inter "Brunsvigia x parkeri W. Wats. ex Traub" et "Crinum moorei Hook. f." hybridae; bulbo cum collo genuino et vagina folii basali tubuloso ornato; foliis loratis canaliculatis plusminusve radiale dispositis; umbella 10—14-floris; floribus pedicellatis albis vel rubellis usque ad subpurpureis; tubo tepalorum curvato, quam segmentis tepalorum dimidio breviore; staminibus fasciculatis quam segmentis tepalorum ca. quadrante brevioribus; antheris versatilibus; stylo quam segmentis tepalorum paulo breviore; stigma minute trifido. Holotypus: Traub no. 809a+b (TRA), clone "Alma Moldenke", culto La Jolla, California, 25 Augusti 1960.

[AMARYLLID GENERA & SPECIES, H. N. Moldenke,
continued on page 57.]

CATALOG OF
NERINE CULTIVARS
1882–1960

By
Emma D. Menninger

FIRST EDITION

THE AMERICAN PLANT LIFE SOCIETY
Box 150, La Jolla, California
1961

ADDITIONS—CATALOG OF NERINE CULTIVARS—TO AUG. 20, 1960

By **Emma D. Menninger,** Greenoaks, Arcadia, California

[A continuation of **CATALOG OF NERINE HYBRID CLONES,** 1882—Dec. 31, 1958, published in **PLANT LIFE** 16: 63—74. 1960.]

The compiler wishes to thank the following named persons for information supplied by them: Mr. L. S. Hannibal, Fairoaks, Calif.; Mr. Jac. Hage, General Secretary, Royal Netherlands Society for Horticulture and Botany, Aalsmeer, Netherlands; and Mr. H. J. Voors, General Secretary, Royal Dutch Bulb Growers' Society of Haarlem, Netherlands.

ADDITIONS TO ABBREVIATIONS

ABBREVIATION	HYBRIDIZERS, GROWERS, SUPPLIERS AND EXHIBITORS
Cl	Sir Ralph Clarke, Borde Hill, Haywards Heath, Sussex, England. See 1960 list.
deG	Goede, Simon de. Elst, Netherlands. Grower and exhibitor.
Er	Errey, Gilbert. Box 1, Lilydale, Victoria, Australia. Hybridizer.
Ha	Hannibal, L. S. Fair Oaks, California. Grower.
Lo	Lothian, T. N. Director Botanical Gardens. Adelaide, South Australia. Hybridizer.
S	Sir Frederick Stern, Goring-by-Sea, Sussex, England.
Tr	Traub, Dr. Hamilton P., 5804 Camino de la Costa, La Jolla, Calif. Hybridizer and grower.
Va	Van Tubergen, C. G. Haarlem, Netherlands. Hybridizer, Grower, Supplier and Exhibitor.

ABBREVIATION	AWARDS
AMR	Award of Merit. Royal Dutch Bulb Growers' Society. Haarlem, Netherlands.
FCCR	First Class Certificate. Royal Dutch Bulb Growers' Society. Haarlem, Netherlands.
GV	Certificate of Merit. Institute—Vaste Keurings Commissie. Aalsmeer, Netherlands.
GI	Certificate First Class. Institute—Vaste Keurings Commissie. Aalsmeer, Netherlands.
PC	Preliminary Certificate, Royal Horticultural Society, London.

ADDITIONS—**NERINE** CULTIVARS, THROUGH AUG. 20, 1960

'Arthur Turner'; grower—Cl; awards—AM, Cl, 1959; **N. sarniensis x 'Wyatt',** HCC 717/1 Dutch vermilion.

'Baby Pink'; grower—deG; awards—GV, deG, 1958; rose pink, camellia rose nerve.

'Borde Hill'; grower—Cl; awards—PC, Cl, 1959, no description.

"Capetown", misspelling for **'Cape Town'.**

'Cape Town'; grower—deG; awards—FCCR, deG, 1957; GI, deG, 1958; rhodamine pink; **N. bowdenii** hybrid, but narrower tepalsegs, HCC 527/2, darker stripes.

'Cranfield'; grower—S; selected for trial at Wisley, 1958, no description.

'Lady Drent'; grower—deG; awards—GV, deG, 1958; porcelain rose.

"Mrs. Barkeley", believed to be a misspelling for **'Mrs. Berkeley',** which see in 1960 list.

'Mrs. Brook'; grower—deG; awards—GV, deG, 1958; mandarin red.

'Pink Frills'; hybridizer—Va; awards—AMR, Va, 1951; GV, Va, 1951; clear pink **N. bowdenii** hybrid, much larger than **N. bowdenii.**

"Pink Trills"; believed to be a typographical error for **'Pink Frills'.**

'Pink Triumph'; grower—V & Tr; listed in 1960 catalog; included in Dutch lists as **N. bowdenii** hybrid imported from Guernsey by Mr. Simon de Goede of Elst, Netherlands, and as having received awards in the Netherlands.

"Pink Triumphant"; believed to be a misspelling for **'Pink Triumph',** which see.

'Rose Camellia'; grower—Ha.

'Rose Tendre'; grower—deG; awards—GV, deG, 1958; neyron rose.

"Samon River"; believed to be a misspelling for **'Salmon River',** which see.

'Salmon River' grower—deG; awards—GV, deG, 1958; camellia rose, shaded China rose.

'San Francisco'; grower—deG; awards—GV, deG, 1958; Turkey red.

'Snowy Dawn'; grower—Ha; "pale pink covered with white ice". Good.

'Walter Fleming'; grower—Cl; awards—PC, Cl, 1959; no description.

'Wyatt'; parent of **'Arthur Turner'.**

CATALOG OF
BRUNSVIGIA CULTIVARS
1837–1960

By
Hamilton P. Traub
&
L. S. Hannibal

FIRST EDITION

THE AMERICAN PLANT LIFE SOCIETY
Box 150, La Jolla, California
1961

CORRIGENDA

CATALOG OF **BRUNSVIGIA** CULTIVARS

Plant Life 16: 39—62. 1960

Page 44, and thereafter, wherever "John Crane Bidwell", "J. C. Bidwell" or "Bidwell" appear, change "Bidwell" to "Bidwill".

Page 45, 15th line from top, change "Hiester" to "Heister".

Page 57, 17th line from bottom, add "X Brunsdonna Hort., Worsley, in JHRS 51: 66. 1926."

Page 59, Delete 25th line, from top, and insert—"**Brunsvigia x parkeri** Zwanenburg group. Syn.—Amaryllis belladonna parkeri".

ADDITIONS—CATALOG OF **BRUNSVIGIA** CULTIVARS, 1837—1960

'Apple Blossom' (Hannibal, 1960), PL **16:** 78. 1960. Pale pink picotee.

'Cynthia Pike' (Pike, 1960), in Gar. Chron. 148; 469. with fig. 1960. Cross of **Brunsvigia rosea** x. **B.** x **parkeri** W. Wats. ex Traub (Kew form). Umbel 8—10-fld; fls. white suffused rosy-purple, apricot deep in throat. Originated by A. V. Pike.

Brunsvigia x **parkeri** W. Watson ex Traub, in Plant Life, Vol. **17.** 1961. Syn.—**Amaryllis** x **parkeri** W. Watson, in Gard. Chron. Feb. 9, 1909, page 92, without description; **Brunsvigia** x **parkeri** (W. Watson) Traub, in Plant Life **5:** 134. 1949; Plant Life **16:** 58. 1960, anglice. See clone **'Lady Parker'**, type below.

Brunsvigia x **tubergenii** Traub, in Plant Life, vol. **17.** 1961. Syn.—"Amaryllis x spofforthiae Herb.", in Amaryll. 278-279; 422; 425. 1837, invalidly published name; Brunsvigia josephinae ♀ x B. rosea ("Amaryllis belladonna Herb.", non Linn.) ♂, C. G. Van Tubergen, Jr., in Gard. Chron. Jan. 23, 1909, with fig. in sppl.; X Brunsdonna tubergenii Hort. Haggag, in Hort. Rev. Egypt, no. 39, page 5, with fig. 1918; Messrs. Van Tubergen, in New Bulbous Plants, pp. 52-53. 1947; X Brunsdonna parkeri var. tubergenii Hort., Worsley, in Jour. Roy. Hort. Soc. **51:** 66-67. 1926; Brunsvigia x tubergenii Hort., in Plant Life **16:** 61. 1960, anglice.

Brunsvigia x baptistii Hort. (=**Brunsvigia** x **parkeri** (Australian group) **baptistii**); umbel radial, flowers white; see Geo. Kerslake, in Practical Experiments in Cross Fertilization, N. S. W. 3rd Int. Conf. Genet. 1906, London. pp. 396-400 (see page 397).

"Felicea" (Bidwill, 1848 or 1849). The Librarians at the Mitchell Library, Sydney, Australia, have found a memorandum of 1848 or 1849 among the John C. Bidwill papers, in which he requested that one of his **Brunsvigia** hybrid clones, named by Mrs. Macarthur, be given to the bearer of the note. Due to the deterioration of the writing, there is uncertainty about the first letter (probably "F") of the name of the hybrid, which is here indicated as 'Felicia'. Historically, this is of importance since it shows an interest by the Macarthurs in Bidwill's breeding activities, who had perhaps more than one named hybrid **Brunsvigia** clone at that early date.

'Lady Parker', Hannibal, in Herbetia 10: 66. 1943 (1944). Type of **Amaryllis** x **parkeri** W. Watson, Gard. Chron. Feb. 6, 1909, p. 92; X Brunsdonna parkeri (W. Watson) Worsley, in Jour. RHS 51: 65-69. 1926; **Brunsvigia** x. **parkeri** W. Watson ex Traub, in Plant Life 5: 134. 1949; 16: 59. 1960; vol. 17. 1961.

'Radiata Queen', see **'Ramogrande'.**

'Ramogrande' (Hannibal, 1960), Plant Life, vol. **17.** 1961. Syn.—'Radiata Queen' (Hannibal, 1960), in Plant Life **16:** 77. 1960.

'Wild Rose' (Traub, 1961) in Plant Life, vol. **17.** 1961; flowers apple blossom pink.

The Genus X Crinodonna
1921 – 1960

Catalog of X Crinodonna Cultivars

By
Hamilton P. Traub

FIRST EDITION

THE AMERICAN PLANT LIFE SOCIETY
BOX 150, LA JOLLA, CALIFORNIA
1961

THE GENUS X CRINODONNA

HAMILTON P. TRAUB, *California*

Dr. Attilio Ragionieri, noted for his professional writings in the field of medicine, died at Firenze (Florence), Italy, Oct. 11, 1933. He carried on plant breeding as an avocation. His chief originations consisted of improved freesias, ranunculi, callas, hybrid amaryllids, lily-of-the-valley and various fruits. One of his outstanding originations we know today as the type of X *Crinodonna corsii,* a hybrid between *Brunsvigia rosea* (the CAPE BELLADONNA) ♀ and *Crinum moorei* ♂, which he reported in Gardeners' Chronicle, with figure, Jan. 15, 1921 (see also Yearbook American Amaryllis Society (Herbertia) 1: 64. 1934). This marks the beginning of the recorded history of the bi-generic genus X *Crinodonna* which is important in the horticulture of the United States and other parts of the world today.

The present review serves as the starting point of the nomenclature of X *Crinodonna.* It serves also as a catalog of cultivars since all of these hybrids were made under cultivation, and are maintained as ornamental plants. This is an opportune time to emphasize the desirability of registering all new X *Crinodonna* names in accordance with the registration service maintained since 1934 by the AMERICAN AMARYLLIS SOCIETY which is affiliated with the AMERICAN PLANT LIFE SOCIETY. This will avoid duplication, mispelling, and misapplication of names in the future.

HISTORICAL REVIEW

Dr. Ragionieri in 1921 named his hybrid, *Crinodonna memoria corsii,* stating—"I have dedicated this new hybrid to the venerated memory of the late Marquis Bardo Corsi Salvati, of Florence (Firenze), the enthusiastic and very intelligent lover of fine plants, who had formed in his garden at Sesto the most complete collection of stove and other plants in Italy."

The name chosen by Dr. Ragionieri for the type of the genus was not strictly in accordance with the Botanical Code which insists on binomial epithets. Accordingly, Stapf (Bot. Mag. Lond. Plate 9162. 1929) made the necessary corrections, and thus the name became X *Crinodonna* corsii. This first hybrid, on the clonal level, is properly known as X *Crinodonna corsii* clone 'Dr. Ragionieri'. Unfortunately, the hybrid made by Dr. Ragionieri in Italy is not available in the United States. It is most likely preserved in gardens there and it is hoped that our Italian friends will exchange offsets of it for different X Crinodonnas produced in the United States.

Fred H. Howard (1873—1948), of Montebello, California, independently made the same cross recorded by Dr. Ragionieri. Howard's cross was first reported by J. Coutts, in Gardeners' Chronicle, London, LXXVIII: 411, fig. 171. 1925.

Through the efficient research of Marion B. Crowell, on the Library staff of the Massachusetts Horticultural Society, Boston, Mass., the early

history of X *Crinodonna corsii* clone 'Fred Howard' (syn.-*Amarcrinum howardii* Hort.) has been traced. Under date of Sept. 21, 1926, the Royal Horticultural Society of London, England awarded a First Class Certificate to this clone. The flowers are described as "pale blush rose, becoming rather deeper at the tips." Later in the same year "it was awarded the major prize, the Cory Cup, as the most important novelty certificated during the entire year," by the Royal Horticultural Society, London. In Howard & Smith's Spring and Summer Catalog, Season 1928, Los Angeles, Calif., page 32, it is referred to as a cross of *Crinum moorei* (♂) on the Cape Belladonna, *Brunsvigia rosea* (♀). "The value of this new plant lies in its usefulness as a bulbous plant for growing in pots or for planting in the open garden. Its beautiful soft pink color . . . combined with the lasting character of its flowers, place it in a class by itself. In 1929, Dr. Stapf of Kew, figured X *Crinodonna corsii* [the clone 'Fred Howard'] in the Botanical Magazine, London, Plate 9162.

Alonzo C. Delkin, of Arcadia, Calif., obtained a X *Crinodonna* clone from Mr. Tom Shimoda, of Monrovia, Calif. in 1943, who had collected it in a field in the City of Los Angeles many years ago before the population exploded to its present extensive proportions. The clone has been appropriately named 'Lon Delkin' in honor of Mr. Delkin, an outstanding amateur horticulturist and amaryllidarian (see Plant Life *10:* 49. 1954). This clone is important since it indicates that apparently the bigeneric cross had been made at least once before either Dr. Ragionieri or Fred H. Howard made a similar cross.

L. S. Hannibal, of Fairoaks, Calif., began breeding X Crinodonnas in 1941. His earlier work (Hannibal, 1943), showed success in using *Brunsvigia rosea* var. *minor* as the seed parent and *Crinum moorei* as the pollen parent. In 1952, he introduced the clone 'Dorothy Hannibal' (Hannibal, 1952), which is widely grown. More recently, he has also used *Brunsvigia* x *parkeri* as the seed parent. Up to the present he has produced over 200 seedlings.

Mrs. Polly Anderson, of La Canada, Calif., began X *Crinodonna* breeding in 1948, and at the end of ten years has accumulated over 28 seedlings (Anderson, 1959; 1961). She has utilized both *Brunsvigia rosea* and *B.* x *parkeri* as seed parents, making crosses with *Crinum moorei,* and the hybrid clone 'Ellen Bosanquet'.

Hamilton P. Traub, of La Jolla, Calif., began making X *Crinodonna* crosses in 1956, and up to 1959 had 82 evergreen seedlings in his experimental garden. He has used *Brunsvigia rosea* and *B.* x *parkeri* as seed parents, and tall, medium and dwarf statured forms of *Crinum moorei* as pollen parents. He is also experimenting in the use of the hybrid *Crinum* clones 'Cecil Houdyshel', 'Ellen Bosanquet' and 'Elizabeth Traub' and *Crinum americanum* and *C. bulbispermum,* as pollen parents (Traub, 1961).

The cross, *Brunsvigia* x *parkeri* clone 'Hathor' ♀ x *Crinum moorei roseum* ♂, represents a new kind of X *Crinodonna,* which Dr. Moldenke has named X *Crinodonna traubii,* with the clone 'Alma Moldenke', with rhodamine pink flowers, as the type (Moldenke, 1961).

Dr. Joseph C. Smith, of La Mesa, Calif., and possibly others, are also breeding X Crinodonnas, but up to the present they have not made any progress reports. It is hoped that they will avail themselves of these columns to write about their experiences in the future.

EXPERIMENTAL TAXONOMY

The historical review shows that the bigeneric hybrids are a distinct cultural asset, but the purpose of the present report is concerned mainly with experimental taxonomy. It is rarely that such excellent material is available for systematic study. But the work has only been started since there are a great many possible hybrid combinations between the many species of *Crinum* and *Brunsvigia*. Extensive trials with such material will bring to light various relationships between the species of these genera.

Genus X CRINODONNA Ragionieri ex Traub, **hybr. gen. nov.**

X *Crinodonna* Ragionieri in Gard. Chron. Lond. p. 32 (Jan. 15). 1921 (err. *Crindonna);* Stapf, in Bot. Mag. Lond. *153:* sub plate 9162. 1927 (1929); Bull. Missouri Bot. Gard. *21:* sub plate 6. 1933; Yearbook Amer. Amaryllis Soc. (Herbertia), *1:* 64. 1934.

Syn.—X *Amarcrinum* J. Coutts, in Gard. Chron. Lond. Ser. 3, *LXXVIII:* 411, fig. 171. 1925.

Plantae inter Brunsvigiam et Crinum hybridae; bulbo ovoideo vel globoso tunicato; collo tunicato et interdum eitam vagina folii tubulosa basali ornato; foliis usque ad ordinem distichum vel radiatum inclinatis; floribus albis vel rubellis usque ad purpureis—ceterum descriptionem originalem generis hybridi bignerici persimilibus.

TYPE: X *Crinodonna corsii* Ragionieri ex Traub.

Diagnosis.—Plant evergreen, vegetating chiefly at the end of summer; rootstock an ovoid or globular tunicated bulb with neck, and sometimes in addition, a tubular basal leaf-sheath above the neck; leaves strap-shaped; more or less distichously, or sometimes more or less radially arranged; scape solid; spathe 2-valved; umbel 8—17- or more-flowered; flowers pedicellate, white, pink or purple; ovary oblong, ovules about 6 per locule; tepaltube 2.7—4.2 cm. long; limb of 6 tepalsegs, bilaterally symmetrical; stamens and style fasciculate-declinate-ascending; anthers finally crescent-shaped; stigma minutely trifid.

Hybrids are Sterile.—The bi-generic hybrids between *Brunsvigia* and *Crinum* obtained so far are sterile. This supports the thesis that these two groups are in fact biologic genera, both on the basis of morphological differences (distichous vs. radial arrangement of leaves) that form a decided gap, and the isolating mechanism that results in sexual sterility in the hybrids. Although there are many other combinations of parents that have not been used in crossing experiments so far, the possibility that any of these should turn out to produce fertile hybrids does not appear very promising due to the decided gap between the two genera.

Possible Fertility by Polyploidy.—There still remains one possible avenue towards fertility and that is through polyploidizing the hybrids. The basic chromosome number in *Brunsvigia* and Crinum is x=11, and all *Brunsvigia* species so far investigated have 2n=22

chromosomes (Gouws, 1949; Traub & Moldenke, 1949; Traub, 1958). In Crinum the same is true, except that one polyploid is known, *Crinum gouwsii* Traub, 2n= c. 72 (Gouws, 1949). This polyploid is fertile when siblings are crossed. Thus there is the possibility that if the 2n=44, or tetraploids of X *Crinodonna* clones can be obtained, these might be intra-fertile.

The colchicine technique has been successful in polyploidizing such distant relatives as *Hemerocallis* and *Allium* (Traub, 1951), and experiments are now under way with X *Crinodonna* clones. The question arises that if such fertile bi-generic hybrids are produced, the outlook on such hybrids should be altered sufficiently so that the multiplication sign (X) before the generic name can be eliminated. This multiplication sign before the name is a very great nuisance to everyone concerned (including the editor, printer and the gardener), and such emancipation would be welcome.

Crosses Reported.—Of the many possible crosses of *Brunsvigia* species with *Crinum* species, only a few have been made. The following are on record:

Brunsvigia rosea major ♀ x *Crinum moorei* ♂ (many have flowered) = *Crinodonna corsii.*

Brunsvigia x *rosea minor* ♀ x *Crinum moorei* ♂ (several have flowered) = X *Crinodonna corsii.*

Brunsvigia x *parkeri* ♀ x *Crinum moorei* ♂ (several have flowered) =X *Crinodonna traubii.*

Brunsvigia rosea major ♀ x *Crinum bulbispermum* ♂ (have not flowered to date) =X *Crinodonna* sp.

Brunsvigia rosea major ♀ x *Crinum americanum* ♂ (have not flowered to date) =X *Crinodonna* sp.

In addition *Brunsvigia* rosea has been crossed with *Crinum* x *powellii* cl. 'Cecil Houdyshel'; and with the clone 'Elizabeth Traub' *(Crinum scabrum* x cl. 'Ellen Bosanquet'); and *Brunsvigia* x *parkeri* with the clone 'Ellen Bosanquet'; but none of these have flowered up to the present time (see Traub, 1961).

Isolating Mechanisms.—The herbarium taxonomist in many cases pays little or no attention to bigeneric hybrids made under cultivation since he considers only plants collected in the wild as important. This is obviously unscientific and short-sighted. Therefore, in the present study herbarium specimens have been carefully preserved on a basis equivalent to that for wild plants.

Although the scientist is not interested in utility as such, it is pertinent to mention that the intensive study of, and experimentation with, bigeneric hybrids will provide important information on the genetic relationships between the taxonomic groups concerned. So far, the data uphold the thesis that *Brunsvigia* and *Crinum,* with decided morphologic (distichous or biflabellate vs. radial arrangement of leaves) and genetic gaps between them, are valid biologic genera. The hybrids are a curious mixture from the standpoint of leaf arrangement. Some show a distinct tendency toward the distichous arrangement of leaves, others show an

intermediate—somewhat bi- or tri-flabellate—arrangement. Others show a tendency toward the radial arrangement of leaves. Thus the great morphologic gap between the parents that is easily visible, appears to be the pattern of leaf arrangement. More important, however, from the standpoint of genetic isolating mechanisms, are the gene mutations of the chromosomes, including those responsible for leaf arrangement, which remain to be studied in detail. All of the crosses so far made have given rise to sterile hybrids.

If the experiments under way to polyploidize the sterile X *Crinodonna* clones and thus obtain fertility should succeed, these would throw light on one possible evolutionary mechanism for the origin of genera.

KEY TO THE SPECIES AND NAMED CLONES OF **X CRINODONNA**

[The key is based on hybrids described through October 1960.]

1a. Bulb ovoid, with neck, rather large; leaves showing tendency toward distichous arrangement; flowers white or pink ..... 1. **corsii**

2a. Flowers white ..... no clone yet named

2b. Flowers light, medium or deeper pink:

3a. Flowers light or medium pink:

4a. Flowers light pink, fading to almost whitish with age; tepaltube 3.5—3.6 cm. long; tepalsegs 7.5—8.4 cm. long; pedicels 3—3.5 cm. long .... 1a. **corsii** cl. **'Lon Delkin'**

4b. Flowers medium pink; tepaltube 4 cm. long; tepalsegs 7.1—8.2 cm. long; pedicels 2—3 cm. long:

5a. Flowers pinkish rose, deeper in center of the tepalsegs and at the apex ..... 1b. **corsii** cl. **'Dr. Ragionieri'**

5b. Flowers rhodamine pink (HCC-527/1), darker on the face downwards, passing into white on the back along the keel ..... 1c. **corsii** cl. **'Fred Howard'**

3b. Flowers deeper pink (Persian rose, HCC-628/1) on opening, fading to lighter pink with age; tepaltube 3.7—4.2 cm. long; tepalsegs 7.5—8.4 cm. long; pedicels 2—6 cm. long ..... 1d. **corsii** cl. **'Dorothy Hannibal'**

1b. Bulb globular, with neck, smaller; sometimes in addition, a tubular basal leaf-sheath; leaves showing a tendency towards a more or less distichous, or to a more or less radial, arrangement; flowers white, pink or purple ..... 2. **traubii**

6a. Flowers white ..... no clone yet named

6b. Flowers pink or purple:

7a. Flowers rhodamine pink (HCC-628/2), white throat, apricot at extreme base; tepaltube 2.7 cm. long; tepalsegs 6.8—7 cm. long; pedicels 1.3—2.4 cm. long ..... 2a. **traubii** cl. **'Alma Moldenke'**

7b. Flowers purple ..... no clone yet named

1. X **Crinodonna corsii** Ragionieri ex Traub, **hybr. nov.**

X *Crinodonna corsii* Ragionieri, Staff in Bot. Mag. Lond. 153: plate 9162. 1927 (1929).

Syn.—X *Crinodonna memoria corsii* Ragionieri, Gard. Chron. LXIX: 32, fig. 17. 1921; Bull. Soc. Tosc. XLVI: 20. 1921; Year Book Amer. Amaryllis Soc. (Herbertia), 1: 64. 1934; X *Amercrinum Howardii* J. Coutts, in Gard. Chron. Ser. 3, LXXVIII: 411, fig. 171. 1925.

Planta bulbosa; bulbo tunicato ovoideo vel globoso; collo brevi usque ad mediocriter longo tunicato; foliis ad ordinem distichum; floribus albis vel rubellis ceterum descriptionem originalem generis hybridi bigenerici persimilibus.

TYPE: Description and figure (Gard. Chron. Lond. p. 32, fig. 17, Jan. 15. 1921 = X *Crinodonna corsii* cl. 'Dr. Ragionieri', see 1b. below.

DESCRIPTION.—Plant evergreen, vegetating chiefly at the end of summer; rootstock an ovoid tunicated bulb with neck; leaves more or less distichous, strap-shaped; scape solid; spathe 2-valved; umbel 8—17- or more-flowered; flowers pedicellate, white or pink; tepaltube 3.5—4 cm. long; limb of 6 tepalsegs, bilaterally symmetrical; stamens and style fasciculate-declinate-ascending; anthers finally crescent-shaped; stigma minutely trifid.

These are hybrids between the Cape Belladonna, *Brunsvigia rosea* (various forms) and *Crinum moorei* (various forms). The clones 'Dr. Ragionieri', 'Fred Howard' and 'Lon Delkin' are fairly similar since they are crosses of *Brunsvigia rosea* (forma *major)* ♀ and *Crinum moorei* (forma *roseum)* ♂; the flowers are light pink to medium pink. The clone, 'Dorothy Hannibal' represents a cross of *Brunsvigia rosea minor* ♀ with *Crinum moorei* (forma *roseum)* ♂ and its flowers are deeper pink.

The white clones from crosses of the pale *Brunsvigia rosea* (forma *major)* ♀ with *Crinum moorei* (forma *album)* ♂ have not been named up to the present.

1a. X **Crinodonna corsii** clone **'Lon Delkin'**, Traub, in Plant Life 10: 49. 1954.

Syn.—X *Crinodonna corsii* clone 'Delkin's Find', Plant Life 10: 49. 1954.

DESCRIPTION.—*Bulb* ovoid, with an elongated neck. *Leaves* present at time of flowering, evergreen, 47 cm. long, 3—4 cm. wide, narrowing somewhat towards the base, and towards the acute apex, more or less distichous, strap-shaped, recurved, flat or shallowly channeled downwards, laterally grooved. *Scape* solid, somewhat flattened, with roundish edges, dark green to fuscous-reddish in lower ¼, lighter green above, up to 63 cm. tall, 1.1 x 2.2 cm. in diam. at the base, 0.9 x 1.2 cm. in diam. at the apex. *Spathe* green, 2-valved, lanceolate with infolded edges, apex truncate to roundish. *Umbel* 9—16-flowered; flowers light pink on opening, fading to lighter pink or almost whitish with age, fragrant; perigone slightly curved. *Pedicels* 3—3.5 cm. long at anthesis. *Ovary* 1.4—1.9 cm. long, 5—7 mm. in diam., ovules about 6 per locule. *Tepaltube* 3.5—3.6 cm. long, 4—6 mm. in diam. at the base, 9—9.5 mm. in diam, at the apex, greenish in lower 1/3, changing to white above. *Tepalsegs* lanceolate, acute, 8.5—9.3 cm. long, 2.2—3.2 cm. wide. *Stamens* about ¾ as long as the segs, anthers crescent-shaped, versatile; *Style* slightly longer than the stamens, but shorter than the segs. *Stigma* minutely 3-lobed.

HOLOTYPE: Traub No. 681a+b (TRA), 8-14-53, cult. Arcadia, Calif. Additional specimens: Traub No. 689a+b (TRA), 7-14-58, cult. La Jolla, Calif.; Traub No. 680a+b (TRA), 8-9-59, cult. La Jolla, Calif.; Traub No. 821a+b (TRA), 9-4-59, cult. La Jolla, Calif.

The parentage of this clone is unknown, but from its morphological characters appears to be a cross similar to those made by Dr. Ragionieri and Mr. Howard—the Cape Belladonna, *Brunsvigia rosea* (forma *major)* ♀ and *Crinum moorei* ♂. The clone was obtained by Alonzo C. Delkin, of Arcadia, Calif., from Mr. Tom Shimoda, of Monrovia, Calif., in 1943, who had collected it in a field in the City of Los Angeles many years ago before the population had expanded to its present proportions. The clone has been named for Mr. Delkin who is an outstanding amateur horticulturist and amaryllidarian, who rescued it from oblivion and brought it to the attention of the public.

1b. X **Crinodonna corsii** clone **'Dr. Ragionieri'**, new clone.

Ragionieri, in Gard. Chron. *LXIX:* 32, fig. 17. 1921; Bull. Soc. Tosc. Ortic. *XLVI:* 20. 1921.

TYPE (NOMENIFER) DESCRIPTION AND FIGURE.—(Gardeners' Chronicle (Lond.), p. 32. fig. 17, Jan. 15, 1921) ". . . Plant evergreen, the chief period of vegetation occurring at the end of summer. Bulb—8.9 cm. in diameter, ovoid, with rather fibrous tunic, plentifully proliferous, with a neck about 15 cm. long. Leaves 10-12 to a bulb, drooping sometimes, showing a tendency to be distichous, dark green, more or less carinate, 3-4 cm. broad, 70-90 cm. long. Peduncle—stout, compressed, green with a purplish tone at the base, lightly glaucous, 50 cm. long. Spathe valves—about 13 cm. long, 3 cm. broad, with a rose coloured stripe occupying the third central portion in its whole length. Perianth [perigone] with a slightly curved tube [tepaltube], 14 cm. long; segments [tepalsegs] acuminate, the three external ones [setsegs] 2 cm. broad, the interior ones [petsegs] 3 cm. [broad]; colour pinkish rose, more deep in the center of the segments [segs] and at their apex. Filaments—shorter than the corolla [tepalsegs] and of the same colour. Anthers—linear. Style—rather shorter than the perianth [perigone], colour dark rose pink. Stigma—trifid. Flowering time, August."

Article 45 of the Code for Cultivated Plants (1958) provides that when a cultivar of an interspecific hybrid is introduced into cultivation, it must be given a cultivar name in addition to the collective name, even if only one cultivar of the hybrid is concerned. This provision apparently refers to intra-generic and inter-generic hybrids. Accordingly, the name, 'Dr. Ragionieri' is proposed for the type clone cultivated in Italy.

This is a hybrid between the Cape Belladonna, *Brunsvigia rosea* (forma *major)* ♀ and *Crinum moorei* ♂.

1c. X **Crinodonna corsii** clone **'Fred Howard'**, new clone.

Syn.-X *Amarcrinum* J. Coutts, in Gard. Chron. Lond. Ser. 3, *LXXVIII:* 411, fig. 171. 1925; X *Crinodonna crosii* Ragionieri, Stapf in Bot. Mag. Lond. *153:* plate 9162. 1927 (1929); Bull. Missouri Bot. Gard. *21:* plate 6. 1933.

DESCRIPTION.—*Bulb* ovoid, with elongated neck. *Leaves* more or less distichous, strap-shaped, recurved, flat or shallowly channeled downwards, laterally grooved, acute, up to 70 cm. long, 3—5 cm. wide, dark green. *Scape* solid, somewhat compressed, with blunt edges, 70—81 cm. tall, 1.3 x 2.5 cm. in diam. at the base, 5 x 12 to 9 x 13 mm. in diam. at the apex, reddish in lower 1/3. *Spathe* 2-valved, lanceolate, green, margins infolded, 8.5—9 cm. long. *Umbel* 8—12—16—17 or more-flowered; flowers rhodamine pink (HCC-527/1), tepalseg tips deeper pink, amberish deep in throat, whitish throat, changing to lighter pink (HCC-527/2) with age; fragrant. *Pedicels* 2—3 cm. long. *Ovary* 1.1 to 1.7 cm. long, 5 x 6 mm. in diam.; ovules about 6 in a cell. *Tepaltube* slightly curved, 4 cm. long, 5 mm. in diam. at the base, 8—9 mm. in diam. at the apex. *Tepalsegs* lanceolate, acute, 7.1—8.2 cm. long, 2-4—3.2 cm. wide. *Stamens* about 2/3 as long as the segs, anthers crescent-shaped, versatile. *Style* slightly longer than the stamens, but shorter than the segs. *Stigma* minutely trifid.

SPECIMENS: J. Coutts, brief description, with figure, in Gard. Chron. LXXVIII: 411, fig. 171. 1925. Specimens: Traub No. 70 (TRA), 9-16-49, cult. Beltsville, Md., greenhouse; Traub No. 628a+b (TRA), 8-20-59, cult. La Jolla, Calif.: Traub No. 686a+b+c (TRA), 8-25-59, cult. La Jolla, Calif. (Holotype)

In order to distinguish this clone from the clone 'Dr. Ragionieri', it is necessary to give a new name to the hybrid made by the late Fred H. Howard in California. This is also a hybrid between the Cape Belladonna, *Brunsvigia rosea* (forma *major)* ♀ and *Crinum moorei* ♂.

1d. X **Crinodonna corsii** clone **'Dorothy Hannibal'**, Traub in Plant Life 8: 85. 1952.

DESCRIPTION.—*Bulb* ovoid, neck elongated. *Leaves* evergreen, strap-shaped, narrowed somewhat towards the base, and towards the acutish-bluntish apex, more or

less distichous, recurved, flat or shallowly channeled downwards, laterally grooved, up to 58 cm. long, 3—4.8 cm. wide. *Scape* solid, 69 to 75 cm. tall, somewhat flattened, with rounded edges, 1.1 x 2.1 to 1.3 x 2.1 cm. in diam. at the base, 8 x 11 to 9 x 12 mm. in diam at the apex. *Spathe* 2-valved, lanceolate, 8.5—10 cm. long, margins infolded, apex acutish-roundish. *Umbel* 15—16—18-flowered, flowers held horizontally or somewhat upright, medium pink (Persian rose, HCC-628/1 = vivid reddish purple DCN-236) on opening, fading to lighter pink (HCC-628/3) with age; fragrant. *Pedicels* 2—2.2—2.5—6 cm. long. *Ovary* 1.5 cm. long, 5—6 mm. in diam., ovules about 6 per locule. *Tepaltube* slightly *curved*, 3.7—4.2 cm. long, 4.5—5 mm. diam. at the base, 7—8 mm. in diam. at the apex. *Tepalsegs* 7.5—8.4 cm. long, 2.2—2.9 cm. wide, lanceolate, acute. *Stamens* about ¾ as long as the segs, anthers crescent-shaped, versatile. *Style* slightly longer than the stamens but shorter than the segs. *Stigma* minutely 3-lobed.

HOLOTYPE: Traub No. 133a+b (TRA), 2-24-50, cult. Beltsville, Md., greenhouse. Additional specimens: Traub No. 134a+b+c (TRA), 3-9-50, cult. Beltsville, Md., greenhouse; Traub No. 688a+b (TRA), 8-29-59, cult. La Jolla, Calif.

This is a departure from the X *Crinodonna* clones already discussed since it is a cross between the late-flowering form of the Cape Belladonna, *Brunsvigia rosea* (forma *minor)* ♀ and *Crinum moorei* ♂, made by Mr. L. S. Hannibal of Fair Oaks, Calif. The color of the flower is deeper pink and the plant is somewhat smaller.

2. X **Crinodonna traubii** Moldenke, in Plant Life 17: 60. 1961.

DESCRIPTION.—Plant evergreen, vegetating chiefly at the end of summer; rootstock a globular tunicated bulb with neck, and in addition, a tubular basal leaf-sheath above the neck; leaves more or less distichous or sometimes more or less radially arranged, strap-shaped; scape solid; spathe 2-valved; umbel 8—18- or more-flowered; flowers pedicellate, white, pink or purple; ovary oblong, ovules about 6 per locule; tepaltube 2.7 cm. long (in type), sometimes shorter, or longer; limb of 6 tepalsegs, bilaterally symmetrical; stamens and style fascisulate-declinate-ascending; anthers finally crescent-shaped; stigma minutely trifid.

HOLOTYPE: Traub No. 809a+b (TRA), 8-25-60, cult. La Jolla, Calif. = clone 'Alma Moldenke'.

These plants represent quite a different kind of X *Crinodonna* from those already considered since they are the result of crosses between the hybrid, *Brunsvigia* x *parkeri* W. Watson ex Traub (various forms) and *Crinum moorei* Hook. f. (various forms). *Brunsvigia* x *parkeri* originated in Australia many years ago, and involves crosses between the Cape Belladonna, *Brunsvigia rosea* (various forms) and the two *Brunsvigia* species, *B. grandiflora* and *B. josephinea* (Traub & Hannibal, 1960).

The hybrids obtained in this class of X *Crinodonna,* up to the present, have the tubular basal leaf-sheath above the neck. The bulbs are smaller and globular in contrast to the larger shaggy ovoid bulbs of X *Crinodonna corsii,* plants of X *Crinodonna traubii* appear to be more truly evergreen than in X *Crinodonna corsii* in which the plants rest in summer in a manner similar to *Crinum moorei.*

Up to the present, only one clone has been named, but many of these hybrids have already been made and other beautiful clones will be named in the future including the entire color range from white, to pink and purple.

2a. X **Crinodonna traubii** clone **'Alma Moldenke'** Moldenke in Plant Life 17: 60. 1961.

DESCRIPTION.—*Bulb* globose, making offsets freely, 8 cm. in diam., bulb neck 2.5 cm. long, 3.3 cm. diam., tubular basal leaf-sheath, 9 cm. long, 3 cm. in diam.; *leaves* 16 or more, more or less radially arranged, lorate, canaliculate, margins somewhat undulate, narrowing to an acutish-roundish apex, lettuce green (HCC-861), up to 54 cm. long, 5.5 cm. wide at the base, 6.0 cm. wide about ¼ from base, narrowing gradually to the apex; *scape* solid, flattish, with rounded edges, 64 cm. long, 1.4 x 2.4 cm. in diam. at the base, 1.0 x 1.4 cm in diam. at the apex, glaucous, somewhat rusty-reddish near the base; *spathe* 2-valved, lanceolate, 7.3 cm. long, green and rusty-reddish, margin infolded, apex acutish-rounded; *umbel* 10-flowered, 25 cm. in

diam., flowers delicate rhodamine pink (HCC-527/2) inside of the flower, with white throat and apricot-colored at the very base, lighter pink on upper part on outside, turning to whitish down to middle of tepaltube, changing to lighter pink with age, thus at any one time there may be flowers of three shades of pink in the umbel; flowers 8 cm. across face; stamens and style white in lower ¾, pink above; *pedicels* 1.3—2.4 cm. long; *ovary* 11 mm. long, 5 x 6.5 mm. in diam., *ovules* abortive, few in a locule; *tepaltube* curved, 2.7 cm. long, 5.5 x 6 mm. at the base, 10 mm. in diam, at the apex; *tepalsegs* oblanceolate, setsegs 7 cm. long, 2.3 cm. wide, apex acute, apiculate; petsegs 6.8 cm. long, 2.8-2.9 cm. wide, apex acute, apiculate; *stamens* attached at the throat of the tepaltube, of 4 different lengths, fascisculate, declinate-ascending, about 2/3 as long at the segs, anthers versatile, 9 mm. long, pollen cream-colored; *style* overtopping the stamens, but shorter than the segs; *stigma* minutely trifid.

HOLOTYPE: Traub No. 809a+b (TRA), 8-25-60, cult. La Jolla, Calif.

This X *Crinodonna* clone is the result of a cross between *Brunsvigia* x *parkeri* (Australian group) clone 'Hathor' ♀ and *Crinum moorei* (forma *roseum)* ♂. It is notable that offsets are produced freely in contrast to several siblings which make few if any offsets.

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[PLANT LIFE LIBRARY, continued from page 172.]

BIOLOGICAL AND CHEMICAL CONTROL OF PLANT AND ANIMAL PESTS, edited by L. P. Reitz. American Association for the Advancement of Science, 1515 Massachusetts Av., N. W., Washington, D. C. 1960. pp. 285. 11 illus. Index. $5.75. The papers in this symposium were presented by nineteen outstanding authorities at the 1957 meeting of the American Association for the Advancement of Science. Part I is concerned with the exclusion and eradication of plant and animal pests; the control of forest diseases and insects; education in the use of pesticides; and regulatory control of pesticides. Part II is devoted to recent advances in chemical control of plant diseases, weeds, insects, and internal parasites of domestic animals. Part III deals with biological control of various pests, including also breeding for resistance to diseases and insects. This is required reading for all interested in the control of plant and animal pests.

EVOLUTION ABOVE THE SPECIES LEVEL, by Bernhard Rensch. Columbia University Press, 2960 Broadway, New York. 1960. pp. 419. illus. $10.00. This English translation is based on the German edition with some revisions. It was written during the latter part of the last war in Germany "with the intention of proving that very probably the major trends of evolution are brought about by the same factors that bring about race and species formation." This was written without knowledge of parallel work by American specialists in this field who had come to similar conclusions which are now corroborated by the work of Dr. Hensch. After considering the causative factors of infraspecific evolution, the following topics are discussed: six types of race and species formation in nature; undirected and directed transpecific evolution; absolute speed of evolution; phylogenetic branching; progressive evolution; evolution and life; autogenesis, ectogenesis, and bionomogenesis; and evolution of phenomena of consciousness. This outstanding book is required reading for all biologists.

BANANAS, by N. W. Simonds. Longmans, Green & Co., 119 W. 40th St., New York 18, N. Y. 1959. pp. 466. illus. This scholarly book deals with the cultivation of the banana, exclusive of the technology of the distributive trades. First, the botany of edible bananas is considered. This is followed by discussions of the climate and soils; planting and management; harvesting, transportation and ripening; composition and utilization of the fruit; production and economics; history; pests and diseases; and banana breeding. This outstanding book on the banana is highly recommended.

BIOLOGY OF MYCORRHIZA, by J. L. Harley. Interscience Publishers, 250 5th Av., New York 1, N. Y. 1959. pp. 233. illus. $8.75. It is generally known that the roots of many plants form specialized mycorrhizal organs in association with fungi. This text by an outstanding authority presents the known scientific facts about this subject which show that mycorrhiza are functional absorbing organs. Part I deals in general with the association of roots with fungi. Part II is concerned with the ectotrophic mycorrhizas of forest trees; the fungi of ectotrophic mycorrhizas; the physiology of salt absorption, and the ecology of, ectotrophic mycorrhizas. Part III is devoted to endotrophic mycorrhiza,—in Ericales and Orchidaeae; other mycotrophic plants with separate endophytes; and mycorrhizas caused by aseptate mycelia. This important book is of importance not only to foresters, horticulturists, agronomists, but also is required reading for all biologists.

[PLANT LIFE LIBRARY, continued on page 106.]

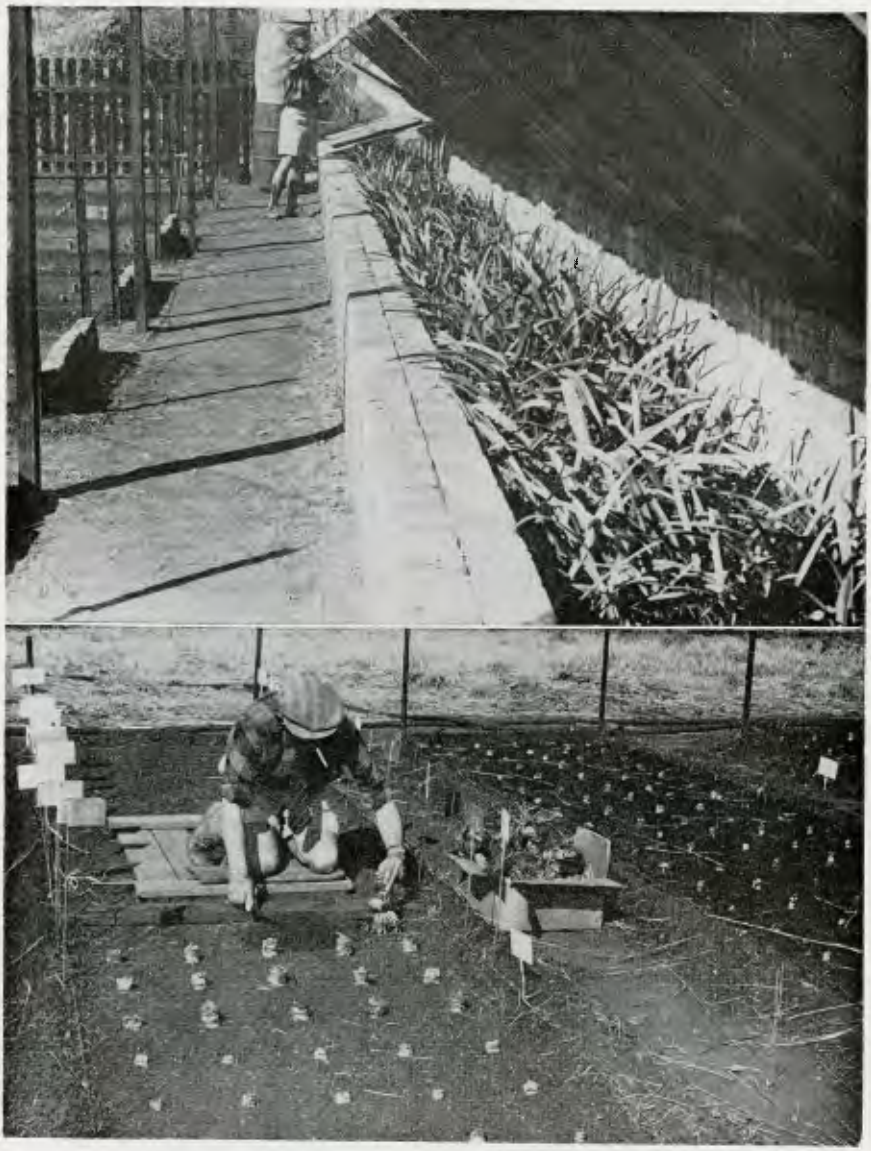

Fig. 11. "Weaning" bed for young vegetatively propagated Amaryllis stock, and transplanting semi-mature bulbs for spring shipment, Amaryllis nursery of Leon Boshoff-Mostert, Balfour, Transvaal, South Africa.

[Caption—continued on lower page 77—opposite.]

3. GENETICS AND BREEDING

AMARYLLIS IN SOUTH AFRICA

LEON BOSHOFF-MOSTERT, *Kleinskuur,*
P. O. Box 84, Balfour, Transvaal, South Africa

[PART 2—CULTIVATION AND BREEDING; CONTINUED FROM PAGE 110, PLANT LIFE, 1960]

In order to have a clear mental picture and proper appreciation of the methods of culture of the amaryllis in South Africa (see Fig. 11 for propagation procedure), it is necessary to be acquainted with South African climatic conditions. Our geographical situation in relation to the equator has an important bearing on cultural methods which, broadly speaking, greatly vary from those generally in vogue in the United States. I am purposely employing the term "broadly speaking" for the reason that in the South, along the regions of the Gulf of Mexico and also in Southern California, I came across amaryllis in private gardens grown by methods similar to those practised here in my own country. I understand this also applies to Florida which, unfortunately, owing to pressure of time, we were not able to visit.

In the Union of South Africa, the amaryllis is predominantly an outdoor plant, although it is often seen indoors in pots during the blooming season. But in such cases the pots, with their flowering bulbs, are brought indoors for decorative purposes. Our climatic conditions are such that the necessity for indoor culture falls away and the amaryllis becomes a garden subject, very often grown for cut flowers.

The object of conservatories or glass houses, whether equipped with an artificial heat control system or otherwise, is to protect plants or

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[Caption—continued from bottom of page 76—opposite.]

Upper, "weaning" bed for young vegetatively propagated *Amaryllis* stock, under hinged glass covers. These are constructed from corrugated steel sheets cut to a length of 4 feet from which a portion of 36" x 18" is removed and a reinforced glass sheet fitted. The bed itself, with front and back brick walls, 24" and 30" high, respectively, is 3 feet wide by 48 feet long and annually accommodates approx. 2,500 young bulblets. These remain in the "weaning" bed for almost a year, by which time they have developed sufficiently for transplanting in open beds, where they come into full bloom after another two years. This view was photographed last year, 9 months after removal of the tiny bulblets from the "incubators". As can be seen, some of the leaves were then already over 24" long. As soon as the bulblets show signs of "taking", they are fed fortnightly, by watering with a special *Amaryllis* plant "food" which is dissolved at the rate of one tablespoonful to a gallon of water. It does push them along. I used to have similar, if not even better, results with liquid manure. No! But what a messy job!!

Lower, this view shows where I am busy transplanting semi-mature bulbs in early spring for shipment the same year. Incidentally, some of those bulbs seen in the view will already be in America by the time this letter reaches you. The open beds are 4'—6" wide and the rows are spaced at 1 foot. The bulbs are also planted 12" apart. At present (August 15, 1960) I have 122 such beds with a total combined length of 4,780 feet.

bulbs, as well as their blooms, against the destructive effect of the elements attendant upon the natural climatic conditions characteristic to the location or area in which the plants are grown. On the whole, South Africa has a temperate climate. Spring and Fall are moderate, Summer is warm to hot and Winter is cold. But even during extremely cold Winter spells when snow falls upon the higher mountain ranges, the atmosphere warms up during the day when the sun shines brightly from our clear cloudless skies. Consequently, freezing of the soil is a very rare phenomenon, even at an altitude of some 6,000 feet where we live on a high plateau, known as the Transvaal Highveld which lies in the South African corn belt.

Since the amaryllis is a Spring flowering bulb, which remains dormant during the Winter, there is no necessity for the protection of the blooms against frost. On the other hand, our Winters are not so severe as to threaten destruction of the bulbs by ground freeze in the open beds. Admittedly, incessant frost over protracted Winter spells does damage the necks and shoulders of the bulbs in the open ground and suitable measures must be taken for the protection of the bulbs against such direct frost on the exposed portions.

For the ordinary home gardener the provision of such protective measures entails very little time and practically no effort. All that is required is some dry straw, hay or bean or other crop husks as a protective covering over the bulbs. In order to avoid excessive growth of weeds during Spring and early Summer cultivation, the choice of the covering blanket should be confined to material which, as far as possible, is free from seed. This may become a difficult matter for the large-scale grower, such as I am, if up to an acre of beds has to be covered each season with the advent of frost, when the straps start wilting and the bulbs enter dormancy. At first, the work entailed in weeding during Spring, after removal of Winter covering, was not only a back-breaking but also a heart-breaking job. Ways and means for the elimination of this extra (and obviously avoidable) work were soon evolved. Natural grasses are cut in the green stage before there is a possibility of maturity of seed. These are left in the open to dry and then stacked in heaps conveniently staggered in the locality of the beds to provide for effortless and expeditious covering when the time arrives. The bulbs are then covered to a depth of a few inches. This ensures a reasonably even soil temperature of the beds throughout the Winter when the bulbs are dormant and, at the same time, they are protected against frost damage.

Although regular normal frost in itself would not destroy the bulbs —unless such frosts are accompanied by repeated freezing and thawing of the soil—it can, nevertheless, have a harmful effect on the bulbs which will manifest itself in the ultimate Spring blooms having blotches and streaky discolourations.

The removal of the Winter covering is an equally simple operation. This is done as soon as the dangers of damage by frost have passed. The material is again neatly stacked in readiness for application the following season. In order to prevent deterioration—especially at the

bottom layers of the covering medium after heavy rains, it may be stacked on wooden poles laid parallel on the ground and conveniently spaced to permit of a free passage of air.

After the beds have been uncovered, they are watered and lightly cultivated between the bulbs. By this time, first signs of Spring growth become evident and the first buds of the earlier blooms start showing. This is also when new root growth starts developing and the bulbs start feeding from the soil after Winter dormancy. From now on, it is essential that the beds be regularly watered and kept reasonably moist all the time.

The treatment described in the foregoing paragraphs has bearing, naturally, only on the conditions applying to our Southern Transvaal Highveld and similar areas where Winter rains are a rarity and our Summer rains are about 26 to 30 inches per annum with, most often, very dry spells between showers or summer downpours. Being at an elevation of 6,000 feet, the air currents are dry and, consequently, the soil also dries out quickly under the basking Summer sun—hence the necessity for regular watering, preferably a good and proper weekly soaking of the beds.

In the Western Province of the Cape where the late Mr. Buller evolved his strain, conditions are entirely different. It is a Winter rainfall area and the soil is wet throughout the dormant spell. Despite the cold and wet, there is no frost, and covering is not required. As in the Transvaal and other frost belts, the straps wither during Winter and new leaf and root growth start in early Spring whilst peak bloom is reached more or less during corresponding periods. Owing to almost complete absence of rain during the blooming season in the Western Cape, the blooms there generally present themselves in a better shape of perfection than in other Provinces where heavy rains, with upward splashes of soil-polluted water, sometimes cause stains and other rain blemishes on the petals and thus detract from their value for exhibition purposes.

My first crosses were effected in 1948 from the initial parcel of Buller bulbs. Those were the days when I was still groping in the dark without any clear-cut idea as to what I should have in mind in regard to ultimate results. There was no hybridizing programme mapped out and in an entirely unorthodox fashion pollen was being applied indiscriminately to any and every available bloom. Furthermore, no records were kept of crosses with the result that there were no possible means eventually of determining parentage.

Subsequently, during Mr. Buller's visit to Kleinskuur and also during my visit to his farm, I was to have my instruction in the art of hybridizing. Now, this is an intricate and involved business and to me, will always remain such because of my countless failures and in spite of my occasional rewarding triumphs. It is an unpredictable venture. Be that as it may. The starting point is a detailed study of those particular clones on which one wishes to work. The choice is confined to those with definitely and determinably interesting, desirable and attractive features which embrace colour, texture, form, size, number of florets,

substance of bloom, length and sturdiness of scape and general vigor of growth, etc. The object is to breed out of a good amaryllis any undesirable characteristic by the introduction of pollen from another variety in which that particular characteristic is favourably and strongly emphasized. Then continue along those lines until all inherent weaknesses are eliminated in the progeny and the desirable aspects of the parents are established in one or more seedlings created along those breeding lines. These are then further propagated vegetatively by cuttage.

I was, naturally, singularly fortunate in having my tuition and instruction from an octogenarian with a wealth of knowledge and practical experience accumulated over a span of half a century. I was also truly appreciative of this unique privilege. Needless to say, my present hybridizing programme is still formulated along those lines with results sufficiently encouraging to maintain my breeding enthusiasm. But, secretly, I am still sorry that those orderly methods of breeding were acquired so early in my career as a hybridist—not that they have in any way minimized the romance of the mysteries which are eventually to be unfolded in the appearance of a new unexpected creation. The reason for my regret is that, from those first year haphazard crosses, has sprung forth new colour-breaks which neither Mr. Buller nor I had thought possible.

In this connection I may add that to the thirty-six different colours in the varieties originally acquired from Mr. Buller, seventeen more have been added over the past twelve years, bringing up the total to fifty-three distinctly different colours in the present Kleinskuur collection. During my visit to the United States in 1960, about which I shall have more to say presently, I was very happy to acquire a number of species, including a yellow and a blue [lilac-colored; *Worsleya rayneri,* syn.—*Amaryllis rayneri*], through the generosity and co-operation of Dr. Traub, Professor Ira Nelson and Messrs. Everett and Politi of the New York Botanical Gardens. On these I am going to work with all the enthusiasm and energy at my disposal and, who knows, along with my own hybrids, there may one day come to light the hybrid amaryllis of my dreams.

It is not intended that space in this article be given to any genus other than the amaryllis. But for the purpose of illustrating the point I now wish to make, it is necessary to refer to the iris. This, after all, is my wife's first love (or do I come first?) and America is iris country. The American Iris Society has over 6,000 members and there are certainly many times more iris lovers with presentable collections in the U. S. A. who are not members of the Society. The first month of our visit was taken up by amaryllis, whilst the other two were devoted to iris. We saw literally hundreds of iris gardens in half a dozen or more States—some large gardens and some small gardens, ranging from 25 acres down to a few small beds or a border in a suburban garden. Among these, commercial and amateur growers alike, there was not a single one who did not have some shape of seedling patch. The remarkable feature which impressed us during those garden visits was that

some of the finest of the hybrids of the day were bred by the backyard amateur. This is indeed a phenomenal achievement. I repeat, phenomenal, because my own personal experience in amaryllis breeding is that not more than five or six seedlings in every thousand are as good as, or an improvement in some direction, on the selected parents. My information—and it is highly authoritative, is that the proportions in iris breeding are even less favourable. Now, if those achievements through amateur perseverance are possible in the iris world, why should not the same apply to the amaryllis?

This may sound like bad business policy—and maybe it is, coming from a commercial grower whose object it should be jealously to guard his domain. But, I feel it is more than high time that the amateur amaryllis grower in America should devote more time and attention to breeding. It will be found a most rewarding effort and definitely a gratifying one, whilst not interfering with any of the attention demanded by the purchased clones to bring them into bloom to that state of perfection which would put them in the running for the coveted Blue Ribbon or even the Tricolor at the annual show.

Earlier, I have stated, having regard to climatic conditions in South Africa, there is no need for growing amaryllis in hot-houses. In any case, with such a wide range and choice of outdoor flowers, the average South African just cannot be bothered with pampering any species or varieties of plants which are suited only to artificially created hot-house conditions. And neither is he prepared to entertain the costs involved. This applied equally to the late Mr. Buller. Gradually, with the passing of time, he systematically eliminated those varieties lacking in vigour and devoid of substance of bloom, until, over the years, he had built up that strain which to-day is a challenge to the severities and extremities which even our elements may wish to offer during the changing seasons.

Therefore, if for no other reason, I am looking forward to the day when there will be American strains of hybrids with substance which is so sorely lacking in the majority of the best blooms I saw, not only on show benches, but also in gardens and in conservatories. These remarks are not offered by way of negative criticism. I have, in fact, been assured by eminent authorities on their subject that, prior to World War II, there were several growers who introduced American bred hybrids with exceptional substance, in addition to having all other desirable qualities. Moreover, these were bred in open nurseries, which strengthens my argument that such strain could again be built up in the States, since the breed has not yet been completely lost in America.

As this is intended to be a frank expression of conclusions arrived at, based on close personal observation, I wish to state that the American hybrids, whilst lacking in attraction from the point of view of the show bench, generally have much better substance than the imported varieties which caught the eyes of the judges at shows. But here I wish to emphasize that those cup-winning imported varieties would be well nigh useless for landscaping or garden planning such as I saw at Mobile,

Alabama where, in one garden alone several thousand American hybrids were used to good advantage by Mr. W. Oakley Cobb in turning a pine forest into a beautiful park.

In Corpus Christi, in the garden of Mrs. Billie Harris, I saw some of her own attractive hybrids in the full blazing Texas sun without a sign of blemish, whereas some of the fine imported varieties, owing to lack of substance, showed signs of scorching and bleached patches. These remarks can also be related to the garden of Mr. Bill Schortman of Porterville where American hybrids, completely in the open, defied the California heat and sun. With perseverance and patience the American strains, undoubtedly, can again be built up to that degree where they embody all the other aspects which go to make the perfect amaryllis. My convictions in this direction are unshakable and here is the reason: Whilst the imported varieties generally overshadowed the American hybrids for attraction in colour and beauty of form, one of the finest specimens which ever it was my pleasure to admire, grows in the garden of Dr. Robert G. Thornburgh in Palos Verdes Estates, California. In drawing comparisons, I exclude neither the Buller or my own hybrids, nor the Dutch hybrids at their best. Here was an amaryllis that offered everything to gladden a hybridist's heart and to stir all his senses with envy. It will call attention to itself from afar, even in the midst of the best that had ever been introduced. And what substance! It is a Howard and Smith hybrid and should be a source of inspiration to every amaryllis fancier in America to put this country forcibly on the map of world breeders.

And now, before stepping off this point, I must reiterate that the amaryllis, whilst admirably suited to indoor culture, is primarily an outdoor plant. For that reason, an equally primary object of the hybridist should be to breed a sturdy, hardy variety with all the substance necessary to make it an outdoor plant under all reasonable climatic conditions which do not, of course, include ground freezing. Under the latter conditions, by all means use it as an indoor plant and, even then, the better substanced varieties, owing to their better lasting qualities, are much more rewarding than their weaker, flimsy sisters.

I trust that I am not approaching dangerous premises and it is certainly not my intention to raise controversial issues, but I am urged to make further references to some of my observations in America—mainly about shows and judging and the preparation and presentation of show specimens. Certain fundamental requirements in shows must, by the very nature and purpose of those institutions, be observed by exhibitors and judges alike. One cannot, obviously, think of a show without well defined and prescribed requirements and standards. So long as civilized and organized society functions, so long will conventions have to be observed, but one should always be fully alive to the danger of enslavement to conventions and prescriptions and the loss of imagination and individualism as a result of the unquestioning acceptance of the dogma and dictates of a few who claim to have a monopoly on tastes, likes and dislikes. This is not a slant on those who evolve show schedules or point

scoring cards. These things are essential because there must be generally accepted standards, there must be prescribed targets and there must be some direction in which the ultimate goal of perfection is to be found.

To the judges I would say this: When judging a specimen, pay more heed to the exhibit confronting you and less attention to your score card. Look at its general appearance—the manner in which it presents itself. Ask yourself whether it is a pleasing balanced unit, whether it has a pleasing compact shape, whether it is attractively proportioned, whether the colour is in conformity with the requirements for the specific variety and whether it commands spontaneous admiration. Then let your judging be largely based on the answers to these questions. The beauty of an amaryllis—and this must at all times be borne in mind, is not determined by the number of florets to the scape or their size. After all, if you multiply one unattractive floret by five, you have done nothing more than to increase unattractiveness five-fold. A well-proportioned healthy scape with three large florets may well be a greater object of beauty than one with a fourth floret added, which may conceivably give an appearance of top-heaviness and overcrowding, which does certainly not enhance the beauty and attraction of a specimen, irrespective of what the well-meaning score card tells you. Furthermore, study the score card with some degree of imagination and interpret its objects with intelligence. The score card is a general guiding factor whilst appreciative, artistic and intelligent judging will come naturally to those who have sufficient interest in the amaryllis to stimulate their desire to became judges. Parrot-style learning by heart of prescribed score cards or judges' manuals and passing of oral or written judges' examinations with flying colours do not necessarily turn out competent judges. And to judging instructors I would say: Do not impose your personal tastes, biases and prejudices on your students, but rather endeavour to guide them in the development of their own individuality. Personally, I did not consciously meet any judging instructors so, fortunately, these remarks are not directed at any particular individual.

To the exhibitor I would say: Since the purpose of a show is to enable you to present your entry in a physical and visual condition as near as possible to perfection, do not be disappointed when obvious defects, even though beyond your control, cause the Blue Ribbon to slip through your fingers. Before a show, expose your exhibits to sufficient direct sunlight so as to ensure a true colour of blooms and a healthy green in the straps.

In conclusion, let me assure my readers that I have seen more beautiful amaryllis in America than I could ever have expected. Possibly that is the reason why so much space has been devoted to American activities in an article on growing amaryllis in South Africa.

And now, I take this opportunity, if the Editor will permit me, of expressing, on behalf of my wife and myself, our sincere appreciation of all the kindness showered upon us during our visit to America. Busy people sacrificed much of their valuable time for our entertainment and comfort. Pen acquaintanceships were moulded into lasting friendships,

to which were added yet many more dear friends of whom we did not know until we arrived at the various centres included in our itinerary. I would like to tell the world that there are no strangers in America, the hospitality of whose citizens is unparalleled.

FIRST FLOWERING OF NEWLY IMPORTED BOSHOFF-MOSTERT HYBRID AMARYLLIS

W. Quinn Buck, *Los Angeles State and County Arboretum, Arcadia, California*

A group of amaryllis bulbs received from South Africa last September gave a foretaste of what can be expected from them. This first blooming was in many ways untypical because none of the bulbs arrived with any live roots; it is, therefore, difficult to make any fair appraisals of these fine things from Mr. Leon Boshoff-Mostert, Kleinskuur, Balfour, Transvaal, South Africa.

Mr. Boshoff-Mostert dispatched his carefully packed parcels of bulbs on a ship sailing July 29th. Two parcels reached us September 8th, the third arriving September 16th. Most of the flower spikes were far advanced on arrival; the first to flower was 'Corpus Christi', which opened five days after potting. Others followed in quick succession.

The most outstanding thing about this group of hybrids was the exquisite porcelain quality of the white flowers as well as of the white portions of some of the patterned flowers. The smoothness of the white in the beautiful picotee 'Corpus Christi' (2)* was evident again in 'Dallas Bride' (4), pure white and with a soft green throat. 'Dallas Bride' had a flat flower, narrow rather than rounded, but altogether beautiful. 'Bridal Bouquet' (2) had this same superb texture, together with fine shape and a beautiful pattern of lines and dots.

'Pink Reflection' (3) had good round flowers, creamy white with wide pink edge and greenish throat. 'Stained Glass' and 'Geranium Lake' (5) were two other beautiful pink-edged flowers, very pleasing in color. 'Impertinence' (3,3) was a full flower with a white star surrounded by a pattern of bold lines, all very pink in effect. 'Dawning' (2) had nice pink-lined areas bordering the very full petals.

'Leah Williams' was white with light red wide striped pattern, and with excellent shape. 'Robespierre' (2,2) on one spike showed similar pattern on all segments, while on the other spike the wide stripes were only on the upper half.

Among the reds 'Etna' (2) had good shape and clear orange-red color. 'Dagbreek' (3), and 'Cathedral Peak' (2) were two very dark selfs, while 'Cardinal Wolsey' (2) was a lighter cardinal red of wonderful shape.

'Signal Hill' (2) had fine shaped flowers, white stars in an orange-red ground. The unnamed 71-58 (2) was outstanding for shape, color,

* The numbers in parentheses indicate the number of florets per umbel; (2,3)=2 flowers in one, and 3 flowers in another umbel; etc.

and pattern, as well as for its wonderful texture; the small white star glistened against the velvety red ground color, which was repeated at the base of the segments as a sort of outline for the stamens.

To sum up, these first flowers were exciting and sometimes completely disappointing. All were small, short-stemmed, and many opened so poorly that they have not been mentioned; some, as indicated, showed themselves as very wonderful things. It will be doubly exciting to get them to flower normally on well-established bulbs after they have adjusted to our northern hemisphere; only then can we judge them fairly for size; shape, texture, and number of flowers to the spike.

[Editorial Note.—Under date of Oct. 24, 1960, Mrs. B. E. Seale, Dallas, Texas, writes—"A beautiful white *Amaryllis* from Mr. Boshoff-Mostert is now in bloom—has two scapes—one has four, and the other has three blossoms. They are just exquisite—also the foliage has grown right along with the scapes."]

HADECO AMARYLLIS HYBRIDS GROWN IN SOUTH AFRICA

ROBERT D. GOEDERT, *Florida*

The Hadeco Strain of *Amaryllis* from South Africa was originated by a few Dutch (Holland) growers who immigrated there about twelve years ago.

They discovered several forms of Hybrid *Amaryllis* in the area that had naturalized there. These *Amaryllis* were very vigorous; free flowering and made offsets freely. This gave them the idea of hybridizing them with the large-flowering Dutch. They have hybridized on a very large scale and have kept only the best types and have now developed a strain which they claim is very vigorous, free flowering and more adaptable to outside culture than the large-flowering Dutch.

They are now increasing the stock of the most outstanding clones which will be named. They plan to introduce these to the American trade in about three years. At present they have about 400 seedlings which they are growing from which to select named clones. Out of these 400 possibly 30 or 40 of the best will eventually be introduced.

They also have large stocks of seedlings coming along each year. Out of these seedling stocks the best are selected and marked by color. They are chosen for their form, color and size. These are sold by color as selected hybrids in the United States and Canada. Red and orange-red are the dominating colors. However they offer a fair quantity of wine-red each year and smaller quantities of mahogany-red, violet-red, rose and pink. The red shades of the selected hybrids are usually solid colors. The rose and pink shades often have white in them, however a fair percentage of them are solid colors. Some might be classed as red and white rather than rose or pink and white.

Seedlings that are not up to a certain standard are destroyed. The remaining seedlings after the selections have been made are dug out and sold as mixed hybrids.

Since the bulbs are grown in the southern hemisphere they ripen off in June or July and are ready to ship in July or early August. They usually are available to the trade in the United States from September to April. They can be flowered very early the first year. Reports from those who flowered these amaryllis the past year indicate that the Hadeco *Amaryllis* is a worth while strain. Apparently this race of *Amaryllis* is one of the largest flowering strains as many reported flowers over 10″ in diameter, and there was one report of a 12″ flower. There are some most beautiful flowers among this strain especially in the dark red tones. I am told by the Holland distributor of this strain of *Amaryllis* that the selected strain to be received this season (1960-61) will be even a better selection than those received last season.

When named clones of this strain are available there is little doubt that they will be most welcome.

X-RAY INDUCED MUTATIONS IN AMARYLLIS HYBRIDS

Robert G. Greenler, *Wisconsin*

In the last several years there have been some very exciting developments in the methods of plant breeding. It has been shown that new characteristics can be introduced into plants which have been treated with X-rays in some stage of their development. In the past the plant breeder has worked at combining the desirable characteristics of various plants in an improved hybrid variety by controlled crossing and selection of promising progeny. However, he always kept a sharp lookout for the plant mutation which might spontaneously appear and which would provide him with a new plant characteristic, not previously present in the plant population. It appears now that the plant breeder may be able to take a more active role in producing desired changes in a plant species than to work only with the mutations occasionally provided by nature.

The specific cause for the spontaneous appearance of a new plant characteristic in a species of plants is not generally known. It is known that the number of mutations which will appear in plants grown from seed, for example, may be greatly increased by exposing these seeds to X-rays before they are planted. This is not the only treatment which will increase the mutation rate; certain heat treatments and the action of several chemicals (the best known of which is colchicine) as well as exposure to gamma rays, ultraviolet light, and neutrons have also been shown to have an effect in altering the genetic constitution of a plant species. The possibility of willfully producing new mutations would seem to have tremendous potential value. However, before we succumb to visions of a new plant industry which will produce custom-tailored

mutants to fit your order, we should consider the expected nature of the genetic changes produced by x-radiation.

Any of the gene-transmitted characteristics of a plant may be liable to mutation. For example, its size, growth habit, leaf form, flower shape, disease resistance, fruit yield, and, in fact, all the characteristics, which taken together define the plant species, may in some way be altered by mutation. There is no guarantee that these changes will be desirable. The fact that a plant species exists is, in itself, a demonstration that the plant is highly adapted to survive all the possible mishaps which are provided by its environment. Those plants that are successful in the continuing struggle for existence are the result of the natural selection of mutations which have occurred after countless generations of plants. Mutations which are not favorable to a plant species' survival have been discarded by natural selection as they have arisen, and those which are desirable have survived. Therefore, the plants, with which we start to work, are developed to the point where we expect most of the random changes which are introduced by x-radiation to be deleterious to the plant's chances for survival. Nevertheless, there still may be mutations which will increase the survival chances for the plant in the environment in which we place it. One way in which its survival chances may be increased is that it have a flower form or crop yield which appeals to man so that he cultivates it, distributes its seed, and shields it from various agents of destruction.

The first step in the production of mutants by seed irradiation is to determine the radiation sensitivity of the particular plant. This varies greatly from one species to another and must be determined specifically for each plant. The work reported here has been done with seeds of Ludwig's hybrid amaryllis, white, orange, pink, salmon, and Gracilis varieties, plus seeds of another yellow-throated, salmon hybrid of unknown origin. The data on all the hybrid amaryllis seeds are grouped together in the results which are reported. The seeds of each variety were divided into several groups; each group received a different X-ray exposure * except for one control group which received none. The seeds were planted on edge in pots containing a one-inch layer of sand and peat over a conventional soil mixture. Seeds of the control group and each of the different irradiated groups were planted in each pot to insure identical cultural conditions for seeds with different X-ray treatments. The criterion for survival in these experiments was taken to be the existence of leaves 65 days after planting time. At this time, a few of the irradiated seeds had sprouted and died, and a few others died later; however, choosing a longer time after planting would not have altered the results significantly. One of the obvious effects of radiation is to increase the time required for germination of some seeds;

* The seed was exposed to the x-radiation from the tungsten target of an AEG-50 tube operated at a voltage of 50 KVP with a tube current of 45 milliamps. Filtering was provided by 0.004 inches of copper and the seeds were located 43 millimeters from the axis of the tube. The intensity calibration was effected by using Kodak Personal Monitoring Film No. 2 (slow emulsion only) at a tube current of 4.5 milliamps. At 4.5 milliamps the exposure was calculated to be 3.0 roentgens/sec.

hence, a time much shorter than 65 days would not have been adequate. Since data was taken from seeds raised in two different seasons, allowance has been made for the difference in germination rate of the control seeds by calculating the survival rate of the exposed seeds relative to that of their controls. (The survival rate for controls was 76% and 82%). Figure 12 shows the percent survival rate of amaryllis seedlings for different X-ray exposures. Each point represents data from approximately 40 seeds.

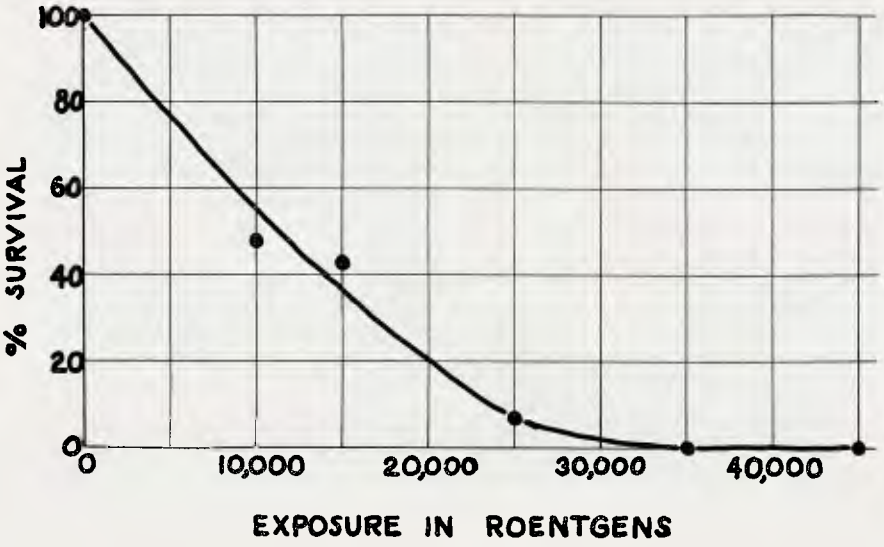

Fig. 12. Percent survival (relative to the control survival percentage) of hybrid *Amaryllis* seeds exposed to x-radiation.

Even with this curve the optimum X-ray exposure for inducing mutations is not obvious. If seeds receive a very large dose of radiation, a high mutation rate is expected, but it does us little good if none of the seedlings survive. At the opposite end of the curve a low dose will permit a high survival rate but would be expected to produce few mutations among the seedlings. There is evidence that for some type of changes the number of mutations produced is just proportional to the X-ray exposure. If this is true, the total number of mutations expected to be present in a group of plants which grew from a fixed number of irradiated seeds should be proportional to the radiation exposure received by the seeds multiplied by the survival rate of the seedlings at that exposure. Figure 13 shows such a curve plotted from the data in Figure 12. This curve has a maximum value at about 12,000 roentgens exposure; that is, we would expect that an exposure of 12,000 roentgens would produce a greater total number of mutations in the resulting plants than would be produced by either a greater or

smaller exposure. It is seen that this exposure produces a survival rate of about 50 percent. One way of specifying radiation sensitivity of plants is to give that radiation dose which will be lethal to 50 percent of the irradiated plants. We see that this dose (sometimes abbreviated as LD-50) comes conveniently close to the optimum dose which we have determined from Figure 13.

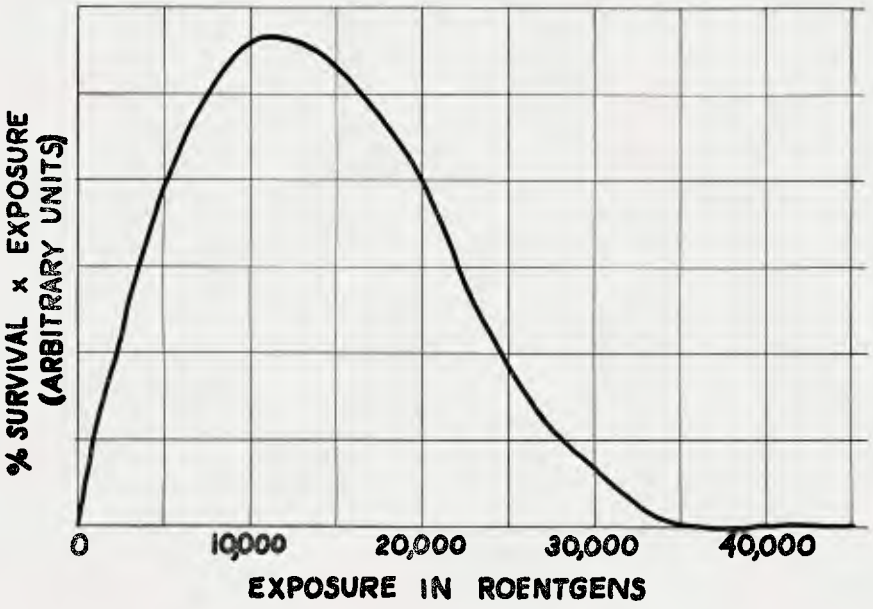

Fig. 13. Total number of mutations surviving from a fixed number of irradiated *Amaryllis* seeds calculated as function of exposure to x-radiation.

Perhaps visible mutations will show up in the plants which grow from irradiated seeds. On the other hand, recessive traits introduced by seed irradiation will not show up in these plants but will show up in the next generation of plants grown from the seed produced by self-pollination.

It is too easy for popular writing to oversell the importance of a promising new development, the real significance of which is still in the speculative stage. I expect to see such articles appearing in the next few years, heralding a new revolution in man-made plants. Although radiation treatment has already been shown to be a useful tool in the development of desirable plant characteristics, particularly in the development of certain agricultural crop plants, it is difficult to foresee just how important a tool to plant development it will become. One thing seems clear: X-ray treatment is not going to be a magic wand which will transform any plant it touches into a super plant. The utility of radiation treatment in the production of new plant characteristics lies in its ability to provide a wide variety of new charac-

teristics from which one will occasionally be found which is desirable. At this point the work of plant hybridizers will begin, combining this characteristic with other desirable traits into a useful plant. The realistic chances of a person who irradiates a few, or even a few hundred, seeds of suddenly producing a startling new amaryllis form are really quite remote; but then, on the other hand, you can never tell. . . .

HYBRIDIZING WITH 'HANSEN'S GREEN' AMARYLLIS

CHARLES A. RAMELLI, *Biloxi, Miss.*

'Hansen's Green' hybrid *Amaryllis* (see Fig. 14)—which will be registered next year—is a segregate among Dutch in the garden of a friend. The pollen was used first in the spring of 1959 to cross with Dutch whites, salmons, oranges and purplish reds—thus trying to create as many color variations as possible. There are 50 to 200 seedlings of some of the crosses which are in their second year's growth.

Fig. 14. 'Hansen's Green' hybrid *Amaryllis,* as grown by Charles A. Ramelli, Biloxi, Mississippi. Photo by C. A. Ramelli.

This spring (1960), 'Hansen's Green' pollen was used both ways but as a mother plant it only set two large pods of seed—one on bloom toward yellow and one toward purple or blue. The pollen was used this year throughout the entire garden on many of which I have only one of kind from 13 years of hybridizing.

My original parent plants were a Dutch red and a pink and white stripe of unknown origin bought in a seed store 20 years ago. When the first seedling bloomed F-2 crosses were made of the most beautiful and exceptional in color. In the meantime some of them took blue ribbons at the Shows. Then the best of the named Dutch and Australian

hybrids and species were added to bring in new genes. Some of the hybrids with the species attracted as much attention this spring as the imported ones from Holland, Australia, India, Japan, S. America and Africa.

The Garden (Figs. 15 and 16) is a riot of color when in bloom and has been a "traffic-stopper" on our street thus forcing me to open my "one man garden exhibit" of hybrid amaryllis free to the public each spring for the past four years. On week-ends there are 50 to 150 visitors

Fig. 15. *Amaryllis* garden of Charles A. Ramelli, Biloxi, Mississippi. Reproduced from C. A. Ramelli kodachrome.

per day who enjoy the beauty which "God" creates in our *Amaryllis*. This has done more to interest flower lovers in *Amaryllis* along the whole Mississippi Gulf Coast than anything I know of.

All the imported *Amaryllis* are labeled for easy identification to visitors; all are in special beds. There should be about ten thousand seedlings in bloom for the first time in the spring of 1961, and the same number the following spring when the first spot blooming of the 'Hansen's Green' hybrids may show. It is getting to be more than I can possibly keep up with as a hobby; especially the use of my vacation time (from my full time job) to keep the garden open for the public.

In the hybridizing the work has been toward the creation of new patterns, and combinations of colors toward the yellows, blue-reds and purple shadings. There were some rewarding seedlings toward the purple side this spring. From now on each spring these hybrids should

be of greater interest to many who are interested in the new colors and patterns especially those from the 'Hansen's Green' when they come into bloom.

Fig. 16. *Amaryllis* display beds, garden of Charles A. Ramelli, Biloxi, Mississippi. Reproduced from C. A. Ramelli kodachrome.

BREEDING WHITE AND DOUBLE AMARYLLIS

WILLIAM W. WALLIS, *Florida*

Several years ago, an ordinary red (Mead Strain) *Amaryllis* seed parent, was crossed with pollen from a pure white hybrid *Amaryllis* that had been treated with colchicine by the late T. E. Moore, of Miami. The progeny bloomed in two years from seed. Some are white with a few reddish streaks; a few are pure white (see Fig. 17), but these flowers are somewhat smaller than the former. Whether or not the colchicine treatment had any effect is not known, but Mr. Moore's plant had a tight cluster of large bulbs (original bulb with attached offsets) at the ground surface, and this character, along with the flower color was carried through to the progeny almost unchanged, as indicated in Fig. 17. In any case, the vigor of the progeny has been far above that of the seed parent.

My experience with the breeding of double *Amaryllis* is limited. My above described vigorous white hybrid was crossed with pollen from *Amaryllis belladonna* var. *semiplena (albertii),* the old original double

scarlet from Cuba. Two of the progeny from this cross have bloomed, each with moderate-sized frilled pink flowers, the two being quite alike (see Fig. 18 for one clone).

For the record it should be stated that several years ago, a friend gave me two *Amaryllis belladonna* var. *semiplena (albertii)* bulbs that he had collected from cultivation in Medillin, Colombia, but no difference was noted from plants I already had of the same variety.

Fig. 17. Hybrid white *Amaryllis* produced by William W. Wallis of Miami Beach, Florida. Reproduced from W. W. Wallis kodachrome.

This year, I applied pollen from a double red hybrid *Amaryllis* (McCann hybrid, from a grocery store rack) to flowers of my vigorous white *Amaryllis* hybrid (Fig. 17), and the seedlings are growing well.

DOUBLENESS IN HABRANTHUS

ALEK KORSAKOFF, *Florida*

In 1955, I obtained a bulb of *Habranthus brachyandrus* from the Fairchild Tropical Garden, Miami, Florida. This plant had the unusual habit of producing double flowers once in a while. This bulb was later (probably in 1957) sent to Mrs. Clint. Most of its seedlings that were retained usually have some tepaloid stamens. *Habranthus robustus*

seeds were obtained from the U. S. Plant Introduction Garden, Chapman Field, Florida. The seedlings obtained from these seeds had very pale pink, wide open, and larger flowers than the usual *Habranthus robustus.*

In 1958, seedlings of the *Habranthus brachyandrus* mentioned above were crossed with pollen from the pale pink *Habranthus robustus.* This cross gives *Habranthus* x *floryi* (see Plant Life p. 121. 1951). In 1959, the seedlings began to bloom; some with two flowers to the scape; one produced double flowers, and this was potted separately. In 1960, it bloomed again and the flower was again double (see Fig. 19). In June

Fig. 18. Hybrid double *Amaryllis* produced by William W. Wallis of Miami Beach, Florida. Reproduced from W. W. Wallis kodachrome.

1960, this bulb was sent to Dr. Flory at Blandy Experimental Farm for experimental use. There were eight offsets, the largest about acorn size, the smallest about ¼ inch in diameter. None has any leaves.

Again, one of the seedlings of the *Habranthus brachyandrus* from the Fairchild Tropical Garden produced a double bloom in 1959 and it was selfed; five good seedlings resulted. The first bloom from these seedlings opened on July 27, 1960, and it was double, but not as double as my *Habranthus* x *floryi* mentioned above. On August 4, 1960, a second seedling bloomed, again a double flower. The three other seedlings are very small, one has two leaves, only about two inches long.

Further reports on the double *Habranthus* will be made in future issues of the Amaryllis Year Book.

Fig. 19. Double form of *Habranthus brachyandrus* bred by Alek Korsahoff of Miami, Florida. Reproduced from Korsakoff snap-shot.

'HIGH TOPPER' MUTATION IN HEMEROCALLIS

Hamilton P. Traub, *California*

Among the diploid *Hemerocallis* seedlings grown by the writer for the purpose of breeding better pink clones there appeared an unusual mutation in the semidouble class. The mutation appeared among crosses of 'Winged Victory', clear lemon yellow to buttercup yellow, with an unnamed pink seedling.

In this mutation, four of the filaments are transformed into tepalsegs (tepaloids) with the anthers attached toward the apex. The other two filaments are normal. The four tepaloid filaments stand up straight and form a crown that is reminiscent of the perpendicular part of a hat. The six tepalsegs are more or less horizontal; somewhat reflexed and form the brim of the "hat" (see Fig. 20). The color of the flower is light salmon pink. Normally the clone should have been named "High Hat", but unfortunately that name had been used as early as

1949, and the name 'High Topper' (Traub, 1961) had to be chosen. It is being distributed on the assumption that others might also want to use it in breeding.

Fig. 20. 'High Topper' (Traub, 1961) mutation in *Hemerocallis*. Grown by Hamilton P. Traub, La Jolla, Calif.

The writer is not overly fond of the super-doubles in *Hemerocallis,* but this new mutation is really beautiful in form, and is not dumpily heavy. Attempts are being made to produce other colors in the 'High Topper' shape by appropriate crossings. Only by making crossings will it be possible to determine if the mutation can be transmitted to the progeny. 'High Topper' will also be polyplodized so that this mutation, if possible, can go into the great reservoir of tetraploid germ plasma.

In this connection, Mr. George Gilmer has pointed out that apparently the Kraus semi-doubles are of the 'High Topper' type.

X CRINODONNA BREEDING REPORT, 1960

HAMILTON P. TRAUB, *California*

The writer started collecting material for the breeding of X Crinodonnas in 1953, and began making crosses in 1956. The main objective was to obtain white- and deeper pink-flowering seedlings. This was extended to include lower growing seedlings in 1959, and was further extended into a general X *Crinodonna* breeding project for the production of a wide range of growth habits and flower shapes and colors. The results obtained through 1959 are summarized in Table 1.

It should be explained that the hybrid bi-generic hybrid genus X *Crinodonna* accommodates all crosses between *Brunsvigia* and *Crinum* (see the genus X *Crinodonna,* Plant Life, vol. 17. 1961). Up to the present, only *Brunsvigia* ♀ x *Crinum* ♂ progeny have been reported, but it is hoped that the reverse cross, at least in some instances, may yet be obtained.

RESULTS THROUGH 1959

X CRINODONNA TRAUBII.—At the time that this project was started, the few X Crinodonnas that had been introduced had pale or slightly deeper pink flowers. The first crosses were therefore made to produce white-flowering seedlings. For this purpose *Brunsvigia* x *parkeri* (Australian group) clone 'Hathor' (pure white with apricot-colored throat) was used as the seed parent, and *Crinum moorei* forma *album* was utilized as the pollen parent. All attempts to reverse this and use *Crinum* as the seed parent have failed. Entries #1 and #3 in Table 1 show that so far 8 seedlings have been obtained. All seeds were white and produced evergreen seedlings. Two of these have bloomed up to the present and are white-flowering.

As shown in entry #2 in Table 1, when a slightly pink-colored *Crinum moorei* form was used as the pollen parent on 'Hathor', 11 seedlings were obtained. No record was kept of the seed color, but all seed that sprouted are evergreen, and very vigorous. So far several of the 11 seedlings (entry #2, Table 1) have flowered. All are pink-flowered.

The seedlings listed under entries #1, #2, and #3 are a new kind of X *Crinodonna* since the parentage is different from that of X *Crinodonna corsii,* the bulbs are not very large, the leaves are more or less radially arranged, and the plants tend to remain in full leaf even through the summer, when X *Crinodonna corsii* clones with large shaggy bulbs tend to rest in summer in a manner similar to *Crinum moorei.*

The first X *Crinodonna* hybrids made by Dr. Ragionieri, in Italy, and Fred H. Howard, in the United States, are crosses between the Cape Belladonna, *Brunsvigia rosea* (Lam.) Hann. (seed parent) and *Crinum moorei* (pollen parent). All other crosses between the Cape Belladonna and Crinum are therefore known as X *Crinodonna corsii.* The crosses between *Brunsvigia* x *parkeri* and *Crinum* represent a new kind of hybrid as already indicated, and Dr. Moldenke has named it X *Crinodonna traubii* with the clone 'Alma Moldenke' as the type (see Plant

TABLE 1. X **Crinodonna traubii** and X **Cr. corsii** seedlings raised at La Jolla, Calif. from 1956 through 1959 with the objective of breeding (I) white-flowering, (II) dwarfer, and (III) other types, of seedlings. Records taken to Aug. 16, 1960.

Seed parent (♀)	Pollen parent ♂	Date planted; seed color	Germinated, white seeds	Germinated, colored seeds	vigor of seedlings
		I. X Crinodonna traubii			
#1. **Brunsvigia** x **parkeri** (Australian group) cl. **'Hathor'**	**Crinum moorei** var. **moorei album**	9-30-56	3		
		few white *	evergreen †	———	medium vigor
		no colored seeds	———	———	———
#2. Ditto	**Crinum moorei** var. **moorei roseum**	9-30-56 white * and colored ** seeds not separated	11 all seedlings	evergreen †	very vigorous
#3. Ditto	**Crinum moorei** var. **moorei album**	9-28-57			
		number white *	evergreen †		
		no record	———	———	medium vigor
		no colored seeds	5	———	———
#4. **Brunsvigia** x **parkeri** (Zwanenburg group) cl. **'Cape Town'**	Ditto	10-5-59	42		
		many white *	evergreen †	———	½ as vigorous as evergreen #5
		Many colored **	———	many 67 deciduous ‡	medium vigor
#5. Ditto cl. **'Jagersfontein'**	Ditto	10-8-59			
		many white *	16 evergreen †	———	very vigorous: twice as vigorous as evergreen #4
		many colored **	———	2 deciduous ‡	medium vigor
		II. X Crinodonna corsii			
#6. **Brunsvigia rosea** var. **major**	**Crinum moorei** var. **minor roseum**	9-3-59			
		many white *	5 evergreen †	———	very tiny
		colored ** no record	———	———	———
			Total number 82 evergreen † seedlings		

* Seeds ranged from greenish, greenish-whitish, whitish-yellowish to white; for brevity they are all indicated as "white".

** Colored seeds ranged from pink, pink-white-blotched, whitish mottled brownish.

† X **Crinodonna** plants similar to **Crinum moorei** in habit resting in summer, or different and evergreen the whole year. All indicated as "evergreen".

‡ Plants deciduous, similar to **Brunsvigia x parkeri** and **B. rosea.**

Life 17: 60. 1961). In this clone the flowers are a delicate rhodamine pink inside the flower on opening, with white throat, and apricot-coloring at the very base; lighter pink on upper part on the outside turning to whitish downward to the middle of the tepaltube. With age, the flower color changes to a lighter pink so that at any one time there may be different flowers in three shades of pink in the same umbel. The flowers are delightfully fragrant.

Entries #4 and #5, Table 1, show that *Brunsvigia* x *parkeri* (Zwanenburg group) clones 'Cape Town' and 'Jagersfontein' are excellent seed parents for X *Crinodonna traubii* seedlings when the former are crossed with the white form of *Crinum moorei.* In the first instance, 42, and in the second, 16, X *Crinodonna traubii* seedlings were obtained. In this case the seeds were separated on the basis of color before planting. It should be noted that the white seeds gave rise to evergreen seedlings (X *Crinodonna),* and that the colored seeds gave rise to deciduous *(Brunsvigia* x *parkeri)* seedlings. The latter are apparently parthenogenetic seedlings and will reproduce the parent type. It is not possible to explain at the present time why only white-colored seeds represent crosses.

X CRINODONNA CORSII.--Entry #6, Table 1, shows that when the Cape Belladonna, *Brunsvigia rosea* (♀) was crossed with the dwarf form of *Crinum moorei,* 5 X *Crinodonna corsii* seedlings were obtained. These were still tiny by Aug. 16, 1960, indicating that the objective of obtaining lower growing X Crinodonnas may possibly be realized.

PEDICEL ELONGATION IN BRUNSVIGIA

Table 2 shows that the application of the pollen of the hybrid Crinum clone 'Ellen Bosanquet' to the stigma of *Brunsvigia* x *parkeri* (Zwanenburg group), rarely leads to seed setting. In contrast, the use of the pollen of *Crinum moorei* on the same *Brunsvigia* hybrid results in the setting of many seeds.

Table 2 also shows that when ovules were not fertilized, the pedicels did not elongate, and that, in this case, the elongation of the pedicel after pollination, within limits, is proportional to the number of seeds in the capsule. The non-elongation of pedicels in the case of unfertilized ovaries has been amply substantiated in the past, but the rest of these results may be misleading. Observations over the years indicate that sometimes even a few seeds in the capsule leads to extreme elongation of the pedicel after pollination. The cause of pedicel elongation is apparently bound up with the production of growth hormones by the growing ovules which gradually develop into the seeds. Aside from the actual number of seeds in the capsule, pedicel length may be greatly influenced by the particular favorable or unfavorable genes in the developing ovules that regulate hormone production. This may explain why sometimes even a few seeds in the capsule may lead to extreme pedicel elongation. Thus the phenomenon of pedicel elongation in *Brunsvigia* needs to be investigated further.

No data were taken on the size of the seeds which vary from small to large in these hybrids.

TABLE 2. Correlation of the number of fertilized ovaries as shown by number of seeds in capsule with pedicel length at seed maturity. 14-flowered umbel of **Brunsvigia x parkeri** (Zwanenburg group), La Jolla, Calif. Sept. 25, 1960.

Seed parent (♀)	Pollen parent (♂)	Number of capsules	Number of seeds	Pedicel length in cm.
Brunsvigia x parkeri (Zwanenburg group)	Hybrid **Crinum** cl. **'Ellen Bosanquet'**	4 *	0	2.2—2.8 **
Ditto	Ditto	1	2	4
Ditto	Ditto	1	3	6.5
Ditto	**Crinum moorei major roseum**	1	5	9
Ditto	Ditto	7	many	12-—16.5

* The arrested ovaries which never developed further dropped off after a time, leaving the pedicel which did not elongate.
** No elongation of pedicel after pollination.

1960 CROSSES

A number of X *Crinodonna* crosses were made in the autumn of 1960. At this writing (Oct. 8, 1960), only a few seeds have germinated and a fuller report has to be reserved for the future. It is important to note in Table 3 that as these and other similar hybrids come into flower, we can expect a far greater variety in X *Crinodonna* than was thought possible only a few years back. The species of *Crinum* crossed on *Brunsvigia* has been extended from *Crinum moorei* only to include also *C. bulbispermum* and *C. americanum.* In future years, the *Crinum* species utilized can most likely be greatly extended. The pollen parent, hybrid *Crinum* cl. 'Elizabeth Traub' represents a cross of *Crinum scabrum* with hybrid *Crinum* cl. 'Ellen Bosanquet'. The latter, parentage unknown, differs markedly from hybrid *Crinum* x *powellii* cl. 'Cecil Houdyshel'. 'Ellen Bosanquet' has *Crinum moorei* as one of its parents, but what the other one, or ones, are may be difficult to establish unless the cross could be duplicated experimentally.

X CRINODONNAS, HYBRID BRUNSVIGIAS AND RHODOPHIALAS

Mrs. Kenneth B. Anderson, *California*

X CRINODONNAS.—It's fun to grow X Crinodonna seedlings (hybrids between *Brunsvigia* and *Crinum).* There are so many variations, and they are so very satisfactory as decorative plants; needing a minimum of attention in cleaning up the old foliage. Although the seed parent is the *Brunsvigia,* they resemble the pollen parent, *Crinum moorei* in most respects. Their foliage is even superior to it, and truly

TABLE 3. X Crinodonna crosses made in the autumn of 1960. Data as of Oct. 8, 1960.

X **Crinodonna** species	Seed parent	Pollen parent	Remarks
X **Crinodonna corsii**	**Brunsvigia rosea major**	**Crinum moorei** forma **album**	7 seeds (6 greenish; 1 pink)
X **Crinodonna** sp.	**Brunsvigia rosea major** (Bolivia)	Hybrid **Crinum** cl. 'Ellen Bosanquet'	34 seeds (2 white; rest pink)
Ditto	**Brunsvigia rosea major**	Ditto	3 pink seeds
X **Crinodonna** sp.	Ditto	Hybrid **Crinum** cl. 'Elizabeth Traub'	10 greenish seeds (small to medium); one germinated
X **Crinodonna** sp.	Ditto	**Crinum x powellii** cl. 'Cecil Houdyshel'	9 medium seeds (3 white; 6 pink)
X **Crinodonna** sp.	Ditto	**Crinum bulbispermum album**	6 white seeds (2 medium; 2 small; 2 tiny)
Ditto	Ditto	Ditto	3 green seeds (1 medium, germinated; 2 tiny)
X **Crinodonna** sp.	Ditto	**Crinum americanum**	3 seeds (pinkish)
X **Crinodonna traubii**	**Brunsvigia x parkeri** (Australian group) cl. 'Hathor'	**Crinum moorei** forms **album**	18 seeds (1 white; 17 pink)
Ditto	Ditto	Ditto	many seeds (1 white)
Ditto	**Brunsvigia x parkeri** (American group) cl. 'Hathor' seedling	Ditto	many seeds (9 white; rest pink)
Ditto	Ditto	**Crinum moorei roseum**	Many seeds
Ditto	**Brunsvigia x parkeri** (Zwanenburg group)	Ditto	Many large pink seeds
X **Crinodonna** sp.	**Brunsvigia x parkeri** (American group) cl. 'Hathor' seedling	**Crinum bulbispermum album**	Few white seeds
X **Crinodonna** sp.	Ditto	Hybrid **Crinum** cl. 'Ellen Bosanquet'	18 seeds (5 white; rest pink)
Ditto	**Brunsvigia x parkeri** (American group) cl. early bicolor	Ditto	15 large pink seeds
Ditto	**Brunsvigia x parkeri** (Zwanenburg group) cl. 'Windhoek'	Ditto	3 large pink seeds
Ditto	**Brunsvigia x parkeri** (Zwanenburg group) cl. 'Pretoria'	Ditto	6 medium pink seeds
Ditto	**Brunsvigia x parkeri** (Zwanenburg group) unnamed clone	Ditto	4 large pink seeds

evergreen, never dying down at all or looking ragged as *Crinum moorei* foliage does just before blooming. The plants are clean and vigorous and the stout stems rise well above the foliage; 3 to 4½ feet high. The flowers range from pure white to deep rose and varying degrees in between. Some are a very light pink with a rose picotee edge. There is another range of color within each head of flowers itself. The buds show a deeper color than the freshly opened flower, and the flowers as they mature tend to blend into a solid color before fading (a trait of their *Brunsvigia* parent); so there are flowers and buds of several shades and patterns all on one plant at one time.

Most flowers are tubular or slightly bell shaped with tepalsegs somewhat twisted, but the better ones open up their faces and are truly nice flowers. They number anywhere from 10 to 23 blossoms per scape and usually two scapes per bulb, coming three to five weeks apart. Bloom starts about September first and continues into November. As soon as they become large clumps I'm sure that their season will be extended, for I have watched a huge clump of X *Crinodonna corsii* clone 'Fred Howard' bloom all summer and through late fall with as many as 15 to 20 stalks in bloom at one time.

HYBRID BRUNSVIGIAS.—After blooming over a hundred seedlings of *Brunsvigia* x *parkeri,* I find that there are roughly two different types, though they overlap somewhat due to having crossed the two types. One type with 14 to 27 blossoms per umbel appears to have a creamy yellow look to the entire head; the apricot tint of the throat shows through on the outside, making the bud a creamy apricot. Even the stamens and pistil are deeply stained with the apricot coloring. The flowers are ruffled and wide open with recurved tips, and many of the heads have flowers facing outward in a complete circle, as opposed to the customary quarter or half circle of the common Cape Belladonna.

The other type of white *Brunsvigia* x *parkeri* has fewer flowers, 7 to 14, and they are more tailored and trumpet shaped, have narrower tepalsegs and are a glistening white with greenish tinge, often showing heavy green ribs on the outside of the tepalsegs. These do have the apricot throat but in less amount and intensity, many times only deep in the throat. A clone from New Zealand falls in this category and it even has a very faint pink blush upon first opening, and again in the faded flower.

I find I can predict the type and color of flower of the Brunsvigias almost the minute the bud emerges. White ones have a very light green bud and stem. Light pink ones have a gray green bud and stem, rose pinks have a pinkish gray bud and stem and the deeper rose and carmine tipped flowers have a very deep grayed wine red bud and even deeper grayed stem. The first type noted above (many-flowered) evidences itself early by an unusually fat bud with a base broader than the stem from which it emerges, almost arrow shaped; whereas the fewer flowered types have long slim buds scarcely larger in diameter than their stems.

So far, I've found the deep colors tend to appear in the smaller flowers and the lighter pinks in larger flowers with wider tepalsegs and

more open faces; but luckily there are exceptions to this and we are breeding more and more of the deeper color into the large flowered types.

The coloring of some of the medium pink and rose-edged flowers begins to blend down into the white throat on the third or fourth day and creates a very attractive effect; sort of a deep glowing rosy light emanating from the heart of the flower.

There are a few heads that open in a full circle, facing in all directions, while many have the pedicels radiating out in the full circle but the flowers tend to open facing Southwest. Of course by far the most of the *Brunsvigia* hybrids have both pedicels and flowers facing in a quarter circle toward the Southwest.

Then there is a whole group of miniatures, very dainty and about half as big as the larger ones, and they include the entire color range of the large ones too. These undoubtedly come from the *Brunsvigia rosea minor,* which I used in my earlier crosses.

I've been trying to make enough observations of the length of the pedicels, to come to some conclusion, but so far, all I can tell is that they tend to bloom with short pedicels, ½ to 3 inches long, which then increase rapidly in length as the flowers mature and fade. Some pedicels reach 8 to 10 inches in length by the time the seed pods form, especially the white forms.

I wonder what nature has in mind for these enlarged heads of seed pods? Might it be to enable the detached heads to blow end over end to distant points to sow their seed, as do some of their relatives growing on the veld of South Africa?

RHODOPHIALA AND HABRANTHUS.—*Rhodophiala bifida,* the Oxblood Lily and *Habrantaus brachyandrus* seem to come up and bloom overnight; so this year I decided to time them. They were in a spot which received no water all summer long; so on September first I gave them a thoroughly deep watering. Sure enough, the next day the tip of the buds of the *Habranthus* and the *Rhodophiala spathacea* (pink) were visible. The third day they were up two to four inches, and on Sept. 4th, the first of the pink *Rhodophiala* and several of the *Habranthus* were in full bloom with secondary scapes appearing four or five days later. The *R. bifida,* oxblood type, took longer to appear and bloomed on the ninth day. This red type is by far the more popular of the two and more easily obtained, but for me, the pink one grows more prolifically, has more blossoms per scape and is even prettier than the oxblood. I have a cross between the two that is just beginning to bloom on taller scapes with a color midway between the pink and the oxblood and with two terminal blossoms on the stalk. This hybrid, which has been made a number of times before by others, has been named *Rhodophiala* x *huntiana* in the present issue by Dr. Traub. The oxblood type will not seed for me except when pollinated by the pink one, but the pink one self seeds readily.

CRINUM — HANNIBAL HYBRIDS

L. S. Hannibal, *California*

This group of hybrid siblings is the result of crossing the Orange River Lily, *Crinum bulbispermum* (red-flowered form described by John Barrows in 1801), seed parent, with an F-2 set of seedlings derived from *C.* clone 'Luther Burbank', pollen parents. *Crinum* (Hannibal Hybrids) clone 'Cape Dawn' is the type (see Fig. 21).

Fig. 21. *Crinum* (Hannibal Hybrids) clone 'Cape Dawn' (Hannibal, 1961), as grown by L. S. Hannibal, Fair Oaks, Calif. Reproduced from L. S. Hannibal kodachrome.

Hybrid *Crinum* clone 'Cape Dawn' resembles the hybrid *Crinum* clone 'Louis Bosanquet' quite closely. However, the blossoms are a deep coral pink, are more numerous, and are considerably larger with broader tepals. The cross is very hardy and extremely vigorous. Three year old bulbs are often four inches in diameter and are capable of producing two or three scapes which are 45 to 60 inches long. The scapes normally carry 15 to 20 blossoms in an open type umbel. Since neither of the parents to 'Cape Dawn' are capable of producing offsets it may be that cuttage will have to be employed in order to multiply the bulbs. On the other hand the cross is an easy one to effect and sibling seedlings are remarkably uniform in color and shape. Thus far 'Cape Dawn' has set no seed but some seed has been obtained by backcrossing onto the F-2 Burbank hybrids.

The similarity of 'Cape Dawn' to the pale pink and white flowered 'Louis Bosanquet' leads to the speculation that the latter may be a 'Luther Burbank' cross on *C. bulbispermum,* possibly on the variety *album,* or *blandum* (the Wyndham Hayward weather sensitive pale pink form). Several breeding possibilities with the clone 'Luther Burbank' have been explored and results are particularly encouraging.

X BRUNSERINE

HAMILTON P. TRAUB, *California*

Crosses between *Nerine* and *Brunsvigia* species (= X *Brunserine)* have been reported in the literature. This subject is important in connection with the preparation of the systematic treatise on the Amaryllidaceae as indicating the degree of genetic relationship between these two genera. In order to verify previous reports, and also to add new data, breeding experiments involving these genera were undertaken a few years ago. As examples that involve the extremes, the crosses between *Nerine filifolia* and species and hybrids of *Brunsvigia* are listed in Table 1.

TABLE 1. Crosses of **Nerine filifolia** with species and hybrids of **Brunsvigia.** The crosses between **Nerine filifolia** and **Nerine** hybrids are included for comparison. Pollens of **Nerine** hybrids were kindly furnished by Mrs. Emma D. Menninger.

Seed parent, and 2n chromosome number	Pollen parent, and 2n chromosome number	Number of seeds produced per capsule
Nerine filifolia, 2n=22 *	**Nerine** cl. **'Dunkirk',** 2n=33	12
" " "	**Nerine** cl. **'Inchmary Kate'** 2n=44 ...	none
" " "	**Nerine** cl. **'Rosalba',** 2n=?	7
" " "	**Nerine** cl. **'Gaby Deslys'** 2n=22	none
" " "	**Brunsvigia rosea major,** 2n=22	2
" " "	**Brunsvigia** x **parkeri** (Australian group) cl. **'Hathor',** 2n=? **	11
" " "	**Brunsvigia** x **parkeri** (Australian group) cl. **'Hathor'** seedling, 2n=? **	6

* 2n=24 also reported.
** Not determined, but most likely 2n=22 since all **Brunsvigia** determinations made so far gave 2n=22.

It is of interest to note that when *Nerine filifolia,* 2n=22, was crossed with the triploid, *N.* cl. 'Dunkirk', 2n=33, abundant seeds were produced, whereas when *N. filifolia* was pollinated by *N.* cl. 'Gaby Deslys', 2n=22, no seeds were obtained. When the diploid, *N. filifolia,* 2n=22, was pollinated by the tetroploid, *N.* cl. 'Inchmary Kate', 2n=44, no seeds were produced. In contrast seeds were obtained in all crosses of *N. filifolia* and *Brunsvigia* species and hybrids.

AMARYLLIS GENETICS — 1961 REPORT

HAMILTON P. TRAUB, *California*

In 1953, the writer made the cross, *Amaryllis cybister* ♂ x *A. belladonna* var. haywardii ♀, and the first flowers were obtained in 1956, but due to other duties no record was taken. The bulbs were taken up and potted, and they again flowered in April, 1960.

The bulbs have only a few leaves; are deciduous and go into a profound resting period over winter as in *Amaryllis cybister.* The scape

is slender, reddish at the base and light green upwards. The umbel is 2-flowered as in *A. bellodonna* var. *haywardii*. The spathe-valves are lanceolate, shorter than the 6.5—7 cm. long pedicels. The ovary is green, 1.3 cm. long, 7 mm. in diam. The tepaltube is 1.3 cm. long; the paraperigone closes in throat and is bearded with short whitish bristles. The perigone is almost as irregular as in *A. cybister,* is whitish on the back sides of the segs, and pink on the inner side of the segs which shows that the pink color of *A. belladonna* var. *haywardii* is dominant over the crimson color of *A. cybister*. The pink color is darker pink in the throat. The lower halves of the two side setsegs, and the whole bottom petseg is much lighter pink, showing that the color pattern of *A. cybister* is dominant over the solid color pattern of *A. belladonna* var. *haywardii*. The stamens and style are pinkish; much exserted and the style is longer than the stamens, as in *A. cybister*. The stigma is very shortly 3-lobed, lobes rounded.

Amaryllis x bellabister, Traub, hybr. nov.

Planta inter A. cybisteram et A. belladonna var. haywardii hybrida; floribus rubellis; tube tepalorum brevi; paraperigonio incurvato, cum setis albidis ornato; staminibus styloque valde exsertis; stigma breviter 3-lobato. Holotypus: Traub no. 734a+b (TRA) culto La Jolla, California, 26 Junii 1960.

These results show that it may be fairly easy to obtain the irregular shaped flower type of *Amaryllis cybister* in various other colors by hybridization with other species and hybrids. *Amaryllis cybister* is 4—6-flowered, and most likely scapes with four or more flowers will be obtained in the segregates from selfing the first generation hybrids.

An additional report will be made when the second generation hybrids flower.

[PLANT LIFE LIBRARY, continued from page 75.]

PLANT GROWTH SUBSTANCES, by L. J. Audus. Interscience Publishers, 250 5th Av., New York 1, N. Y. 1959. pp. 553. illus. $10.00. This enlarged second edition of Dr. Audus' comprehensive handbook on plant growth substances will be welcomed. In it the important advances in the subject since the appearance of the first edition are incorporated. After considering the nature of plant growth and its control in general, the following topics are fully treated: the natural auxins; the chemistry of auxins; the mechanisms of auxin action; auxins as general growth stimulants; auxins as initiators of new organs—the rooting of cuttings; auxins as stimulants of cambial activity—use in grafting and wound healing; auxins as initiators and stimulators of fruit development; auxins and the shedding of organs; auxins as growth inhibitors—bud growth and induced dormancy, and general toxicity and use as selective weed killers; various applications of auxins; hormones and reproduction; specific factors for the growth of organs; natural plant growth inhibitors; and growth substances in soil. This stimulating text is must reading for all plant physiologists as well as those interested in the practical application of the information to crop production. Highly recommended.

4. AMARYLLID CULTURE

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

AMARYLLIDS IN CENTRAL CALIFORNIA WINTER-RAINFALL GARDEN

LEO BREWER, *Orinda, California*

Twelve years ago we began an experiment to determine if it is possible to have a large attractive garden in central California which would persist on natural rainfall alone and which would not require much time for maintenance. We have gathered up plants not only from California but from dry-summer areas all over the world.. The acre garden is divided into woodland areas, which are dominated by native conifers; shrubby areas, which are dominated by *Arctostaphylos* and *Ceanothus* along with *Fremontia, Romneya, Dendromecon, Carpenteria,* and many other Californian shrubs; and the grasslands, where most of the members of the Amaryllis, Lily, and Iris families are planted.

Although twelve years is a short time for the slow growing plants of an unwatered garden, the experiment can already be labeled a success if one is willing to tolerate an essentially dormant garden in midsummer. As I must now give up my home and garden in this area and the chance of finding a real gardener who would continue our experiment is not great, this would appear to be the appropriate time to summarize our results to date. This article deals with our experience with members of the Amaryllis family.

To help in the projection of our results to other situations, it might be valuable to define our garden conditions. The garden is three miles east of the center of the University of California campus on the east side of the Oakland-Berkeley hills at 1200 feet altitude. As the hills to the west range from 1700′ to almost 2000′ in altitude, we are shielded from much of the summer fog of the Bay area and our climate is not moderated by the ocean as much as most of the San Francisco Bay area. Our summers are hotter and drier with the temperature reaching 90°F a number of times during the summer and our winters are colder and wetter with the temperature dropping below freezing during most winters. The annual average rainfall is 35 inches, but it is concentrated in the winter and the garden is situated on a knoll from which the rain runs off very quickly. The average rainfall in June, July, August, and September is, respectively, 0.3, 0.02, 0.06, and 0.2 inches. However, these averages are the result of rare moderate rain storms and no rain at all falls in most years. On an average, every other year has a five month drought with less than 0.5 inches of rain. Six month droughts with a total of less than one inch of rain occur on an average of every four years. The real test of such a garden is a drought of eight to nine months with less than one inch of rain which comes possibly once in fifty years. Our garden has successfully weathered one such drought.

The knoll on which the garden is situated was originally part of the natural grasslands with no shrubby plants except for some poison

oak, which was removed. The many oak, maple, and other seedlings which are found each spring are unable to get their roots deep enough to survive the hot dry summer. However, trees and shrubs which were watered during the first summer were able to persist without additional care. Most plantings were made in the late fall so that the winter rains could establish the plants. Mulches were used to retain moisture during the first summer. Most bulbous plants generally received no artificial water even during their first summer.

There are several general remarks about cultural practices that apply to most plants from dry-summer climates. They have not had to develop resistance to fungi which develop rapidly under warm moist conditions such as some of the *Fusarium, Stagonospora, Sclerotina, Ramularia* and especially the widespread *Sclerotium rolfsii* Sacc. Most books advise light soils for dry-climate plants even though they are usually found in heavy soil naturally, but such advice is based on experience in English gardens where the summer rain would quickly bring on rot if drainage were not perfect. Under our central California conditions, most of the plants that we have tried prefer our normal heavy adobe clay soil to any soils which have been lightened by large additions of sand and humus. The heavy soil retains more of the winter moisture through the spring growing season and yet does not promote fungus diseases if the soil is kept bone-dry during the summer. Experimental watering experiments have demonstrated that summer watering is fatal to many of the plants from dry-summer climates.

The next general remark has to do with tender plants. We have concentrated on plants with winter growing habits to take advantage of our winter rain. However, freezing spells often severely damage the winter growth, particularly of many of the South African bulbs. At our altitude we do not experience the severe freezes as low as 15° F which occur in the valley below us, but we can expect 25°F at least every five or ten years. The lowest temperature at our altitude in the last 25 years has been 22°F. These cold spells come during a time of a very cold dry air mass over California. We have observed that exposure to the sky is the most important factor which determines frost damage. Any weeding which removes grass cover causes much greater frost damage. Plants close enough to shrubs or trees which shield a portion of the sky show much less frost damage. If the plants need full sun, they can be planted on the south side of a shrub which will shield them from the night sky.

In the early years, it was our practice to dig in compost and fertilizer below the bulbs. This has been discontinued since it appears to promote fungus growth, tends to cause concentration of root growth too close to the surface, and generally does not seem to be worth the trouble. Many books recommend peat moss. Although our soil is only slightly acid, peat moss seemed to be detrimental to many amaryllids under our conditions. Our present planting procedure is to dig as deeply as possible with a pick and to insert the bulb with no additional soil preparation. Planting depth varies considerably, but generally we

tend to plant deeply, particularly if the bulb is tender, if birds or rodents eat the bulb, or if the bulb is not very drought resistant. Also bulbs which tend to divide too quickly and to become crowded are planted deeply to discourage excessive division. Normally plants are never disturbed once they have been planted.

It is perhaps most convenient to discuss our results with amaryllids by considering related bulbs together. The Allieae tribe has contributed importantly to our garden. Most Allium species are not sufficiently drought resistant to perform well in the grassland areas in full sun. White flowering *A. zebdanense* takes full sun, but *A. cowanii,* which is the showiest white, and *A. neapolitanum* need some shade. *A. triquetrum* grows in full shade here and spreads rapidly. It is delicious in salads and we have to eat it as fast as we can to keep it from becoming a nuisance. *A. tuberosum,* an evergreen onion from North India, also has white flowers and is excellent for salads. Yellow flowering *A. moly* is persistent here on north slopes where the ground does not dry out too soon in the spring. Blue flowering *A. azureum* has been a complete failure here. We have about twenty pink-lavender-purple *Allium* species growing here, but we do not find many of the colors attractive. *A. roseum grandiflorum* and the Californian *A. unifolium* are very attractive here with considerable shade on slopes which retain moisture late into the spring. *A. giganteum* is very showy. The Texan natives *A. drummondii* and *A. zenobiaea* are very attractive here.

One attempt has been made to establish *Nothoscordum,* but it appears to have failed. *Leucocoryne ixioides* has provided us with gorgeous floral displays each spring. The species *Muilla, Triteleia, Bloomeria, Brodiaea,* and *Dichelostemma* play a very important role in the grassland areas. Several were already growing naturally on our land and we have introduced additional species to a total of about 20. They bloom from early March into June. In favorable years the grass is blue with their flowers. Except for *Triteleia lactea* and its lilac variety and for *T. penduncularis,* the others grow in full sun. However, most grew better with either a little shade or a site that did not dry out too soon in the spring. They all do well in heavy soil, even very heavy sterile sub-soil banks. *Bessera* and *Muilla* were tried, but their summer growing habit is not compatible with our conditions and they seem to have been lost.

Both *Agapanthus* and *Tulbaghia* species of the *Agapantheae* tribe have been tried with disappointing results. None of the three *Tulbaghia* species tried will flower without water even in full shade. *A. longispathus* and *A. Weilligii* bloom in partly or largely shaded spots without summer water. Other *Agapanthus* species are established, but they are very slow growing under our conditions. They need special sites of a type that will be discussed in connection with *Crinum* and they may need summer water for several years to establish them more quickly.

Many *Hemerocallis* have been planted near the house where they may benefit from run-off from the lawn. A number of evergreen and early blooming varieties have been planted in the grasslands or in partly shaded spots. They have achieved a good deal of growth during the

rainy months and have given bloom, but their performance has been very inferior to typical garden results. They clearly need more moisture. *Ixiolirion ledebourii* and *I. pallasii* have done well here and the flowers are very attractive.

The *Zephyrantheae* tribe provides *Sternbergia lutea,* one of the most important plants of the grasslands. The bright yellow flowers of many hundreds of bulbs in the fall are an important part of the garden's fall display. The bulbs grow anywhere in the grasslands. *Rhodophiala bifida* and *R. spathacea* grow well also. *R. chilensis* appears to be more difficult and only rarely blooms. *Sprekelia formosissima* and its variety *superba* persists under our conditions, but rarely blooms. It goes dormant during the summer and starts growth after the fall rains. Thanks to the kindness of Dr. Thad Howard, a large variety of rain-lilies *(Zephyrantes* and *Habranthus)* have been planted along our lawn. Each heavy watering of the lawn is followed subsequently by a show of flowers during July through September. A few have been planted where they receive only natural rainfall. Their growth has been much less vigorous, but an unusual heavy rain in May brought forth some blooms and blooming more frequently follows heavy fall rains if they come early. *Sternbergia fischeriana* has not yet been tested in the grasslands, but a test planting near the house gave lovely bloom this spring.

Amaryllis, the favorite amaryllid of most readers, is poorly adapted to our garden. One single bulb is planted where it can receive some run-off from the lawn. It persists, but has never bloomed. However, the other genus of the Amarylleae tribe, *Lycoris,* plays an important role in the garden. A number of these species grow in the grasslands and their fall color is an important addition to the garden. *L. squamigera* has been planted in a variety of locations and persists, but it has never bloomed here. *L. sprengeri* and *L. incarnata* grow and bloom well in the grasslands. *L. sanguinea* has apparently been lost; it may be too tender. *L. radiata* needs shade, probably for frost protection as well as conservation of moisture, to bloom. *L. albiflora* and its variety *carnea* have bloomed well with at least 50% shade. Fifteen *L. aurea* (might be *L. traubii)* have sent up leaves every fall for four years, but they have suffered from frost during the winter and one scape has been obtained in four years.

Narcissus unquestionably dominates the spring garden for almost three months. We have more than 200 varieties and many thousands of bulbs planted throughout the grasslands. The varieties have been carefully chosen to be sun-proof, which has eliminated many large cups and most small cups. Our location appears to be ideally suited for *Narcissus* as representatives of all ten divisions are growing well here. The very late blooming varieties such as the poeticus hybrids, for example, must have considerable shade. Many of the forms of *N. bulbocodium* and other species do well here. The *Narcissus* plantings are divided into two distinct sections which are separated by our house and generally a gap of 20 to 30 feet. Quite a number of years ago, before we had learned to recognize the presence of bulb flies, both the large and small narcissus bulb flies were introduced into the southern

Narcissus section in a batch of bulbs obtained from a local nursery. Although the infestation spread throughout the southern section, it is striking that neither narcissus bulb fly has been observed in bulbs from the northern section. The flies apparently do not travel far. Fortunately, the winds are from the west and never from the south during the time that the flies are on the wing. With the plentiful supply of *Narcissus* in the garden, no evidence has yet been found of attack of other amaryllids except for *Leucojum*. 5% dieldrin dusted around the base of the leaves in March has greatly reduced the infestation. A dusting followed by a spraying of the leaves in April should practically eliminate the flies. If the next owner were to apply the double treatment and follow it with a lifting of the bulbs in August to eliminate any remaining grubs, the infestation could be eliminated permanently. Except to check for fly infestation, the bulbs are left undisturbed. The shoulder of the bulb is covered with 6 to 9 inches of soil to slow down formation of offsets. The bulbs are planted in clumps of one or two dozen with the clumps randomly distributed in the grasslands.

Haemanthus coccineus is well suited to our conditions and never fails to bloom in late August and September. All that it demands is the shelter of some shrub to protect it from the winter sky or ample grass growth around its large leaves to offer frost protection. *H. carneus* has persisted without blooming but the leaves have always been small. It is in 75% shade. *H. catherinae* has been grown as a watered plant, but with no bloom to date. *H. albiflos* goes dormant during the summer and leaves start after the fall rains. Growth has not been vigorous and there has been no bloom.

The *Crineae* tribe provides the very important *Brunsvigia* and *Nerine*. The Californian natives provide ample color in the period November-June in normal years and it is the fall period that needs the most support. Fall color has been provided primarily by *Sternbergia, Lycoris, Brunsvigia, Nerine,* and the fall *Crocus*. The various *Brunsvigia* hybrids do very well in the open grasslands except for frost damage to the leaves during some cold winters. The clones 'Durban', and 'Windhoek' of *Brunsvigia* x *parkeri* (Zwanenburg group), and clones of *B.* x *parkeri* English group, seemed to be the most tender, but the damage is greatly reduced if the grass still overtops the new leaves in late January or if a shrub provides shelter from the winter sky. Several hundred bulbs are planted throughout the grasslands and all available varieties have been tried. Many bulbs have not bloomed yet, but the number of scapes increases every fall and the fall display may some day rival the spring *Narcissus* display.

The *Nerine* must be carefully protected from frost. *N. Corusca major* is very badly damaged in mid-winter if its leaves are not covered by grass or shielded by shrubs. Otherwise its orange scarlet flowers are quite reliable. Some of the *N. Bowdenii* forms put out fall leaves and then go dormant in December whether protected from frost or not. *N. Bowdenii* clone 'Pink Triumph' is particularly valuable for its large blooms on tall scapes up to New Year's Day, but its leaves show frost damage where fully exposed to the night sky. The form 'Pink Beauty'

is similar to 'Pink Triumph'. 'Magnifice' (or 'Magnifica') is an attractive earlier blooming variety. *N. flexuosa alba* does well, but the flower was small and not especially attractive. *N. undulata,* on the other hand, has a small flower but a clump of scapes with pale pink waved tepalsegs is very attractive. A number of other *Nerine* have been tried, but none compared with the best of those mentioned above. Care must be taken not to plant the *Nerine,* especially 'Magnifice', in too shady a spot or trouble is encountered with mealy bug. If shelter from the night sky is desired, the south side of a shrub is preferable.

In the early years of development of the garden plantings were restricted to those plants that had a good chance of succeeding. In recent years less favorable plants such as *Agapanthus, Hemerocallis, Hymenocallis,* and *Crinum* have been tried. These plants would considerably extend the season of color in the garden and they were worth some effort. The problem was to find a site where they could find sufficient underground water for their late growing season. At first we reasoned that sub-surface drainage would follow surface drainage and that the lower parts of the garden would have sub-surface water later in the season than the higher parts. However, it turned out that the sub-surface drainage did not generally parallel surface drainage. By noting where grass stayed green later in the season and by probing to test the sub-surface moisture content, it was possible to map out those parts of the garden where sub-surface moisture was available late in the season. The planting procedure was to dig as deeply as possible and to lighten the sub-soil with sand and vermiculite. It appears that it may be necessary to water for two summers before the plants are well enough established to carry on without care. As noted above, some *Agapanthus* and *Hemerocallis* have been established; it is too soon to say how generally successful the procedure will be. It has worked well for *Crinum yemense* and *C. 'Ellen Bosanquet'* but both are tender and must be sheltered from the winter night sky. Even with protection, they lose most of their leaves in January, but they still bloom without fail every year. We have about nine or ten other *Crinum* species and hybrids being grown as watered plants which were to have been moved to unwatered sites. *C. bulbispermum* seems to be the most hardy. The others all suffer considerable frost damage even with protection. *C. moorei* is planted north of the house where it receives sun only during the six months that the sun is highest in the sky. Even this small amount of sun appears to be too much during July and August hot spells and it must be watered. It has bloomed the last two years. The X *Crinodonna* is much more like *Crinum* in regard to water requirements. It has not yet been established in an unwatered site.

Leucojum aestivum and *L. vernum* grow well if partially shaded. We have not yet found the proper conditions for *L. autumnale. Galanthus* is an important contributor to the garden. *G. nivalis* and *G. plicatus* and their many forms grow best on north slopes or in considerable shade. *G. elwesii* takes much hotter and drier locations. *G. byzantinus* and *G. caucasicus* also seem more drought resistant.

Most members of the *Pancratiae* tribe do not seem well suited to our conditions, but *Pancratium illyricum* blooms consistently in the hottest driest parts of the grasslands. *P. maritimum* grows well but has not been so good a bloomer. *Childanthus fragrans* and *C. ehrenbergii* have been grown as watered plants; their growing seasons do not seem well adapted to our garden conditions.

An attempt was made to adapt the various *Hymenocallis* (including *Elisena)* species to our conditions by changing their growing habits. Len Woelfle had pointed out that these plants are found near the equator and that it should be possible to control their growing season by availability of water. In 1959, when no appreciable rain fell between January and September, all of the bulbs remained dormant through the spring and summer. An unusually heavy September rain brought them out of dormancy. *H. amancaes* grew vigorously until late December frosts. *H.* 'Daphne', *H. caribaea, H. Harrisiana,* and *H.* 'Advance' *also* converted to fall growers. 'Advance' gave bloom in September. However, an unusually heavy rain in May 1960 brought them all back to a spring growing season. It is doubtful if a suitable growing season can be established here. In a garden with higher winter temperatures, it might be possible to convert them to winter growers.

In conclusion, it was found that many amaryllids grow and flower well with only natural rainfall under our conditions. Indeed, quite a number of amaryllids die out quickly if watered in warm weather. Plants of marginal drought resistance can often be successfully grown if provided with some shade. Quite a few amaryllids thrived under our hottest driest conditions and should grow well in even drier climates. The sheltering of tender plants from the winter night sky by shrubs, walls, or grass was found to be of great importance in minimizing frost damage. The mapping of sub-surface water flow appears to provide information on favorable sites for plants with late spring or early summer growing periods. The fall blooming amaryllids can be very effective in remedying the lack of fall color in a typical Californian native garden. Some of the experiments described above are still incomplete. It is to be hoped that the next owner of the garden will be interested in continuing these experiments and perhaps will report the final results in a future article.

WINTER-RAINFALL GARDEN IN SOUTHERN CALIFORNIA

HAMILTON P. TRAUB, *California*

When the writer first settled in southern California, he attempted to have all portions of his garden under overhead irrigation, but he soon learned that certain plants, especially many bulbous plants from South Africa, resented this extra attention, and died out. This led, after such failure, to the making of the winter-rainfall garden which is called also the South African garden since most of the plants grown there are from that region.

In San Diego and nearby La Jolla, the average annual rainfall is about 12 inches, and varies from about 5 inches to 35 inches (in very widely spaced years). In 1958-1959 the rainfall was 6.5, and in 1959-1960 7.5, inches. This rain occurs from October to June, rarely beginning in September. From June to October rainfall is nil or in trace quantities.

In the winter-rainfall garden area, no irrigation is given from June 1 to August 1, and then only in August and September to bring Brunsvigias and Nerines into flower.

The main species now grown in the writer's winter-rainfall garden are *Brunsvigia,* including *B. appendiculata* and the various forms of *B. rosea* (the Cape Belladonna), and various hybrids—*B.* x *parkeri* and *B.* x *tubergenii.* The fall and winter growing Nerines are also planted here, but such species as *N. krigei,* which produce their foliage in summer, are grown in the summer-rainfall garden, receiving a three hour overhead irrigation once each week from June to October.

Landscape gardeners and home owners generally in the irrigated regions of California, Arizona and Texas should investigate the possibilities of the winter-rainfall garden. Attempts to change the arid climate into a humid climate seem to be illogical. It is better to leave the major portion of the garden area as a winter-rainfall or desert garden which receives only the natural rainfall from October to June, and then a special effort can be made to reserve a smaller area which is irrigated in the summer.

Gardeners in the humid regions, with adequate summer rainfall, should not attempt to grow the winter-rainfall type plants in the open ground, but should grow them in tubs. These can be kept in dry storage from June to October, and, from October to June, in the South, can be placed in a protected place, or, in the North, in a window garden or greenhouse, to make leaf growth and flower. In Europe, such plants are sometimes planted outdoors in well-drained soil against a building or wall (southern exposure) with good results. There are some reports from the South that indicate at least limited success in growing such plants in humid areas by planting in *very well-drained sandy soils,* but such results are not generally applicable in humid regions in the South.

AGAPANTHUS AFRICANUS NATURALIZED AT GLADWYNE

Mrs. Mary G. Henry, *Pennsylvania*

For some twenty years *Agapanthus africanus,* sometimes called "Blue Lily of the Nile," has been living out of doors at Gladwyne, seemingly content and happy. I planted three bulbs in the springtime on the north side of a deeply imbedded rock, so they would have a cool root run and also to help conserve moisture.

They were planted in a slight depression so I could water them efficiently, not often, but only in an extra dry spell, maybe once or twice a summer. As the ground slopes gently the drainage is good.

The bulbs were planted in good clay loam which was rather stiff so I mixed in a little sand before planting them. They were set not much below the surface. The first winter I protected them carefully. About six inches of leaves were piled over them and on top of them I lay a piece of cello-glass, on the four corners of which stones were laid to keep it in place during winter storms. This is my usual method of protecting "doubtfully hardy" bulbs during their first winter. It seems worthwhile to spare no pains in protecting bulbs or plants for a year or even two years. After that period I feel they should fend for themselves, and if they cannot "take it" they are free to die in peace with no protest from me, merely regret.

The background is of large, deciduous trees in front of which are hemlocks, broad-leaved evergreen shrubs and deciduous Rhododendrons.

Fig. 22. *Agapanthus africanus* as naturalized at Gladwyne, Penna., the estate of Mrs. Mary G. Henry.

While the *Agapanthus* do receive a lot of sunshine in the afternoon, the backdrop of shrubbery shades them until well along in the morning.

In summer when the weather becomes hot and dry I sometimes dig in a top dressing of old leaf mold. Once every few years they have a few handfuls of Vigoro scratched in. During some winters they receive no care whatsoever and all of our winters are cold ones, near zero, to zero and below zero.

These *Agapanthus* have done well, really, with remarkably little care or attention. I could almost say they have thrived on neglect. The three original bulbs which I planted about six inches apart have now

increased to well over thirty. This year there are a number of self-sown seedlings around the clump. [Fig. 22]

The flowers of *Agapanthus africanus* are of a beautiful medium-deep blue, with about thirty-five good sized flowers in a head held on strong, but slender, stalks about two feet tall. The blooms come when they are greatly needed, about July 20th. At that time my new race of late-flowering Azaleas is just coming into bloom. The twelve feet tall Azaleas, *Rhododendron gladwynense,* blanketed with their pale salmon-pink flowers, are directly behind the brilliant blue Agapanthus. The effect is wonderful. Each enhances the beauty of the other.

GROWING AMARYLLIDS IN MICHIGAN

Donna N. Schumann

As with many amaryllid devotees, our interest began with inexpensive *Amaryllis* hybrids. We lived in Cincinnati at the time and soon discovered that placing plants outdoors during the summer months not only relieved the windowsills of the rather large-sized pots but also greatly benefited the plants.

After several years of growing *Amaryllis* hybrids successfully and being filled with awe each time one of them bloomed, we decided that here was a group of plants that warranted more interest. So we began adding a few "foolproof" *Zephyranthes* such as *Z. grandiflora, Z. citrina* and *Z. candida* to our summer garden plantings. The little plants produced their pink, yellow and white blossoms readily and thrived nicely during the long growing season in Cincinnati (mid-April into October).

As our interest grew so did our variety of amaryllids. Len Woeffle, who lived only a few blocks from us, not only willingly answered some of our questions and gave us growing hints but also parted with some of his plants to be added to our collection.

Then, in the fall of 1957, we moved to Kalamazoo, Michigan. Half-heartedly we dug and packed our bulbs. This, we expected, could be the end of our amaryllid hobby, except for those which could be treated as houseplants. Our stock, at this time, consisted of our Ohio grown plants as well as some lovely new species which we enthusiastically received from Mrs. Clint of Brownsville, Texas. These plants were all from Texas and several areas southward. Needless to say, we were very apprehensive about growing them in Michigan.

However, we optimistically planted our various amaryllis, *Zephyranthes, Habranthus, Cooperia, Ismene, Hymenocallis, Crinum,* and *Chlidenthus* the following mid-May hoping that an unexpected frost would not destroy our efforts. But everything grew! Everything bloomed! We were delighted!

Most of the bulbs were planted on the south side of the house close to the foundation where they were exposed to the sun for the entire day. The soil, which is usually a hard-packing black loam, was loosened by the addition of spagnum peat moss and sand. During the frequent brief dry

spells which are common here, the plants were watered regularly. Blooming during the dry periods was much reduced in spite of watering, but after a day or more of summer showers the plants would burst forth with many dainty flowers.

When freezing weather threatened during the latter part of September, we lifted our bulbs and stored them for another long winter.

TABLE 1. Degree of success in growing various amaryllids in Michigan. See text for methods of culture.

1. GROWTH OBTAINED BUT NO BLOOMS TO DATE

Chlidanthus frageans

Zephyranthes flammea (Pyrolirion flammeum)

Zephyranthes x **ruthiae** clone 'Ruth Page'

Zephyranthes sp. (collected by Prof. Nelson in Panama; near to **Z. puertonicensis)**

2. GROWTH OBTAINED AND LIMITED BLOOM

Zephyranthes drummondii D. Don (syn.-**Cooperia pedunculata)**

Zephyranthes brozosensis (syn.-**Cooperia drummondii** Herb.)

Zephyranthes citrina

Zephyranthes insularum (Clint-M-741)

Zephyranthes macrosiphon

Zephyranthes smallii (syn.-**Cooperia smallii)**

Zephyranthes sp. (Clint; "Valles")

Habranthus brachyandrus

Habranthus cardenasiana

Habranthus robustus

Sprekelia formosissima "var. superba"

Sprekelia formosissima "from Chandler"

3. GOOD GROWTH AND GOOD BLOOM

Crinum clone 'Cecil Houdyshel'

Crinum x **powelii** var. **album**

Hymenocallis harrisiana

Hymenocallis (subgenus **Ismene)** Clone 'Sulfur Queen'

Hymenocallis (subgenus **Ismene)** clone 'Advance'

Hymenocallis (subgenus **Ismene)** Clone 'Pax'

Hymenocallis (subgenus **Ismene) narcissiflora**

Zephyranthes candida

Zephyranthes grandiflora

Zephyranthes sp (Clint M-375)

Zephyranthes sp. (Clint M-292) (syn. **Cooperia)**

4. HARDINESS TEST (OUTDOORS)

(Planted within 33 inches of house foundation, south exposure).

Crinum x **powellii** var. **album**

Crinum clone 'Cecil Houdyshel'

Zephyranthes sp. (Clint M-375)

Zephyranthes candida

Zephyranthes grandiflora

Crinum clone 'Cecil Houdyshel', *C. powellii album* and *Zephyranthes candida* were left in the garden for hardiness tests, since they are said to be somewhat hardy. Apparently they were sufficiently protected by the house foundation and an ample snow cover since they have now survived two normal winters. A few *Z. grandiflora* and *Z.* Clint M-375's

lived through last winter. A planting of *Z. candida* in an open garden away from the house was, however, unsuccessful.

Our stored bulbs were planted again last May and grew and bloomed rewardingly. We had an extra bonus from them last fall when after a cool, rainy period in early November we discovered a profusion of bloom from *Habranthus brachyandrus, H. cardinasiana, Zephyranthes candida, Z. citrina, Z.* Clint M-292, and *Z.* Clint M-375. All bulbs, except the Crinums and *Z. candida* hardiness test bulbs, were lifted and stored after this display of flowers.

The bulbs have now been planted for a third summer in Michigan. Most of them appear in good condition and many of them have multiplied well so that we can expect even more lovely flowers than before. The only bulbs that have failed to survive in storage were of *Zephyranthes rosea.* Another attempt will be made with new bulbs.

Apparently amaryllids can be grown successfully during a much shorter and cooler summer than they are naturally accustomed to in their native habitats.

In the accompanying summary the growth and blooming qualities of our various amaryllids are indicated. It is hoped that such information will encourage other growers to try more varieties of amaryllids in the northern parts of the country. See Table 1.

BRUNSVIGIAS IN NORTHWESTERN LOUISIANA

CAROLINE DORMON, *Louisiana*

Several years ago I obtained Brunsvigia rosea minor from J. N. Giridlian. I planted it in coarse gravelly sand, mixed with leafmold, about five inches deep. The site is well drained, as I live on the side of a sand hill.

The first two winters, the leaves were cut down by severe freezes, and no flowers followed. I concluded that the latter was the result of the former. When cold weather was predicted the next winter, I turned a bushel basket over the clump of leaves, then threw a tow sack over that. This light protection was sufficient, and the leaves were not even nipped back.

The latter part of August I was richly rewarded for this small attention—a mass of flowers appeared. There were seven stems in one small clump. The flowers were not large, but clusters were full. The color was soft rose, tipped with bright blue—a lovely combination.

For two winters I have followed this course, and on two Augusts have been rewarded with flowers. In 1959 the temperature dropped to 16° F. one time, in 1960, to 19°. Lower temperatures might wipe them out, but I shall hope not.

HAEMANTHUS CARNEUS AND H. NELSONII

L. S. Hannibal, *California*

One of the interesting features of collecting amaryllids is that on unexpected occasions one encounters some very pleasant surprises. This has been particularly true with the bulbs of *Haemanthus carneus* Ker-Gawler and *H. nelsonii* Baker. I first encountered *H. carneus* while rambling about in the shady portions of Cecil Houdyshel's interesting garden. The two inch bulb had a pair of small semi-elliptical leaves covered with a fine white fuzz, giving the plant an appearance quite similar to the little *H. albiflos* var *burchellii* which I have grown for many years. So, concluding that the plants were probably similar, a bulb was purchased for breeding purposes. A small hybrid adaptable to a three-inch pot would make an interesting foliage plant and an occasional dish mop like red blossom would add to the oddity.

Fig. 23. *Haemanthus carneus* as grown by L. S. Hannibal, Fair Oaks, Calif. Reproduced from L. S. Hannibal kodachrome.

However when a flowering umbel finally arrived [Fig. 23] and opened fully it was quite an unexpected surprise, as the flowering head is quite distinct from all of our better known *Haemanthus* species such as *H. katherinae* or *H. coccineus*. The flattened six-inch high scape carries some 30 to 45 small pink blossoms on two-inch long pedicels in an open cluster. The small yellow anthers are rather insignificant—The pastel pink tepalsegs and tepaltubes predominate giving the umbel a rather dainty appearance. The blossoms open at random over a period of ten days and last for four or five days.

Seeds set rather readily and ripen within six weeks. The seed coatings remain unpigmented and thus fail to turn scarlet as in *H. coccineus* and other species with which I am familiar.

Haemanthus nelsonii can be readily confused with *H. carneus*, however the umbel is more compact and the anthers more prominent. At least that is the description given of the typical form. The bulb pos-

sessed by the writer had the anthers sunk so deep in the throat of the blossoms that they were nearly invisible and the tepalsegs were colored a pastel pink.

Haemanthus carneus probably represents a relative primitive form of the genus. The blossoms are more typical of the basic blossom of the Amaryllidaceae and the anthers have not taken over the bizarre arrangements as found in the other species. *H. carneus* is listed and illustrated in the booklet on Protected Wild Flowers of the Cape Province. We can conclude that the species is none too plentiful, but since it grows to an elevation of 4000 feet it is fairly winter hardy. The seeds sprout quite rapidly when planted on a moist loamy potting mix, but since only two leaves are produced each year it takes four or five years to obtain bulbs of flowering size. The color range is not fully known, but appears to extend from a near white to a deep coral pink. The blossoms are ideal for a small corsage.

SMALL-FLOWERING AMARYLLIDS IN THE LOWER GULF COAST REGION

CLAUDE W. DAVIS, *Louisiana*

The numerous species of bulbous plants which include *Zephyranthes* and *Habranthus* have very appropriately been given the group name "Rain Lilies", because they bloom after a rain in the wild. Bulbs of about three dozen species were planted in the fall of 1958 on the bluff land at Baton Rouge, Louisiana. The soil is a silt loam of the soil series classified as Olivier with a pH of 6.4 to 6.6 During the summer of 1959 summer rainfall was frequent and heavy,—almost daily at times. The mature bulbs bloomed freely and a heavy crop of seed was set on the fertile species. The following season, 1960, a very severe drought was experienced in the entire region with very little rainfall in the months of May through July. The beds were not watered and as a result practically all species became dormant with neither flowers nor foliage. Rains commenced in early August and within a week most of the species were flowering and putting out new foliage.

My interest in these small-flowering amaryllids was stimulated by the plant hunting expeditions of Mr. and Mrs. Morris Clint of Brownsville, Texas, into the prairies of Texas and down into Mexico, as reported by Fred B. Jones in Herbertia 1956 and by Kitty Clint in Herbertia 1957 and 1958. My attention was also called to the fact that Dr. Thad H. Howard, Jr., of San Antonio, Texas had been making similar plant collecting expeditions and had built up quite a treasure-trove of species and varieties which were new to horticulture. Both Dr. Howard and the Clints generously shared some of their "finds" with me and this article is in the nature of a report of performance here in the Lower Gulf Coast Region of these native bulbous plants of Texas and Mexico, plus a few other species acquired from other sources. In the Clints' nomenclature an "M" indicates Mexico and a "T" indicates that the plant was collected in Texas.

All of the small flowering amaryllids grown here appear to be perfectly winter hardy in this region. Freezes are infrequent and of short duration and it is very rarely that the temperature drops as low as 20 degrees. All of the species grown appear to do well in full sun and all respond to a fertile soil, high in organic matter and an abundance of moisture during the spring and summer months.

Zephyranthes grandiflora, from Mexico, is the largest and most commonly grown of the rose-flowers species. The bulbs form offsets freely and the increase from this means is rapid, but the flowers appear to be sterile. The white *Z. atamasco* which is native from Virginia to Florida has been a failure here, although the writer has seen it flourish at the home of Caroline Dormon in the sandy-clay coastal plains of North Louisiana. *Z. candida* is a white flowering form from Argentina and Uruguay with blooms coming in mid-summer to late summer. It does not set seeds, but offsets freely. The leaves endure through the winter months. *Z. citrina,* M-449, *Z. smallii (Cooperia smallii),* T-56, a larger form of *Z. smallii, Zephyranthes* sp. M-550 and *Zephyranthes* sp. 'Valles' are all of some shade of yellow from a light straw yellow to a deeper color. These yellow forms seed freely, but the increase from bulb division is very slow.

Zephyranthes drummondii (C. *pedunculata),* a native of Texas and Clints' M-292 are large white forms. The latter is a light seeder, but gives a very satisfactory bulb increase.

Smaller forms of collected white rainlilies which have done well here include *Z. traubii (C. traubii)* which is found in the coastal prairies between Corpus Christi and Houston, Texas and *Z. brazosensis (C. drummondii).* There are several variations of the latter, depending on the locality where found. Two which have done well here are Dr. Thad Howard's 'Stars' from North Bexar County, Texas and one from N. W. Bexar County, a less desirable form. This latter variety is white tipped with pink on the reverse. Another form of *Z. brazosensis* which has done well in Baton Rouge was collected by Dr. Howard between Cuidad Valles and Tamazunchale, Mexico.

A very excellent "Rain Lily" for this locality is Dr. Howard's *Z. ruthiae* Clone 'Ruth Page' which he described in 1958 Herbertia (page 55) and which is again discussed in more detail in 1959 Herbertia by Dr. Traub (page 35) and by Dr. Howard (page 85). 'Ruth Page' is a selected seedling of a cross of *Zephyranthes rosea* and *Z. citrina.* This extremely vigorous clone is a deep "shocking pink" in color. The size is intermediate between *Z. rosea* and *Z. grandiflora.* Increase is very rapid from vegetative offsets.

The large pink rainlily, *Zephyranthes macrosiphon,* has been successful here. It was collected by Mr. and Mrs. Clint under the number M-30 in Mexico near El Sol, San Louis Potosi. Increase is both from seed and from offsets.

M-20, the dark red *Zephyranthes clintiae,* is a fine garden subject. It is described in Herbertia 1952. Associated with it in the same locality

are several other forms which seem to be so closely related botanically that Mrs. Clint has dubbed them "the clintiae complex". One of these, M-25 is an extra large, dark pink. Other collected pink *Zephyranthes* which have proven their worth here are M-22, a bright pink with a white streak, M-410, a deep pink with a white throat and M-375, a pale flesh pink with a deeper color on the reverse. Not to be overlooked is the small and dainty *Zephyranthes* sp. collected by Prof. Ira S. Nelson in Panama and distributed to the members of the Louisiana Society for Horticultural Research as the "Panama Rainlily". The color is a light lavender-pink.

Habranthus are another group of the small-flowering Amaryllis which share garden interest equally with the *Zephyranthes*. *H. texanus* is bright yellow on the inside and burnt orange on the reverse of the flowers. It is a native of Texas, but appears to be equally at home in the silt soils of this area. Increase is from seed and bulb offsets. *H. brachyandrus* is a large lavender with purple at the base of the flower. A sterile hybrid form, *H.* x *floryi* is a large pink which flowers well here, but has made no increase. The Clints' collected form *H.* sp. M-445 is a pink similar to *H. robustus,* with flowers 2″ across the face and up to 2½″ long. *Habranthus robustus* is a large, pale pink which grows vigorously and flowers well. Vegetative increase is slow, but the plant seeds freely.

By far the most startling discovery and introduction on the part of Mr. and Mrs. Morris Clint was their collection M-456 in the state of Guanajuato, Mexico. This was later recognized as a new species by Dr. Traub and given the name *Habranthus immaculatus.* This is a magnificent and stately white species with flowers 3½″ across the face, borne of 14″ scapes. It is described and illustrated by Mrs. Clint on pages 17 and 18 of Herbertia 1957. Growth is very vigorous and the bulbs are immense, up to 3″ in diameter, but the increase, alas, is extremely slow.

SOME GOOD NEW DAYLILIES

GEORGE GILMER, *Virginia*

There are many fine varieties of daylilies that I have never seen and others that I have not grown. My comments are confined to recent introductions growing in my own garden. All mentioned have been highly praised by garden visitors.

In 1959 Dr. Traub introduced fifteen tetraploids. I bought two of the less expensive, 'Captain Reid' and 'Reverend Traub.' As small plants this year , they did so well I recently bought two more.

'Captain Reid' is like 'ALAN', but a little better on a smaller, younger plant. 'Reverend Traub' is the purest, brightest golden yellow I have seen and repeats. I believe there would be a tremendous demand for them if they sold at the same price as other introductions. I have given this space to tetraploids because I am expecting big things from them in the next few years.

Dr. Traub's diploids are priced in line with the introduction of other breeders. His 'Winged Victory' is a lovely yellow. 'Junipero Serra'

is a lovely yellow blend. I also have his "George Gilmer', but will not comment on it, lest someone think I am partial because of the name.

'Lyric' is a good garden pink.

'President Rice' is a fine large golden yellow. 'Alan' is one of the best reds.

'Flying Saucer' and 'Joan Durelle' are good yellows. 'Molle Gloye' is a beautiful bi-color of soft pastels.

'Chetco' is a fine new yellow. 'Pink Lace' is a pink that is near white.

'First Orchid' is an interesting color break. 'Gene Wild' is Lester's best. It comes early and repeats. It is a yellow blend. 'Kings Ransom' is one of the newest and best melon pinks.

'Alice Russell' is the most beautiful yellow and pink I have seen. 'Cartwheels', is one of the largest and best of the new yellows. 'Miranne Russell' and 'Lucille Russell' are fine garden pinks.

'Green Shadow' and 'Tenth Anniversary' are two of Sass' best.

Mrs. Taylor introduced 'Colonel Fry' last year and 'Crimson Challenge' this year. They are two of the best reds. 'Highland Fling' and 'Bridal Wreath' are two lovely pastels with harmonizing eyes. 'Sun Down' made perhaps the best display of any single plant in my garden in 1960.

There are a lot of other new ones that are about as good as these mentioned above. It is just remarkable how the hybridizers keep on bringing out something better year after year.

I have arranged the plants under the alphabetical order of the breeders, except Dr. Traub's. His new ones are such a break they are put first.

SHIPPING HEMEROCALLIS PLANTS

HAMILTON P. TRAUB, *California*

Losses have been reported when daylilies have been shipped even by air mail in recent years. Thus it would appear that the shipping of *Hemeracallis* plants should be standardized.

The *Hemerocallis* rootstock is a pseudo-bulb, that is, a near bulb. It is a thickened stem portion surrounded by leaf-bases, but evolution has not proceeded as far as the true bulb where the living thickened leaf-bases that surround the stem remain intact for a considerable time and serve as storage organs. Thus the *Hemerocallis* plant, with the leaves trimmed to 3 to 4 inches may be treated somewhat as the bulb.

A good friend of mine on the Atlantic seaboard, who sends out strong *Hemerocallis* plants, digs and air-dries them, and places them in a cardboard box and mails either by ordinary mail or express. Plants sent in this summer have always arrived in excellent condition. The important detail is to see to it that there is no moisture to initiate decay.

The writer uses the above method when strong plants are sent. However, when single fans are sent, especially if they have been separated shortly prior to sending, they are air dried, the roots are placed in a plastic bag with a small amount of vermiculite to take up any excess moisture. It is important not to place a great excess of vermiculite in the plastic bag since this may cause additional drying of the plant. The plastic bag may be sealed off with a rubber band above the roots.

Plants placed in plastic bags without air-drying and sealed off with a rubber band or string at the pseudo-bulb level have arrived here by air mail from the Middle West with the lower portions of new roots decayed (mushy), and entire decay (mushiness) of the old roots. Sometimes, such plants may be salvaged by removing the decayed parts and carefully planting the remains in pots. It may also happen that such plants are too far gone and cannot be salvaged.

RHODOPHIALA X HUNTIANA

WILLIAM LANIER HUNT, *North Carolina*

The hybrid between two MINIATURE ARGENTINIAN LILIES, *Rhodophiala* x *huntiana*, that Dr. Traub graciously named for me (PLANT LIFE 17: 1961), that is the subject of this note, makes seeds so late (Sept.—Oct.) that these should be planted in a flat in the greenhouse. However I have planted several crops of seeds of the "oxblood" red form of this beautiful little hybrid out of doors. As soon as they were ripe, I simply scratched out a spot in a good flower bed, scattered the papery seeds and raked them lightly into the soil as one does with grass seeds.

A light covering of pine needles over the beds has been all the protection from the on-coming frosts that my seedlings have ever had. Usually, quite a crop of tiny hair-like green threads comes up at once, and apparently many of these succumb to winter. It may be a good thing that they do not all grow, for, from each of the yearly beds, it seems, a never-ending crop of bulbs has come. Every year, the beds of flowers which have long since taken over the seed beds must be cleared of MINIATURE ARGENTINIAN LILIES. *Rhodophiala* seeds all come up at once, but this experience reminds me of the beds of gladiolus seeds I had when I was a child; they would keep coming up for seven years.

I tried unsuccessfully for years to get *Rhodophiala spathacea*. This "pink" species is advertised at a high price. They were always "lost" or "out", so I never got any. Now, however, perhaps as many as 1 percent of the seedlings that keep coming up have turned out to be pink—what might be called "shocking pink", in two shades. Actually, they are near to the Horticultural Colour Chart's rhodamine purple (HCC-628/2). The stock of *Rhodophiala bifida* (oxblood form) that we have in the United States is self sterile, and *R. spathacea* (purple) is self-fertile and is cross-fertile with *R. bifida*. Thus, the fertile forms that I have are apparently segregates of hybrids between the two. This cross has been made by others, and Dr. Traub has named it for me as already indicated.

Rhodophiala seeds are very perishable. As soon as the papery black seeds are beginning to shatter, scatter them over the surface of a seed box or bed and sprinkle soil lightly over them. A light mulch will help to preserve the moisture and speed germination which takes place very quickly. In colder sections above North Carolina, a greenhouse or at least a frame is necessary to protect the evergreen seedlings the first year. After that, the little bulbs will pull themselves down into the soil to the level they like best.

THE DIMINUTIVE AMARYLLID, CRYTANTHUS

CLAUDE W. DAVIS, *Louisiana*

Cyrtanthus are an intriguing small-flowering Amaryllis of easy culture in the garden where the winters are mild and, indoor as pot plants in cold climates. These narrow leaved, bulbous plants have small, umbellate flowers on scapes which may vary from 6″ to 2 feet in length, depending on the species. The tubular flowers of the Henry Hybrids, *Cyrtanthus* x *henryae* that I have been growing, are approximately an inch in length and are colored white, cream yellow, pink or bright salmon. Stamens are inserted in the tube of the corolla. The tepaltube, or tubular portion of the perigone, is generally enlarged toward the apex of the flower and the tepalsegs above the tepaltube are usually shorter than the tepaltube.

Culture should be the same as that used for Amaryllis under the same climatic conditions. Flowering frequently occurs in the late winter, which makes open culture somewhat unsatisfactory in regions which normally have mild winters, but which occasionally experience a light freeze in late winter or early spring. Under these conditions the foliage of the plants is not affected, but the flowers are ruined.

Cyrtanthus seed freely and are easily grown from seed. The seedling bulbs may easily be grown to flowering size in two years if given good culture under conditions which permit optimum growth during the winter months.

These diminutive plants from South Africa do not produce the spectacular show of color which one finds in the hybrid *Amaryllis,* but they are charming and relatively inexpensive to acquire, easy to grow and propagate and make an interesting addition to the flower lover's plant collection.

ANOTHER FINE NEW LYCORIS

WILLIAM LANIER HUNT, *North Carolina*

In 1951 and 1952, I was fortunate enough to purchase some imported *Lycoris* bulbs. When they first bloomed on August 26th, 1953, they turned out to be nearly white, with tiny red lines on the tepalsegs and ever-so-faint a hint of peach. After they were fully opened, they were an off-white, very delicate and beautiful. The foliage came along tardily; not until after that of *L. radiata* (old sterile form) i.e., in late

September. Tardy foliage in middle North Carolina is apt to get frozen back. This is what happens to ultimately destroy *L. aurea.* However, the leaves on the new bulbs came sooner than those of *L. aurea* and were mature enough to take the November frosts in stride.

When the bed of improved bulbs began to flower yearly, I noticed, one day, right in the midst of the patch, a marvelous light greenish yellow blossom, quite different from the rest. By Wilson's Colour Chart of the Royal Horticultural Society, it turned out to be Dresden Yellow 64/3—a shade that one finds almost nowhere except on certain fine china.

This outstanding flower was a great deal fuller and heavier than the airy blossoms around it, and so Kodachrome records were made of it in

Fig. 24. *Lycoris* Sp. (Dresden yellow-flowered, with fuller, heavier flower), in foreground; and *L. houdyshelii* in background. Grown by William Lanier Hunt, Chapel Hill, North Carolina.

its prime and in different stages of opening from year to year. After fully opening it turns to the faintest creamy white. When one inspects the bed of flowers, one's eye lights immediately upon it because it is fuller and heavier than its companions.

In 1957, Kodachromes and specimens were sent to Dr. Traub by air mail. He identified the flowers from the new patch of lycoris as *L. houdyshelii* and the strange new one as something as yet unknown. I am sure that he will describe in Plant Life. Since no black and white photographs were ever made of this flower, and the Kodachromes are inadequate for this purpose (see Fig. 24), we shall have to wait another year to publish a good picture of it.

The heavy winter snows of 1960 seem to have prevented the normal flowering of lycoris in general this year. Foliage was not evidently damaged, but the formation of flower buds seems to have been. *L. squamigera* has flowered only about 2 percent, and the early fertile clone of *L. radiata* has done a little better: perhaps 10 percent. The bulbs of the new lycoris had not awakened on the last day of August, but watering brought out three buds by September 10th. Perhaps the approaching hurricane, "Donna" will bring forth more buds. One bulb of the newcomer is to be sent to Dr. Flory and one to Dr. Traub, and it looks as if we may have another very, very fine new lycoris for Southern and West Coastal gardens.

AMARYLLIS IN THE MIDDLE WEST

MRS. FRED TEBBAN, *Illinois*

Here in Illinois this 1960 growing season is a fine one with plenty of heat and moisture which amaryllis need and all my plants grown in pots are putting up fine husky foliage. The seedlings I find it necessary to grow in beds are also doing well, although our growing season here is so short they must be planted late and harvested early so it takes them a long time to reach blooming size.

The potted plants were grown indoors under fluorescent lights for several months and then were placed outside in partial shade on the south side of the house in early May. It was necessary to cover them only once as protection against frost, and I shall leave them out as late as possible in the fall, although it is generally necessary to bring all potted amaryllis inside soon after Sept. 15th because of threat of frost. Most are forced into dormancy then but a few of the slower ones are allowed to grow again under light inside.

Before placing the amaryllis outside I used muriate of potash as a fertilizer in solution (one teaspoonful to a quart of water) and watered the growing amaryllis with this a number of times to induce strong, stalwart foliage to withstand wind damage after placing outdoors. I find that this is an excellent practice to follow for those of us who must use the indoor-outdoor method of culture for since using this fertilizer I have been able to move the amaryllis outside without the loss of a single leaf from wind damage. In the 1959 HERBERTIA, Mr. Douglas D. Craft of Chicago, refers to a "Tomato Food" he uses on his amaryllis. I was able to obtain some of this "Tomato Food" which has an analysis of 3-12-13, and have used this in solution also, to feed the potted amaryllis. I have used this in the same strength as the muriate of potash, one teaspoonful to one quart of water, and am very well satisfied with the results of its use. I have also used as a starting solution an "Alaska Fish Emulsion" which is slightly higher in nitrogen content but very good to get leaf growth started. However, it is better to use outdoors rather than inside due to the very fishy odor, although it is advertised as odorless. These fertilizers, together with liquid manure, are fed in rather

larger amounts than would be used if our growing season were longer. I find it wise to fertilize pots at least once a week as fertilizers leach out with frequent waterings. Those grown in beds are not fertilized quite so often, as some dry fertilizer was placed in the beds and worked in to insure a good supply in spite of rainfall and frequent waterings.

To each pot this year I added a generous supply of charcoal to keep the soil from becoming too acid. Frequently red spots appear on the foliage and one can know then the soil is too acid for the liking of the bulb, and a small amount of horticultural lime must be added to bring it back to a more neutral condition. Due to the use of the charcoal, thus far no red spots have appeared and all the amaryllis appear to be in a healthy condition. I have dusted them occasionally with a chlordane dust, and water once in a while with a DDT solution, to discourage insects in the pots, although we have few insect pests other than cutworms and sowbugs that are harmful. There are no fungus diseases or viruses to fight unless we receive infected bulbs, and each new bulb should be segregated until it is found to be free of all such ailments. I have often found bulbs with thrips between their scales and occasionally mealy bugs, but these I have gotten rid of quickly by dusting the bulbs with Semesan. I have found this most useful too in counteracting decay that may be caused by too much watering or too cold temperatures. Here our greatest two enemies seem to be acid soil and cold below 50 degrees, for the amaryllis dislike temperatures below 50 for any length of time.

I have purchased during the last two or three years a number of the hybrid *Amaryllis* bulbs, grown in South Africa, which have shown up on the markets and am very happy to find them equal to the Dutch Hybrids in every way. They bloom in late October or early November when first purchased but I am wondering if this cycle of growth will change and they will bloom at the same time as the others after being grown in this northern hemisphere. Only time will tell.

I still find that I have many failures among the various bulbs of *Amaryllis* species, but always hope for better luck another year.

Each year I try to add a few new bulbs to my collection, and this year am ordering 'Bouquet', 'Apple Blossom' and 'Delilah' from Ludwig's. I have long striven for a good orange and a good black-red among the various shades of color, but have found neither of these so far among my purchases. Maybe I shall someday be able to produce these shades in seedlings of my own crosses when I live in a climate more adapted to amaryllis growing.

COMMENTS ON THE 1959 — 1960 AMARYLLIS SEASON

ROBERT D. GOEDERT, *Florida*

The 1959-60 season was marked by abnormally heavy rains in many sections of the south and a very late spring. The flowering season was erratic and many spikes that came up early were damaged by the cold. This reduced the quality and number of spikes at the various shows. I did, however, have a number of letters from amaryllis fans who had exceptional results and I feel *Amaryllis* gained many new friends this past season.

I believe generally that the largest number of complaints this season was about short spikes. I think short spikes are caused by the bud starting and then suddenly being retarded or stopped by a prolonged cold spell. If the cold condition is for a sufficient length of time the bulb will often become dormant and the bud will not develop when the bulb starts to grow again.

This season I observed quite a few beds of amaryllis in the Jacksonville area. Most of the best flowers were in beds in protected areas and particularly on the west side of the buildings or walls. I believe the ground in these areas has a more constant temperature and the bulbs remain dormant until the weather is more settled. I found where the beds were on the east side of buildings or out in full sun growth started in many cases a month earlier and many spikes were damaged by cold spells.

With the wet season just past I believe many of us in the south will admit that generally one plants his bulbs too low. I am adding coarse sand to many of my beds and raising them several inches before replanting. I think we should pay more attention to seeing that an open textured soil is used for our amaryllis beds and that they are well drained. Water should drain away from them and not pond so the soil gets soggy or muddy. Most soils can be improved by adding sand, perlite, peat, manure and leaf mold. Remember that in most regions of South America where amaryllis are native the country is mountainous and not like our flat Southern Gulf States and Atlantic Seaboard. There are some species that grow on a precipice and even in trees. If you can plant your amaryllis on a terrace or slope it would be well worth trying.

This past season was marked by other difficulty besides the weather. One Dutch firm shipped a considerable number of bulbs through a southern port to avoid the possibility of freezing which had occurred the season before. Many bulbs came in sprouted. Part of this was due to heating in transit and to the fact that shipping schedule to the southern ports from Holland takes several weeks longer than to northern ports. Though this was a noble experiment it did not appear to be the answer to receiving bulbs dormant and in top condition. The Dutch firms are constantly striving to furnish bulbs in top condition. Last season they also experimented in a small way by starting their green-

houses a full month earlier so they could ship before cold weather sets in. The results looked good and this season many bulbs will be shipped early. It is hoped this will improve considerably the condition of the bulbs received by the customers. Most bulbs however will again be shipped through northern ports to reduce shipping time.

This coming season there will be a larger number of new amaryllis clones introduced by the Dutch Growers. Notably these will be from three firms: Ludwig, Warmenhoven, and Van Waveren.

The Van Waveren new clones sound interesting. They are listed as follows; 'Christmas Dream', orange scarlet; 'Decora', carmine rose; 'General Eisenhower', salmon; 'Haarlem', red; 'Orange Beauty', orange; 'Poussin', wine red 'Rose Beauty', cyclamen rose; 'Rosy Cloud', pearl pink.

Both Ludwig and Warmenhoven showed in the Floriade or World Flower Show. The Ludwig firm won a gold medal first prize. The Warmenhoven strain won the Prix D'Honneur for the stand that had the best and most exclusive and attractive display. They also won the Gold Medal First Prize for outstanding quality of flowers and large range of clones. It is most gratifying to see this firm introduce five (5) new clones at this show. It is also fitting that with the Floriade this year the Ludwig firm should introduce a larger number of clones than usual. It also would be expected that the new introductions from these firms will be most noteworthy. It will also be noted that three of the Warmenhoven clones are a departure from the solid colors. This may point to a new trend in Dutch Amaryllis—to more of the stripes, two tones and blends. This will be a welcome change in my opinion.

The new Warmenhoven clones will be quite high in price this year, and since they are scarce, will possibly remain high for several years. The new white 'Snow Queen', is said to be a huge flat faced variety with faint green throat. It may prove to be the largest white. 'Golden Triumphator' is a large light salmon orange with greenish throat. The upper tepalsegs of this clone have a violet stripe. 'Orange Wonder' is a light orange blending to dark orange in the throat. 'Floriade' is a most interesting clone—a white with a soft pink sheen; the lower tepalsegs being pure white; the upper tepalsegs have two dark lines in each. As the clones tend to have more color in this country it may turn out to be more striped than the description indicates. 'Elvira Aramayo' is a light violet with very large flower. From early indications this clone will be much sought after. Only those ordering early in 1960 will be able to get it. It is a color many desire and should become very popular.

Ludwig & Co., introduced a number of clones at the Floriade that will not be made available to the public until stocks are more plentiful. Their two picotee type clones are 'Petticoat' and 'Square Dancer.' Others are 'Alpine Splendor,' white; 'Sleigh Bells,' white; 'Dutch Belle,' rose; and 'Peppermint,' a striped clone. They all sound most interesting and will be welcome additions when available.

Ludwig's seven introductions for the 1960-61 season consist of four (4) large-flowering clones and three (3) gracilis types. The four large-

flowering kinds are, 'Symphony,' a delft rose said to be an improved 'Diamond;' 'White Favorite,' a slightly bearded late white; 'Belle Vista,' a cherry red; 'Flora Queen,' a spinel pink with dark veining. I have been told that Ludwig & Company has great faith that 'White Favorite' will be one of the top whites for a number of years. Their three new gracilis are 'Pixie,' orange with pointed petals; 'Pamela' capsicum red with green throat; 'Voodoo,'' scarlet with white green throat. The Gracilis are lovely pot plants and should be grown more extensively.

The Van Meeuwen firm offers one new clone this season. 'Verona' is a salmon pink with white throat. There are few amaryllis in this coloring so it should be a welcome addition.

Reports from last season's new introductions have been light, however, of Ludwig's clones 'Spring Dream' and 'La Forest Morton' have caused the greatest comment. 'La Forest Morton' is a very good violet rose clone that should become very popular. 'Spring Dream' is apparently a free flowering salmon pink. This is a departure from the rose pinks that have predominated. 'Ludwig's Ace' is similar to 'Spring Dream' but with more of a salmon orange tone. 'Prima Donna' is an old rose, a new color about which there is a mixed opinion. After it is better known this color may be accepted with more enthusiasm. It is a different shade and is a worthwhile addition to any amaryllis collection. 'Christmas Gift' did not get wide distribution. The public seemed to go more for the older proven whites. This is partly due to the fact that new fan's first Dutch amaryllis is usually a white. Often they have seen a white clone they want. 'Christmas Gift,' after one season's growing appears to be a worthy addition to the white class. It is fairly large, slightly ruffled, and sweet scented as it grows for me. It should prove to be a good clone. 'Circus,' Ludwig's new dark red and white variety is similar to 'Candy Cane' but darker. It did not cause much comment. Another year will give a better picture of its worth.

'Purple Queen,' Warmenhoven's new dark purplish red clone of last season, was fairly popular the first season. I have heard mixed opinions on it. Some say it is in their opinion the outstanding dark red. Of course some were disappointed that it was not a true purple. I feel it will be many years before we have the true purple. 'Pink Beauty' was grown by only a few fans. It appears to be a large free-flowering clone. It is different from any other clone—red and white veined with a general tone of pink. It has the same veining effect as 'Sweet Seventeen' but possibly more so. It can apparently be grown large and should make a good show clone.

Van Meeuwen's new clone of last season that caused the greatest comment was 'Zenith.' This unfortunately was poorly described and many were disappointed in it. Others did not let the poor description alter their opinion of it and considered it one of the best striped red and white varieties yet introduced. It is a large bearded red and white

striped flower with the lower tepalsegs near white. In Holland I understand that the lower tepalsegs are often pure white and the red color more rose. I am afraid we can not depend entirely on the color description made in Holland especially on the striped clones.

If one will realize that Holland is on a latitude equal to Canada and that we in the Gulf states of the United States are on a latitude with Northern Africa one can readily see where some variations in color might be expected. In Holland the springs are marked by heavy fogs, when here usually the skies are clear. The sun's intensity has a lot to do with the color shades of amaryllis. In Holland the colors are usually much lighter than here. In the striped clones the striping appears pink or rose, when here it appears red. 'Zenith' should become one of the leading red and white striped clones.

Van Meeuwen's pink 'Queen of Sheba' and 'Queen of the Pinks,' appear to be very free flowering rose pink clones, possibly a little darker than Ludwig's older, 'Pink Perfection.' 'Queen of the Pinks' flowered much larger for me than 'Queen of Sheda.' Both appear to be good additions to this color shade.

The clone 'Camellia,' unfortunately, was very scarce. It is said to be practically double. The bulb I had was damaged by cold so I did not see this clone. It seems to be more tender than others. It may be a hybrid of one of the double species that are more tender and do not flower well when disturbed.

Last season the new "Hadeco" strain from South Africa was introduced. These come in separate colors. Although all colors were not true they did prove to be at least 80 to 90% true to color shade. I had reports of flowers up to 12″ and many said they were some of the darkest reds they had ever seen. The pink and rose shades turned out mostly striped red and white and pink and white. They appear to be very free-flowering. Flower size is good and they are worthy additions to the amaryllis list. They can be flowered early as they are dug in July and August and are available from September to March. This firm expects to offer named clones in the near future and surely they will have many worthy ones.

The amaryllis received from India this past season were very interesting, however there is still a need for improvement in uniformity and proper classification. The bulbs I received from the Universal Bulb Company were most desirable.

The Dutch Strain from Universal Bulb Co. in separate colors were an improvement over those received the season before and of fine quality. Many were equal to named Dutch. I had several in a lot of about 200 that were outstanding. The Dutch Strain I received from L. K. Pradham appeared to be a mixture of Dutch, half Dutch, Australian and other hybrids. Many showed the characteristics of the species, amaryllis. Some were of the *A.* x johnsonii type. In several hundred I flowered many were culled but I found some outstanding flowers among them. They surely would not be accepted by customers in the U. S. as of the Dutch strain. The colors were only partly true.

as labeled. They possibly were classified by the color of the seed parent. There were a number of most interesting types in them but one has to buy a hundred bulbs to get a fair assortment. I found some interesting bronzy orange colors, a number that had the lower tepalsegs specked with small dots of color, a rose with large yellow green throat that appears yellow at a distance, and a large orange and white about 12″ with twisted tepalsegs. I would say this is a grab mixture and if one likes to gamble on a 100 to 1 shot this would be an interesting venture.

The Australian hybrids I received from Universal Bulb Company this past season were much improved over those received the year before. They appeared much like a selection of the bulbs sold by L. K. Pradham as Dutch strain. In fact I had several that appeared to be identical in both lots. The Australian hybrids were only fairly reliable to color but the colors and forms were most interesting and different. The whites were all near white, however there were a few pure white that were most interesting. One had a yellow tone with large green throat. One would have to buy some quantity of these bulbs to get a good picture of this strain. If these hybrids were properly selected they would be an excellent addition to any amaryllis collection.

The miniatures from L. K. Pradham and Universal Bulb Co. were much alike but those from Universal were a much better selection. They range from *amaryllis belladonna* hybrid types to flowers similar to the Dutch Gracilis. They also contain some near *A. johnsonii* and other types. They were a "Dukes Mixture" if there ever was one. Those from L. K. Pradham had a higher percentage of Belladonna hybrids in them. Of those from the Universal Bulb Co. I found some most interesting miniature in the striped red and white and pink and white sorts. They appear to be hybrids of several small species.

The Gracilis from Universal Bulb Co. appear to be a more select cross than the miniatures. Most were orange red and very pretty. They appear to be a cross between Dutch Gracilis and the Belladonna hybrids and possibly other species and hybrids. Their growth is much different from that of the miniatures being much smaller and less vigorous. They are definitely different. The Gracilis from L. K. Pradham turned out mostly to be of the Indian Belladonna hybrid type and a small scarlet and white hybrid or species and a few other hybrids.

Few of the miniature doubles from the Universal Bulb Co. flowered but those that did were small—about 6″ tall—with a double flower similar to the double form of *Amaryllis belladonna (albertii)* but much smaller. They do not grow well until warm weather and those left out last season perished due to cold. They are more tender than the others and can only be grown in the open in areas with a very mild climate.

The amaryllis sold in India as "Equestris" is a miniature scarlet with yellow green and white throat. It is plentiful and makes a very nice pot flower. It has been determined as a hybrid of *Amaryllis belladonna*. It is an interesting and worth while hybrid.

From the amaryllis examined from India it can be said that there are many interesting sorts raised in that area. There appears to be

no standard of quality or type, and anyone ordering can not be sure what he will receive from the different bulb dealers and growers in that country. It is hoped this can be corrected so that a more reliable source of better types can be had.

The amaryllis is definitely on the move to a more prominent place in the southern garden, as a show flower, and as a pot plant in all parts of the United States. We find, besides the Dutch, competing in this market, growers from South Africa, and India. As this competition becomes keener it will necessitate an even higher standard in quality.

While South America has been slow to recognize the value of the amaryllis as an ornamental plant interest is beginning to show in some areas. This interest will surely grow and it is expected many new species will come out of South America in the next few years.

COLLECTING AMARYLLIS SPECIES

JOSEPH C. SMITH, M.D., *California*

Another year has gone by and many things have happened in the world of amaryllis. New and exciting F_1 and F_2 hybrids of species have been reported on by the Louisiana Society for Horticultural Research. Ludwig's tenth anniversary catalogue offers new color patterns in the hybrids. Dr. Cardenas of Bolivia has supplied a number of persons and institutions with seeds of *Amaryllis* species and crosses that he has made. Mr. Goedert of Jacksonville, Florida, has imported more unidentified species from Brasil. Thus, many of us have been able to add to our growing collections of *Amaryllis* species.

An unidentified *Amaryllis* species being grown by a number of collectors as *A. forgetii* since its introduction from the Andes several years ago by Dr. Goodspeed has been temporarily placed as a form of *A. correiensis*. This classification may yet have to be changed pending further study due to its summer flowering habit, whereas, the true correiensis flowers in spring. This is not as attractive a form of *A. correiensis* as the type. Its value to the breeders lies in its summer flowering habit which along with the fall blooming *A. aulica* could be expected to extend the flowering season of the hybrids. This species was described in the 1956 Herbertia under title of "An Andean Amaryllis Species."

Amaryllis barbata has been reintroduced from Suriman by a California enthusiast. The writer has identified *A. barreirasa* among bulbs received from Prof. Nelson via Dr. Cardenas. This form has somewhat narrower tepalsegs than the one originally described from Barreiras in east central Brasil. Since Dr. Cardenas collected this bulb in Bolivia this would indicate a wider range of *A. barreirasa* than has been previously reported.

Amaryllis species imported from India as "equestris" have turned out to be a nice near *A. belladonna* hybrid. It makes a very nice show with its bright scarlet color when planted several bulbs to a pot. [See

Amaryllis x *mostertii* described elsewhere in this issue.] The double form offered by the Indian growers is also a very nice miniature. The hybrid of *A. reticulata* var. *striatafolia* 'Mrs. Garfield' is also available from India. *A. stylosa* received from the same source did not bloom so has not been positively identified.

Mr. Robert Goedert of Jacksonville, Florida, has imported at least four batches of unidentified *Amaryllis* species from the states of Santa Catarina and Paraná, Brasil which he is offering for sale. To date none of these have been positively identified but from the foliage at least one could be a nice miniature species. Mr. Goedert will no doubt have other species in the future as his collectors are successful in locating them. The writer has received of *A. calyptrata* from central Brasil. This one is said to be a light green in color with deeper green netting and pink stamen. From the same area bulbs of *A. aulica* have been received which no doubt will prove different from those from Santa Catarina reported upon in the 1960 Amaryllis Year Book.

Amaryllis bulbs received from Mrs. Every, of Chrispeen, Saba Islands, Netherlands Antilles bloomed well and were pretty much like those pictured in the last year book with Mr. Jones article. His came from the same source as Mrs. Every is quite liberal with her *Amaryllis* bulbs to those who buy some of her excellent needle work. These are probably mostly early hybrid forms.

As far as it is known to the writer stock of the newly described species, *A. fragrantissima,* as described on page 32 of year's book by Dr. Martin Cardenas has not been sent to the United States as yet. Dr. Cardenas has been exceedingly helpful to American collectors by making available to us seeds and bulbs of the species native to his country, Bolivia. Last year he sent seeds of the newly relocated species, *A. viridiflora,* as well as a number of crosses of species he has under cultivation. It is hoped he will continue to provide this type of service in the future and make available seed of the pure species so that we may have early wide distribution of these in this country. In his article on searching for the green flowered *Amaryllis* species he mentioned seeing *A. crociflora* growing in the wilds. We hope he can supply this one this year.

One of the highlights of the past year has been the first flowering of a new *Amaryllis* species imported from Bolivia in 1957 and collected there by Dr. Howard Smith then on missionary work in Peru. This is not an exceedingly beautiful species being a shade of brick-red in color. Its really outstanding feature is its extremely short tepaltube, the shortest yet described in an *Amaryllis* species. It will flatten the "pansy-faced" hybrids even more when it is bred into the hybrid lines. For practical purposes you can say it almost has no tube at all. The tepal-segs are formal and the two flowers face slightly above horizontal. The plant is quite robust and easy of culture. The leaves are rather long and can be distinguished by their rolled edges. The first flowers went into the Traub Herbarium so it is not known whether it will seed well to its own pollen.

Another highlight of this season has been the report of a new species from Argentina, *A. parodii* (Fig. 25). This one has greenish-yellow long trumpeted flowers and belongs in the Macropodastrum group. Bulbs have been promised and seed have been received and started. This is a very exciting new addition to the available *Amaryllis* species.

Fig. 25. *Amaryllis parodii* (Hunz. & Cocu.) Traub, native to Argentina; flower with long-trumpet, and greenish-yellow in color. Reproduced from Trab. Mus. Bot. Univ. Nac. Cordoba. 2 (no. 7). 1959.

Many other leads on *Amaryllis* species have been run down, and a number of bulbs have been obtained that have not flowered as yet so will have to be reported on later. Actually, instead of getting closer to having in collection all of the *Amaryllis* species, we get further from the goal as new species are discovered and many of the long described ones remain unavailable. There is a great likelihood that there remain many more species in the wilds of South America, and we can look forward to many more years of discovery of new species to work with and enjoy.

FIRST STEPS IN AMARYLLIS GROWING

Mrs. Victor McGee, *Costa Mesa, California*

Having seen our first Dutch Hybrid *Amaryllis* in bloom in a southern California nursery in 1945, my husband and I were unable to forget its beauty and huge size.

Although the first few domestic bulbs purchased were a disappointment, in 1955 I sent to Holland for six bulbs, which came in December. They were planted in a mix of garden loam, peat, leafmold and sand with one tablespoonful of bonemeal and one teaspoonful of blood meal per six-inch pot.

Soon huge buds began to show and in 8 to 10 weeks they began to flower in my living room, later being shifted to a lathhouse which is covered with plastic on the top in the winter.

As they bloomed, we began to hand pollinate the flowers (not knowing that newly rooted bulbs should not be used for seed-setting.) In spite of this, we have over 1,000 seedlings in the backyard, of which about half should bloom this spring (1960). The fifteen or so that bloomed late in summer of 1956 were some lovely selfs in coral, pink, salmon and reds. This bed has had a ground rabbit manure mulch and the bulbs are completely covered with soil. A large percent of these seedlings already have a ring of offsets around each one.

Each winter I add a few new bulbs from Holland. Two years ago 'Candy Cane' and 'White Giant' failed to root, so in May I quartered the bulbs, covered them with Vermiculite and now I have two lovely 'Candy Cane' bulbs; but 'White Giant' failed to produce any bulblets. Of the twenty potted bulbs we have, only 'Ludwig's Dazzler' has produced an offset.

In another bed I have what I believe are "American Hybrids", purchased from a lady nearby, who grows them. Some blossoms are 11" across and they multiply rapidly.

Last spring I found a maggot like worm in the scales, causing rot. I lifted all these bulbs, a few at a time, and soaked them in a semesan solution for one hour, dusted them with chlorodane and soil sulphur and replanted them with ½ of the bulb above the soil, which I had lightened with sand and peat. Our soil is adobe and alkali due to water supply. Recently I found several of the bulbs dead, roots completely rotted off.

In 1959 I had flowers constantly from January 14th to October 7th from my bulbs. Now I am anxiously awaiting the results of my newest bulbs; one of them is the rare 'Cerise' (Warmenhoven).

AMARYLLIS NOTES, 1960

C. Lloyd Burlingham, *Florida*

FLOWERING.—In 1958 I bought *Amaryllis* seeds from Ludwig, 100 white strain and 100 rose strain. The seeds were sown on receipt, and the resulting plants were grown next to each other under similar conditions of heat, light, moisture and feeding. Less than two years later (May 10, 1960) three of the white strain bulbs had blossomed. One bulb was 2½ inches in diameter, with two offsets (each 1⅛ inch in diameter) on April eighth when I repotted it. Another bulb that blossomed was also 2½ inches in diameter, with two offsets. The third bulb

that blossomed was 3 inches in diameter, with no offset. Curiously in the same lot was a 3 inch bulb with two offsets that did not blossom, as well as a bulb 2¾ inches in diameter with no offsets. None of the rose-colored bulbs blossomed when the flowering season ended for this spring (1960). Incidentally, these seedling whites had beautiful 7-inch flowers which I prefer to the usual early whites.

I have read somewhere that the secret of *Amaryllis* flowering is feeding, that if one grows the bulbs large enough, they will surely blossom. This is of course an exaggeration. I have had plenty of 3 and 4 inch *Amaryllis* bulbs which have skipped a year.

In making my Mead cross H-1 x 11-1, I used for the seed parent a bulb with a 7-inch medium red blossom, but with a white blotch near the edge of one tepalseg. The pollen parent had a 6-inch dark red flower with no white. Of some thirty resulting seedlings, only one showed any white, and that was a near-white. The flowers ranged from six to seven inches, and were all dark red, (except for the one near-white), not covering a white range except for No. 18 (the 18th of the cross to bloom), which was extremely dark, perhaps the darkest *Amaryllis* I have seen. It is darker than 'Alcyone'. I did not have a 'Tristan' in blossom for comparison. The extremely dark red was not evident in the seed parent, and was not evident in the two preceding generations of the pollen parent. Where did it come from? Thus the parents must be heterozygous, possessing both genes for white and red flower color. Red is apparently dominant over white, and when red was present in double dose in the offspring, the seedlings were red-flowering. In the one case, genes for white-pattern were apparently present in double dose and this gave rise to the near-white.

Occasionally an Amaryllis blossom will have eight, ten, twelve or more tepalsegs. But seeds from such plants will seldom produce bulbs that produce flowers with more than the normal number of tepalsegs. Thus these unusual forms are not due to heredity.

FEEDING.—We all know that *Amaryllis* are voracious feeders. I have found that *Zephyranthes* are no more abstemious. *Hymenocallis* grow nicely here in sandy soil without fertilizer or care. But I potted a small offset and found it takes kindly to an amount of fertilizer that would kill a lot of plants.

ADAPTABILITY.—Last year, because of unsuccessful crosses, I had quite a few bulbs of *Amaryllis* to discard. I removed the soil, which I wished to retain, from the roots and tossed the whole plant into the high grass. We had an unusually heavy and prolonged rainy season in the summer. This year I find that a lot of them took root where they fell, and have been blossoming as happily as if they were still in their pots.

RESULT OF A CROSS.—One year I had a 'Red Master' bloom very late. I wished to use the pollen in a cross, but the only blossom I had available was a Mead Strain bulb (#16-1). It was a dark red, although not my darkest, and had a flower only 5½ inches in diameter. I did not expect all the flowers of the resulting seedlings to have flowers

twelve inches in diameter, as 'Red Master' was advertised to produce. I thought some of them might be only eleven and a half inches. The seedlings that matured and blossomed, less than a dozen, had seven-inch flowers. In some cases the color of the flower of the seedling was a little darker, not much, than that of the Mead parent, and sometimes there was no change. I had supposed that in a cross the darker red would be dominant over the lighter red.

EXPERIENCES WITH AMARYLLIS

B. W. Homfeld, *California*

I started to grow Amaryllis about eight years ago. A friend gave me a pound coffee can filled with seeds that she had raised in her yard from fine Dutch hybrid *Amaryllis*. Thus I got started on an interesting project which has expanded into more than a hobby. However, before I write about my experiences with *Amaryllis*, it is important to say something about the locality, soil and climate.

We live in the southern part of the San Joaquin valley, about thirty miles north of Bakersfield. The summers are hot and dry; the winters are quite cold and damp. During the summer the temperature is mostly above 90° F. Once in a while it goes up to 110° F. We seldom have even as much as a light shower from early May to the last of September, and all the water that the *Amaryllis* bulbs receive in summer is from irrigation water. The soil is a sandy loam, quite easy to work if it is not disturbed while it is too wet. Winter is our rainy season—last year we had a total of a little over three inches. The frosts are quite heavy, the low during my experience was +17° F. What we lack in rain we receive in "pea soup" fog that fills the valley for much of the time in winter. This should give you a fair picture of what we have to contend with.

I was lucky because the seeds that I started with came from the best Dutch *Amaryllis* hybrids available at the time. I obtained a good stand of seedlings. I had purchased *Amaryllis* bulbs before my first seedlings bloomed but my own seedlings really awakened my interest in breeding these plants. Even now after having produced thousands of blooming seedlings, I still get a real thrill from watching the new ones bloom. [Fig. 26]

At first I planted the seedlings in part shade, with the bulb about half above the soil level, but the sun could injure the bulb in the summer, and frost could cut down in winter. Thus experience taught me that the bulbs should be planted more deeply in this locality. After the shaded location was used up, I started to plant the bulbs about 30 inches apart each way quite high on ridges with about one and a half inches of soil over them. This keeps the frost from injuring the bulbs in the winter and the sun from "cooking" them in summer. The important thing as I see it is to keep the bulb growing during the hot weather so that it can get off to a good start in the fall when the weather is cooler

and more favorable. When the temperature rises to 108°-112° F. it requires a lot of water to keep the bulb from going dormant. I believe that if the ground gets too dry, the bulbs will be retarded.

In my experience, the bulbs are best transplanted from early spring until August without too much of a setback, but after that date, they may go dormant and the fall growing season is lost.

Fig. 26. Hybrid *Amaryllis* seedling grown by B. W. Homfeld, Wasco, Calif. Reproduced from B. W. Homfeld kodachrome.

During the past spring when the bulbs were in full bloom, I sold many. In this way the buyers could select the colors that appealed to them. The bulbs were taken up with a little soil and wrapped in a plastic bag. All were surprised how well they withstood the transfer from one garden to another.

As fertilizer I use lots of cow manure. *Amaryllis* are heavy feeders and require lot of it, which is spread between the rows and worked into the ground with the tiller.

I have derived much pleasure from showing the blossoms that I have during the off months of June, July and even August. The blooms in part shade (Fig. 27) are usually better in color. Blossoms that are in the hot sun fade pretty badly. There are at least a half dozen blooms in the garden now (July 26, 1960), and that is after at least 10 days of at least 104° F. weather.

Fig. 27. Mrs. Emma Lou Homfeld admiring Homfeld Hybrid *Amaryllis* seedlings; spring 1960. Reproduced from B. W. Homfeld kodachrome.

All in all I derive a lot of pleasure in finding out how to grow bulbs in this locality so that they will bloom well and multiply. I believe that the largest bulb that I planted last season was over seven inches in diameter.

I hope that my experiences may assist others in the San Joaquin valley and others living in a similar climate, to grow *Amaryllis* successfully.

CONTROL SUGGESTED FOR AMARYLLIS SPOT *

Three things generally are necessary in the control of red leaf spot disease of *Amaryllis,* according to Dr. D. B. Creager, head of the Plant Board's Pathology Department. In a report on this fungus-caused infection, he suggests sanitary practices, preplanting bulb treatment, and fungicidal sprays.

An important disease of *Amaryllis,* red leaf spot frequently is referred to as red blotch, red fire and rust, and is called leaf scorch on *Narcissus.* This ailment appears first as small red spots, then grows larger to form dead areas with red borders and brown to gray centers. The tips of affected leaves die back, often as far as the top or neck of the bulb.

A suitable sanitation program demands the removal and burning or burying of all dead and severely affected leaves, plus all dead leaf debris scattered among the plants. Crop rotation should be practiced in commercial plantings.

Bulbs soaked for two hours just before planting in a solution of one-half gallon of commercial formaldehyde and 100 gallons of water should reduce the bulb-borne phase of the pathogen.

The amount of leaf spot on plants can be reduced significantly by sprays of Zineb or Ferbam. Applications should begin when the foliage is small and continue until blooming.

AMARYLLID CULTURE

C. L. Burlingham, *Florida*

Amaryllis x *johnsonii*—It is said that *Amaryllis* x *johnsonii* thrives in clay soils in south Texas, but in south Florida it does very well indeed in sandy soil in full sun. Some one has suggested that since this hybrid originated so long ago, and has been grown under such different conditions, some deviation might have occurred. I procured three bulbs of *A.* x *johnsonii* from Texas, and could see no difference in their flowers from those of the sort usually grown in south Florida. However, Mrs. Carl Shirley, 1540 Forsythe St., Beaumont, Texas, believes she has found a deviation in a bulb somewhat smaller than usual, with leaves not over twelve inches tall, with scapes still shorter. The flowering differed in having narrower, much recurved tepalsegs. Mrs. Shirley admits that the size of the bulb and plant may have been influenced by the fact that she found it growing in "black gumbo", which gets brick-hard in summer.

USE OF FERMATE.—Some years ago I received a shipment of *Clivia* heavily infested with crown rot. In some way I learned that the answer was "Fermate", though I had no information as to how to apply it. I sprinkled the powder generously into the crowns of the plants. None of the treated plants survived. Later a correspondent informed

* Reprinted from Florida State Plant Board Bulletin, Vol. 2, page 4, January, 1960.

me that I should have used a weak solution; that the treatment would have killed, even if the disease did not.

Later still, I received a shipment of three Dutch Hybrid *Amaryllis* bulbs, damaged by cold. By the time I realized anything was wrong, two of the bulbs had completely rotted. In the third I cut a wedge, past the center, from top to bottom. I realized that my bulb was finished as a bulb, but it had an unrooted offset one inch in diameter, which I wished to save. I had had some difficulty previously in rooting offsets even in sphagnum moss. I cleaned off the rotten tissue as well as I could, and left the bulb with offset attached on a bench in the shade to dry. Next day I found it had not dried, but continued to rot. I cleaned up the bulb again, and applied Fermate generously to all cut surfaces, the powder quickly forming a paste. In 48 hours I washed off the Fermate under running water, and planted the bulb with offset attached in potting soil. Six nice bulblets were obtained. When it came time to repot, because the six bulblets were crowded in a six-inch pot, I could not determine, by size or otherwise, which was the offset I had fought to preserve.

Amaryllis belladonna L.—It is generally known that *Amaryllis belladonna* L. (forma *major)* as grown in Florida is usually self-sterile. It may also be inter-sterile. On a dozen flowers I tried the pollen of 'Tristan', a dark red Dutch hybrid, without success.

Amaryllis striata.—I have two forms of this species. One is a six-inch flower, light salmon in color, with long narrow tepalsegs. The other has a modern red five-inch flower, with shorter, wider tepalsegs, which usually overlap more than half their lengths, though there may be some variation even on the same scape. Out of curiosity to see if I could get a satisfactory form of *Amaryllis striata* with a dark red color in 1959 I used the pollen of 'Gypsy Girl', a Ludwig dark red "Gracilis" not yet generally introduced, and in 1960 the pollen of 'Tristan', a dark red Dutch hybrid. The results from this cross are eagerly awaited when the seedlings flower.

GERMINATING SEEDS IN VERMICULITE

LEO BREWER, *Orinda, California*

In the 1958 HERBERTIA, L. S. Hannibal reported a method of germinating seeds in sealed plastic containers containing vermiculite which would appear to be a boon to gardeners who do not have sufficient time to keep seed beds watered.

The method was tested on a variety of seeds of both bulbous and non-bulbous plants and was also used for cuttings. In place of rigid plastic food containers, polyethylene freezer bags were used. One to two inches of vermiculite was put in each bag, water added, and the excess drained off. The seeds were sprinkled on top of the vermiculite and the top of the bag was folded over and sealed with a paper clip, which also held the identification tag. The bags were stacked in a large carton which was kept in a dark cool spot until leaves sprouted.

When seeds sprouted during the fall and early winter, the seedlings were often transferred directly to either seed beds or most commonly to their permanent site. The roots can be easily extracted from the vermiculite without damage. A sharp probe was used to make a hole deep enough to accommodate the two to four inch roots. The seedling was inserted and the hole filled with vermiculite. The top of the hole around the base of the seedling was filled with soil to hold the seedling upright.

Seedlings which sprouted in late winter or spring were allowed to grow in the bags which were taken outside and stored in a box in the shade of a tree which prevents overheating of the bags by the sun. The long length of the plastic bags allowed ample room for the leaves. Bulbous plants such as *Nerine* went dormant during the summer and the bulbs were picked out in the fall and planted outside. Evergreen plants such as *Iris douglasiana, Iris innominata,* or *Iris tenax* retained their leaves all summer. As the plants received no nutrients, growth was not excessive and the plants could be kept alive in the bags until the fall rains had started and the plants could be set in the ground.

There are several details to note. No effort was made to securely seal the bags. In some instances, there were holes in the sides of the bag. The increased water loss through small holes seems to be negligible compared to the water content of the vermiculite. The bags were checked usually once a month and water added if necessary. Seeds were carefully cleaned as it was found that mould often developed if parts of seed pods or stems were mixed with the seeds. When it was planned to grow seedlings through the summer in the bags, the vermiculite depth was often increased to four inches and fewer seeds were added.

Most amaryllis and iris seeds germinated well at an average temperature of 50-60° F. A few seeds refused to germinate without chilling. For example, *Iris tenuis,* which gave zero germination even after a year, gave over 50% germination after several weeks chilling of the bag in the refrigerator and then returning to the higher temperature.

Another valuable use was found for the vermiculite bags. Many of the Pacific Coast native iris are very difficult to transplant as they are deeply rooted and it is impossible to dig deeply enough to preserve the root tips. If they are planted out in the sun immediately after lifting, they will wilt away even if watered. If the plants are sealed in a bag for two to three days and kept in the shade, sufficient root tips are regenerated to sustain them after replanting in the open with a high survival rate. This method works well whether the soil is retained around the roots or whether it is washed away. During spells of low humidity when it did not seem safe to put them out, the plants have been kept in the bags for several weeks without harm. The leaves are normally left outside and the bag sealed with a rubber band around the base of the plant.

The polyethylene bags were also used to pre-germinate seeds of annual and perennial plants that are normally broadcast. The plan was to scatter the seeds just before they were ready to germinate and just before a fall rain storm. Unfortunately, there was no rain from October

to Christmas last year and the seeds had to be scattered out when they showed signs of germinating. The yield was much smaller than usual; the pre-germinated seeds appear to be more susceptible to drought. However, in normal years, this procedure should insure a greater germination yield and should give the seedlings a better start on the grasses and other competitors.

A GIANT LATE HOOP-PETTICOT DAFFODIL

WILLIAM LANIER HUNT, *North Carolina*

The old orange *Narcissus bulbocodium conspicuus* used to be a rare plant in gardens in the Southern States. It was a great favor if the

Fig. 28. *Narcissus bulbocodium* Giant Late Hoop-petticoat form as grown by William Lanier Hunt, Chapel Hill, North Carolina. Reproduced from W. L. Hunt kodachrome.

owner agreed to give you a few bulbs. Today, it is still very scarce, but it is not as early or as beautiful as the light yellow forms of *N. B. citrinus* which we can now buy from bulb dealers.

In middle North Carolina, the temperature drops as low as two to four degrees below zero F. for a few hours in the middle of the night during the last week of the year and the first week of January. During late December, the buds of *N. B. citrinus, N. B. romieuxii* have already begun to show, the daytime January temperature, which is most often just above freezing, gradually tempts these buds into bloom. There are, during this period, between three-fifths and one-half sunny days, and the sun awakens the small flowers of *N. B. citrinus* and *N. B. romieuxii* in frozen condition every morning. Their resistance to freezing is amazing. I have taken several colored slides to show how they last from one to two weeks in the garden in spite of it.

Of course, by the opening of the year, *N. B. monophyllus* has long since bloomed and gone—usually well before Christmas and sometimes at Thanksgiving. In January and February, various other hoop-petticoats fill the winter with their charms, and the season had always ended, in my experimental garden, with the old *N. B. conspicuus.*

Some years ago, however, I received from one of my bulb dealer friends in this country, a little batch of fifty *"N. B. citrinus"*. They were planted in a mixture of chip dust, gritty clay and some bone meal on a little slope to the South. When foliage began to show in late fall, I was intrigued to see that it was not roundish but flattish and very wide. Not a flower bud showed all through January and February. Finally, the old *N. B. conspicuus* flowered, and then, just as it was at its height, the newcomer deigned to open its very large, showy flowers on stiff tall stems. The blossoms were an inch and a half across and very weather resistant, and the long flattish leaves half as long again as any *bulbocodium* foliage I had ever seen.

Every year, the bright light yellow flowers of this magnificent plant have opened over a long season from a month to six weeks in an amazing show. In this one, we have something superb for Southern gardens and gardens on the West Coast during March and early April. The fact that the patch settled right down and began to produce seedlings in the mulch is proof that this *bulbocodium* is happy here (Fig. 28).

Experiments are now being made to see whether or not the late bloomer likes more moisture than I am giving it. Some of these little bulbs are meadow plants, and I may have been keeping this one too high and dry. It may even turn out that, in a moisture place, it would come into flower earlier, but it is good to know that, like *Zephyranthes atamasco,* it is willing to accommodate us under normal garden conditions.

NARCISSUS BULBOCODIUM

Caroline Dormon, *Louisiana*

Most gardens are so obsessed by great size, they give all their time and attention to large gaudily-colored flowers. But to a few of us, the tiny species, neglected orphans of the tremendous family Amaryllidaceae, are fascinating. Especially charming are the white-flowered forms of *Narcissus bulbocodium,* most of which bloom in winter. These snow-

Fig. 29. White-flowering *Narcissus bulbocodium* as grown by Caroline Dormon, Saline, Louisiana. 1. N. b. hybrid clone 'Nylon'; 2. N. b. *monophyllus;* 3. N. b. *tenuifolius;* 4. N. b. *foliosus;* and 5. N. b. *clusii.* Approx. 2/3 natural size. Drawing by Caroline Dormon.

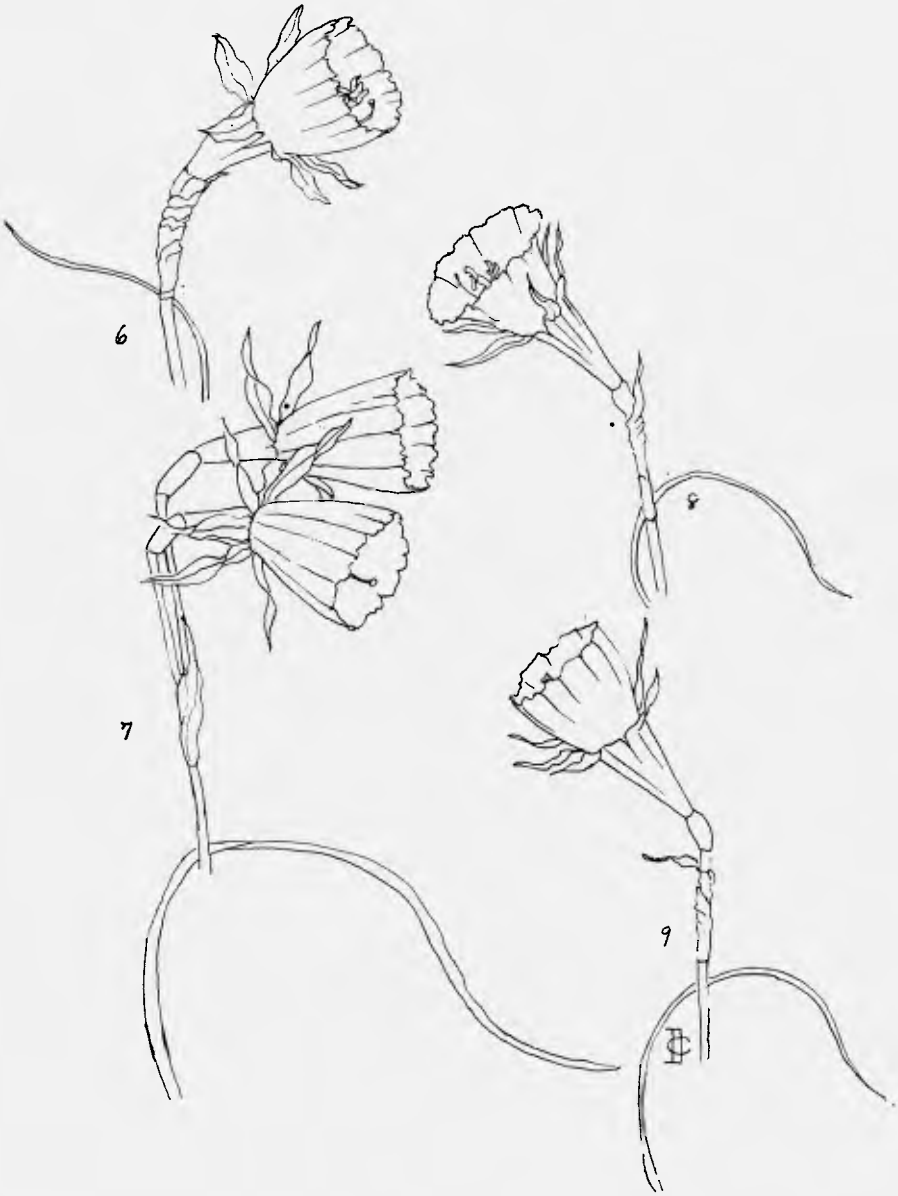

Fig. 30. Yellow-flowering *Narcissus bulbocodium* as grown by Caroline Dormon, Saline, Louisiana. 6. N. b. *obesus;* 7. n. b. species unknown; 8. N. b. *citrinus;* and N. b. *conspicuus*. Approx. 2/3 natural size Drawing by Caroline Dormon.

maidens include several species and forms, identification of which will always be the subject of controversy. By no means do I claim that my names are indisputable, I simply name them as they came to me, in each case giving the source. I have devoted a good deal of study to them, but information is exceedingly sparse—and contradictory.

The first to flower is delicate 'Nylon,' a hybrid (Fig. 29-1), bulbs of which Mr. Harold Epstein sent me. The crown is slightly flaring, edges erose; tepaltube long, segments comparatively short and wide; flower held erect, on a 5-inch stem. The leaves are very narrow, slightly flattened, 6 to 9 inches long, but reclining and do not hide the blooms. This is the purest white of all, with a delicious perfume. With me, it bloomed from Nov. 29 to Dec. 7.

The next to appear was *N. b. foliosus* (Fig. 29-4), the most remarkable of all in that it remained open nine days, outdoors, though the temperature dropped to 16° F. Each time it was frozen, I felt certain that anything so fragile looking would melt away, but when the sun came out, it stood up as perky as ever, and giving forth its exquisite perfume. The very short crown is fluted and flaring, erose and laciniate. The tepaltube is quite short, the segments of medium size. The stem is only 5 inches, but the numerous filiform leaves do not obscure the flowers. This one lasted from Jan. 8 to 27.

Jan. 15, *N. b. monophyllus* (Fig. 29-2) came into flower, another as white as a snowflake. It is very erect, on an 8-inch stem, tepaltube exceedingly long and slender, segments tiny. The crown is rather flaring, but slightly cupped, edges almost smooth, merely scalloped. This, too, posesses the characteristic perfume. Why "monophyllus", when there are always at least three filiform leaves?

N. b. clusii (Fig. 29-5) began blooming Jan. 12. The crown is broad, rather short, and slightly cupped; tepaltube rather long, segments of medium size; edge of crown finely serrate; deliciously fragrant. The stem is 7 inches, the very long leaves filiform, reclining, and almost "curly."

The smallest species, *N. b. tenuifolius* (Fig. 29-3) is also the last to come, not appearing until March 20. The stamens are hidden, a distinguishing feature. The crown is slightly erose. As the name would indicate, the leaves are very narrow. Flowers white, with delicate perfume.

The sulphur-yellow *N. b. citrinus* (Fig. 30-8) is also a winter bloomer, coming Feb. 28—which is really spring here in North Louisiana. It has an odd flaring crown, almost smooth at edges, and rather long tepalsegs. The leaves are narrow, but slightly flattened.

As the name would indicate, *N. b. obesus* (Fig. 30-6) has a rather fat crown, slightly cupped, edges dentate. The tepaltube is short, and the segments are the shortest and widest of all. The color is bright yellow, and the flower is not hidden by the rather short leaves. It bloomed March 8.

The next, March 12, marked "unknown" (Fig. 30-7), is going to bring outcries, as it is a mystery plant. The flowers are much the

largest of all, and there are *always two!* Some will say it cannot be a *bulbocodium,* but it is typical in every way, except for the long pedicels and the two flowers. The way I came by it is a rather strange story. Several years ago, I ordered *N. b. citrinus* from Jan de Graaf. Among them was this one bulb, which bloomed—and left me completely at sea. I drew it, and sent to Mr. de Graaf, with a pressed flower. He knew nothing about it. If he imported *citrinus,* this odd bulb could have slipped in. If it is a natural hybrid, it would seem to be between *N. b. conspicuus* and *Narcissus triandrus*—but where did it get that size? Each spring it provides excitement. The color is cream, but it fades quickly.

There is no need to describe the brilliant yellow *N. b. conspicuus* (Fig. 30-9). I have had it so long I do not remember the source. It blooms profusely the latter half of March, and supplies a gay note in any planting of small bulbs. It is so happy in my sandy soil it multiplies rapidly, and even reseeds. All my bulbocodiums are planted where they get full sun until noon. There are two *Cornus florida,* which being deciduous, allow full sun during growing and flowering period of the Bulbocodiums. My soil is poor sand, so I add iron gravel and some leafmold. I should say that perfect drainage is the secret of growing these charming flowers. No other small bulbs cover such a long flowering season, and their exquisite grace is almost unmatchable.

Where another source is not given, all of my bulbs came from the Heaths, The Daffodil Mart.

APHIDS AND THRIPS ON HEMEROCALLIS

Hamilton P. Traub, *California*

In 1960, specimens of aphids and thrips that appear on *Hemerocallis* were collected and sent to Dr. Floyd F. Smith. They were identified as the aphid, *Myzus hemerocallis* Takah., and the thrips as *Hercinothrips femoralis* Reuter.

Aphids are not very important here at La Jolla, Calif., since they appear only during the winter and spring seasons as a rule, in the crowns of the plants. They usually do not cause any damage, and can best be controlled by overhead sprinkling. In only one instance known to the writer have they checked the growth of any *Hemerocallis* plant. In this case the new growth in the crown was attacked so severely that the plant was set back, and lateral sprouts appeared soon after.

In this cool coastal climate at La Jolla, Calif., damage by thrips is noted on amaryllis such as *Hemerocallis, Crinum,* X *Crinodonna, Hymenocallis,* and others, when the temperature reaches the range from 80° to 86° F., and the relative humidity is below 50%. When the temperature range is below 80° F., the infestations disappear. Temperatures in the higher range are not common here on the coast so that damage is usually not serious. It is remembered that in the greenhouse at Beltsville, Maryland, thrips damaged *Hemerocallis* plants severely if the thrips were

uncontrolled and the temperature was allowed to reach a relatively high level. In a short time under these conditions, the leaves could be destroyed in a few days.

LOCAL DISAPPEARANCE OF SNAILS

HAMILTON P. TRAUB, *California*

The large local snail, *Helix aspersa Moeller* *, was introduced from Europe many years ago into California as a source of food by southern European immigrants, but unfortunately, the Americans never accepted the snail as an article of food, and the snail multiplied and eventually spread over most of California as a pest that causes great economic losses.

At the writer's residence in La Jolla, Calif., the snail was abundant when he arrived in 1954, and it has been necessary to fight it each year at considerable expense with snail bait such as "Snail Roll" obtained from the local garden supply dealer. After fighting this pest for six years, the snail suddenly disappeared from the scene in 1960. During 1960, only three adult snails, and one immature one, were observed. The last was killed in July and since that time no others have been seen. It is realized that unless the snail has disappeared also in surrounding locations, eventually it will show up again by the wandering in of individuals which could then increase rapidly due to lack of competition.

The big question raised by this incident is the reason for this disappearance. If that were known it might be possible to wipe out the snails in the entire southwest. Possibly others have had similar experiences, and it would be interesting to have their reports in future issues of PLANT LIFE.

It is also of interest to report that the slugs have decreased in numbers but have not died out. Thus, whatever has killed off the snails has not affected the slugs to the same degree.

Part of the garden plot is devoted to the breeding of tetraploid *Hemerocallis*. The snails do not normally feed on this plant, and may eat it only as a last resort, if at all. But they do use the *Hemerocallis* plant as a home from which they sally forth. The regular rotation every two years when the old plants are removed and a new generation of daylilies are set out may upset the breeding of the snails. However, since only a portion of the garden is used in this way, this cannot be the real cause for the disappearance of the snails.

* Identified by Dr. R. Stohler, Dept. of Zoology, University of California at Berkeley.

VEGETATIVE PROPAGATION OF BRUNSVIGIA AND OTHER AMARYLLIDS

Hamilton P. Traub, *California*

In the Tribe Crineae there is great variability in bulb offset production in the species and hybrids. Some hybrid clones of *Crinum,* X *Crinodonna* and *Brunsvigia* make offsets profusely, some make only a few, and still others never produce any. Mr. L. S. Hannibal, the foremost *Brunsvigia* breeder, reports that several of his named clones are 8 to 10 years old and yet he has only the original seedling bulb. This class includes such clones as 'Purity' and 'Apple Blossom'. He regrets that he cannot distribute offsets to other amateurs.

This problem can be solved by following a procedure used in curing growth stoppage in Amaryllis (see Traub, 1958, pp. 178-179). In the autumn before flowers are produced, the bulb is quartered as recommended for vegetative propagation in *Amaryllis* (Traub, 1958, pp. 128-129). These quarters are potted in coarse sand. They are placed in their original position in the pot and about ½-inch of coarse sand is filled in between them. The top of the quarters are barely covered with coarse sand. Water is given regularly as needed, but fertilizer is not applied until leaves appear above the surface. Each quarter will produce one or more bulblets. When the plants go dormant in summer, the quarters are removed from the pot, and the offsets are separated and set in the garden like one-year old *Brunsvigia* seedlings which are planted in the winter-rainfall garden.

This simple method of vegetative propagation may be applied to a variety of other amaryllids.

LITERATURE CITED

Traub, Hamilton P. Traub. The Amaryllis Manual, Macmillan, N. Y. 1958.

BULB BLACK ROT OF BRUNSVIGIA

A black rot of the bulb in *Brunsvigia* x *parkeri* (White hybr. UCLA) was noted for the first time in the writer's garden this season (1960). The back rot begins in the root base and later involves the entire stem part of the bulb. The roots decay, and the black rot begins to spread gradually upwards into the bulb scales. The disease is accompanied by only a moderate odor. Black rot differs from bulb decline brought on by watering *Brunsvigia* bulbs throughout the summer season. In such cases the bulb decay is not accompanied by the black color of the involved areas.—*Hamilton P. Traub*

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EDITED BY
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PREFACE

Gardeners in southern California have been attempting to grow the Royal Poinciana, *Poinciana regia,* also known as Flametree and Flamboyant, but there are apparently no reports of success. This may be bound up with the difficulty of germinating the seeds. How this problem was solved is reported by Principe and Whitaker in the present issue. Now that the seedlings are available, the task remains of growing these to maturity. It is hoped that other Californians will also enter this interesting field, and will report their results in future issues of Plant Life.

Mrs. Paul A. Kane contributes notes on the culture of aroids, *Aristolochia elegans,* and *Agdestis* in Texas.

Mr. Sydney Percy-Lancaster of Salisbury, Southern Rhodesia, is apparently the first to undertake a comprehensive *Gloriosa* breeding project. We will all be interested in hearing of his work as it progresses. Anyone having *Gloriosa* breeding material in other parts of the world is urged to share it with Mr. Percy-Lancaster, whose address is given at the end of his most interesting first report in the present issue.

The Cycadaseae Committee had been in the organization stage for a number of years, when fortunately Mrs. Ben Roth consented to take over the Chairmanship. Members interested in this group should write to Mrs. Roth at 10223 Haines Canyon, Tujunga, Calif.

December 15, 1960,
5804 Camino de la Costa,
La Jolla, California

Hamilton P. Traub
Harold N. Moldenke

AFRICAN RAINFALL, VEGETATION AND SOIL MAPS

In the November 1960 Scientific American (vol. 203 (no. 5) : 123-134), F. Fraser Darling in discussing the utilization of land south of the Sahara, presents generalized rainfall, vegetation and soil maps of that great region. These are of interest to the many Americans who grow South African amaryllids. It is significant that most of the soil types are not suitable for cultivation.

The summer- and winter-rainfall areas are not differentiated. A map of this kind showing summer- and winter-rainfall areas would be useful to those interested in growing South African amaryllids.

SEED GERMINATION OF THE ROYAL POINCIANA

JOSEPH A. PRINCIPE and THOMAS W. WHITAKER, *California*

THE ROYAL POINCIANA or FLAMETREE, *Poinciana regia* Bojer *(Delonix regia Raf.)*, is reputed to be one of the most popular, and certainly the most beautiful flowering tree in Florida. The species is a native of

Fig. 31. THE ROYAL POINCIANA or FLAMETREE, *Poinciana regia* seedling as grown by Joseph A. Principe and Thomas W. Whitaker, La Jolla, Calif.

Madagascar. They are tropical, leguminous plants, requiring a frost-free environment for maximum growth. On the average the trees attain a height of 20-30 feet, with an equal lateral spread.

The flowers are borne in large racemes; individual flowers may be as much as 2 to 3 inches in diameter. In the early summer months the trees are a gorgeous sight, with a mass of scarlet flowers crowning the deep-green, finely-cut foliage. Later the fruits appear. They are heavy, strap-shaped pods, 2 inches wide and 2 feet long.

There seems to be no good reason why this beautiful plant could not be grown in protected locations, relatively frost-free, in sub-tropical southern California and similar areas. One of the principal bottlenecks to the widespread use of the tree is the difficulty most gardeners and nurserymen have experienced in germinating the seed. The seeds are about one-quarter inch long and have an extremely hard seed coat.

We obtained about one dozen seeds of *Poinciana regia* through the kindness of Dr. H. P. Traub. They were planted in a 6-inch pot in good garden soil. The soil was saturated at planting and kept moist thereafter. After two weeks in the soil, the seeds had not softened perceptibly, and there was no sign of germination. At this time, one-half the seeds were treated by slitting the seed coat with a sharp knife. The incision, perhaps as much as one-sixteenth inch wide, was made along the hilum, almost the length of the seed. In making the incision great care should be exercised not to damage the embryo. After treatment all seeds were replaced in the moist soil. Several of the treated seeds germinated within three weeks, and grew into good, sturdy, healthy plants (see Fig. 31). The remaining seeds deteriorated and decayed after about 6 months.

The experience recorded above suggests that seeds of the Royal Poinciana can be induced to germinate by slitting or possibly scarifying the seed coat, followed by reasonable care to prevent the invasion of rot producing organisms.

[Editorial Note.—Dr. Joseph C. Smith, La Mesa, Calif., reported to the writer that he planted *Poinciana regia* seeds in the garden, and that some of these germinated. This apparently is unusual in California since the writer had no success when he planted seeds in open. Seeds placed in water without scarifying did not swell even after 9 months in water.—*Hamilton P. Traub*]

CULTURE OF AROIDS IN TEXAS

Mrs. Paul A. Kane, *Texas*

Several years ago a bulbous plant was sent to me for possible identification. The gardener, who sent it to me, wrote that her family had settled in the area nearly 70 years ago and that many of the descendants of the original settlers still lived in that vicinity—Arkansas Post, one of the oldest settlements in the country is nearby.

The family start of the plant, she wrote, had been obtained from one of these neighbors when it was the custom to "swap" seed, plants and shrubs every spring.

As soon as I unwrapped the plant it was obvious that it was an *Arum,* but which species? Careful reading of encyclopedias and catalogs did not answer the question. At last a beautiful picture, in a catalog, settled the issue. It was *Arum italicum,* native of Europe. One cannot help wondering which flower-loving settler had carried it to that part of Arkansas from which it was sent to me.

Since that time it has settled down to grow, quite happily, in several San Antonio gardens, where it produces handsomely variegated foliage all winter from late November through April. This light-veined foliage is a boone to flower arrangers, for once "hardened" by overnight immersement in cold water, the leaves last ten days or more in a cool room.

The small bulbs do not bloom, nor is the foliage on these as striking as on mature plants. The old bulbs put out an odd greenish-yellow spathe and later a spike of dark orange-red seeds is formed. As the berries ripen and drop off, the foliage dies away and the bulb goes entirely dormant through the hot summer.

The plants are in various sections of the garden but appear to grow best in a rich sandy loam to which has been added peat moss, peanut hulls and vermiculite, thus providing a soil that never dries out entirely, yet has excellent drainage. All are grown in partial shade as those planted in full sun died the first year.

To provide year-round foliage in these spaces the *Arum italicum* is interplanted with *Hydrosme rivieri* (syn.—*Amorphophallus rivieri)* This puts up interesting, much-divided foliage on a spotted stem, just about the time that the *Arum italicum* has gone dormant, thus providing an attractive background for the colorful fancy-leaved caladiums which occupy the foreground of the bed all summer. Grey and white *Nepeta hederacea variegata* and purple leaved *Ajuga* cover the brick edging which raises the bed slightly above the surrounding area.

The *Hydrosme rivieri* has the local reputation of being hard to find once the foliage has died off, so it is transplanted in full leafage. It does not appear to resent this treatment, rarely even wilting though the temperature may be in the 80's by this time of the year. It increases fairly quickly by offsets which may appear some distance from the parent plant and propagation is from these small plants rather than disturbing the large bulb. All bulbs of *Hydrosme rivieri* are left in the ground all year, evidently they are hardier than formerly surmised. The temperature in San Antonio may drop as low as 14° F. in January or February and occasionally reach a high of 105° F. in mid summer. This plant has been grown in San Antonio for many years but *Arum italicum* seems to be a new introduction to local gardens.

GLORIOSA BREEDING PROJECT, 1960

S. Percy-Lancaster, F. L. S., & A. Percy-Lancaster,
779 Mansfield Road, Marlborough,
Salisbury, Southern Rhodesia

The name *Gloriosa* was given by Linnaeus to a race of climbing herbaceous plants, all of which are indigenous to either Tropical Africa or Tropical Asia. The first named species was *Gloriosa superba,* indigenous to India and introduced to England as far back as 1690. It is because these plants were both glorious and superb that my son and I were attracted to them many years ago in India. Since we have come to Africa our interest has been heightened by the many species and varieties we have found near Salisbury, the attractive Capital of this new home of ours, Southern Rhodesia.

Gloriosas are easy to grow, anything but fussy in their cultural requirements, and most rewarding in their return of flowers when happily established. We, my son and I, have had some experience of these beautiful plants in their natural habitat and would like to put this knowledge of them at the disposal of readers and to encourage a greater interest in them. We ourselves have gained an added interest because the Gloriosa is Rhodesia's national flower. Here it is known as the Flame Lily.

In India, *Gloriosa superba* is fairly wide-spread and is found from the state of Bombay in the West to Assam in the East. These are plants of fairly open scrub land, and grow at the base of thorny shrubs up which they climb for support. Near Sanchi they grow among thorny Capparis shrubs in fairly sandy soil. Around Kathgodam, in the foothills of the Himalayas, the soil is gravelly and even stony in parts. They are happy, too, where the silt of the great Bramaputra enriches the adjoining alluvial plain when in occasional flood. There are, as far as we know, only two species in India, *G. superba* and its yellow form, *G. superba* var. *lutea (aurea).*

The African Gloriosas are our current study, and we can only tell of the finds of one year so far. These were collected mainly within a forty mile radius of Salisbury. One, a dwarf yellow species, we found a hundred yards from the sea at Beira in the Mozambique province of Portuguese East Africa. We have found that Gloriosas are indigenous to South Africa, South West Africa, Central Africa, (the Federation of the Rhodesias and Nyasaland), the Belgian Congo, French Equatorial Africa, Kenya, Tanganyika, Uganda, Nigeria, Ghana, Sierra Leone, Sudan, Ethiopia and the Cameroons.

It is not surprising, therefore, that there is a variety of form and colour when one considers the climatic and elevation variation, the soil conditions and the ecological differences that exist from the sandy sea shore in Portuguese East Africa to an elevation of 7500 feet in Kenya.

But let me tell you of the local conditions under which we have collected approximately 600 tubers this last season. These show an interesting variation and point to the fact that the genus is anything but

intolerant. Within a mile of our Marlborough suburban home there is a tract of low lying boggy land, called vlei (pronounced flay). The soil is heavy black clay which during the rains has the consistency of plasticine and which in the dry weather hardens to the like of cement. Termites here and there have erected mounds, perhaps 3-4 feet high by 8-12 long, and we found the majority growing at the bases of these derelict ant hills, trailing their stems over the tall grass that is so very much part of the Rhodesian landscape. Salisbury, by the way, is set in attractive hilly country at an elevation varying between 5000 and 5500 feet above sea level. Further afield we have found species growing from the sandy banks of streams, their bases most certainly covered by water when heavy rains swell the flow. They grow happily, but with less luxuriance, on the rocky slopes of hills called Kopjes (Koppies), where the soil may be a greyish grit from great basalt rocks or a bright red haematite. Because of the vigorous and tough grasses to be found everywhere except in the meanest land, their removal is not the easiest of operations, more so since any damage to the rooting system means almost instant collapse. We have found tubers with only an inch or two of soil cover and have also had to dig them up from a depth greater than twelve inches. And the growth? Some a mere foot high topped with a single flower, others with ten feet, or more, of succulent stems carrying from 15-20 blooms per plant.

The wealth of variety on our doorstep suggested possibilities of greater variation further afield. In response to over a hundred letters to every country in Africa, to India, to Ceylon, to Malaya and to Burma, we have had mere acknowledgements, courteous interest, reference to others, promises of help, and—to our joy—gifts of tubers. We have learned (from Kew) that no scientific work has been done on this genus for 67 years and, from the correspondence received, that there is utter confusion in nomenclature. Of one thing my son and I are sure and that is that the *Gloriosa superba,* which is indigenous to India, is not the same as a plant called *"G. superba"* in Africa. Having now achieved a collection of approximately 600 tubers we plan to grow and study them, record their horticultural differences, photograph and plant their flowers and foliage, and if possible, enlist the aid of a botanist in sorting out species from varieties and possible natural hybrids.

In response to a request for help the Director of the Royal Botanic Gardens at Kew very kindly recommended various publications that we should consult and we have asked for extracts to be made. Dr. H. P. Traub has listed a number of recorded species citing relevant literature. Gardening Cyclopedias, both American and English, have been consulted, and while they refer to some of the species, details which might be helpful in identification are lacking. In one instance, *G. abyssinica,* the colour of the flower has not been stated.

From the literature available and from correspondence so far received, it is clear that it is necessary to collect both material and more information. A list of species described in various publications to which

we have access, is as follows. This table is obviously subject to correction in the light of further researches.

GLORIOSA L.

1. **abyssinica** A. Rich. (in Tentative Flora. Abyss. 2: 322.). Abyssinica. Fls. yellow (?), plant 1½—2 ft. high.
2. **aurea** Chiov. (in Pl. Nov. Aethiop. 8: 1928). Somaliland. Fls yellow.
3. **carsonii** Baker (Kew Bull. 74. 1895). British Cent. Afr. Fls yellow & purple, plant 8—10 ft. high.
4. **greeneae** Hayward (Winter Park Sun, Fla. USA.). Fls. yellow, plant 10—12 ft. high.
5. **leopoldiana** (Paxton's Bot. Dictionary). Fls yellow, plant 2 ft. high.
6. **leopoldii** Hort. (syn.-**simplex** var. **grandiflora**), Bailey's Cyclopedia Amer. Hort.
7. **lombei** de Wild. (Fedde Repert 9: 536. 1913). Republic of Congo.
8. **lutea** (Van Tubergen price list). Fls yellow.
9. **magnifica** (Chandra Nursery, Sikkim, price list). Fls yellow and scarlet.
10. **minor** Rendle (Jour. Bot. 132. 1896). Trop. Afr.
11. **nepalensis** (Paxton's Bot. Dictionary), syn.- **G. superba L.**
12. **plantii** Loud. (syn.- **simplex** L.; **virescens** Lindl.)
13. **richmondensis** Hort. (Jour. RHS. London), Fls. yellow, plant 6 ft. high.
14. **russellii** Hort. Fls. yellow, purple tipped, plant 6 ft. high.
15. **rothschildiana** O'Brien (Bailey's Cyclo. Amer. Hort.). Trop. Afr. Fls yellow and crimson, plant 4 ft. high.
16. **sampiana** P. Lima (Broteria, ser. Bot. 19: 112. 1921). Afr. Lusit. Or.
17. **simplex** L. (Mant. 1: 52.) Trop. Afr. (syn.- **plantii** Loud. and **virescens** Lindl.) Fls. yellow and scarlet; 2—3 ft. high.
18. **simplex** var. **grandiflora** (syn.- **Methonica grandiflora** Hook.), (Bailey's Cyclo. Amer. Hort.
19. **superba** L. (Sp. Pl. 305.) Trop. Asia; fls. yellow and scarlet; plant 12—15 ft. high.
20. **superba** aurea. Zanzibar. Fls. yellow.
21. **superba** cv. 'Yellow Joy' (Wyndham Hayward, Winter Park, Fla., price list.) Fls. yellow.
22. **superba** var. **africana** (Van Tubergen price list). Trop. Afr. Fls. yellow and scarlet; plant 6 ft. high.
23. **virescens** Lindl. (Bot. Mag. plate 2539) Trop. Afr. Fls. yellow & scarlet, plant 3 ft. high.
24. **verschuuri** Hoog (Jour. RHS 1950, p. 22). Hab.?

Dr. J. C. F. Hopkins, A. I. C. T. A., Senior Plant Pathologist, Department of Agriculture, Salisbury, Southern Rhodesia, in "Common Veld Flowers," says that the difference between *G. superba* and *G. virescens* lies in the fact that "the former has wavy, curled or twisted petals whilst the latter has petals which are flatter and only slightly curled."

The name "simplex" implies a single, unbranched stem and we presume the name applies to a dwarf type with crimson red flowers which is fairly common around Salisbury. Among the dwarf Gloriosas we have collected were some on which the stem forked. This may be due to the fact that these were young plants of species other than *G. Simplex.* The term "virescens" means "becoming green" and is stated in the Royal Horticultural Society's Journal to be a synonym of *G. simplex;* it may be a variety, for we have a dwarf form in which the basal yellow of the petals is tinged green. *G. plantii* is reported by the R. H. S. to be another synonym of *G. simplex.*

The following species of Gloriosa were cultivated by us whilst in India; they came from Kew.

G. carsonii, tall growing, flowers yellow & purple.
G. richmondensis, tall growing, flowers deep yellow with a dark chocolate basal dot.
G. russellii, tall growing, flowers yellow with a narrow mauvy purple stripe at the tip of the petal.
G. superba, tall growing, flowers scarlet & yellow.
G. superba aurea, tall growing, flowers deep yellow.
G. rothschildiana, four feet high, flowers crimson & yellow.
G. simplex, dwarf, two feet high, flowers orange red & yellow.

In addition we grew many other un-named varieties as well as hybrids.

The actual rooting system of Gloriosas is fairly poor, for approximately 25-30 thin, thread-like roots are produced in a rough circle just below the new growing point. These grow only 2½-3 inches in length. *Gloriosa* shoots are liable to re-appear in a different place from where the tuber was originally planted because new growth forms at the extreme tips of the arms of tubers. The larger the old tuber grows the further away will the new shoots appear. The underground stem is very lightly attached to the tuber, and in consequence the lifting of a Gloriosa while in growth is fraught with a certain amount of risk. If the rooting system is damaged the new tuber may not develop strongly enough to flower the following year or may not develop at all.

The foliage of the Gloriosas we have collected have shown a wide variation in size and shape. Some leaves may be only 3 inches long by a quarter inch in width, linear lanceolate in shape, while others measure 7 inches long by 3 inches wide with a more or less cordate base and generally ovate lanceolate in shape. The leaves may be alternate or opposite, and in some instances have appeared in threes. In colour we have found that the green varies in shade; while the majority are glabrous some have a glaucous flush on one, or both, surfaces. The tendrils, too, may be short and hooked, or long and curled. Many plants develop these tendrils like the hair-spring of a watch.

The flowers show a great variation in shape. Some are vase shaped, narrow at the base and reflexing toward the top. Some flowers have their petals erect while in others the tips are incurved or even irregular. A few have a distinctly erect flower, the edges of the petals being heavily crisped and narrow. One small flowered form which we collected had its petals so incurved as to appear almost spherical. The petals of some species are almost flat with only slight undulations at the edges; others are very wavy.

The colour of the flowers shows a fascinating variation. A few species or varieties of species, have a pure colour throughout, but most have a combination of two colours in varying degrees. We have specimens which are pure yellow. Some of these are lemon, others cream and others yet a deep chrome. In some of the specimens there is a chocolate blob at the base of each petal to distinguish them. We have found one yellow variety (species?) with green instead of chocolate at the basal end of each petal. The more common species are bicoloured though we have one that is more or less entirely crimson. Generally, however, there is a distinct "basal" v-shaped patch of yellow to the bicoloured species and varieties, the other colour ranging from orange-red, through vermilion to crimson; and one species has pale purple as the predominant colour. We have also found a variety (species?) in which the colour predominating is green, the petals having flecks and streaks of red in varying degrees. Could this be the true *G. virescens* originally described by Lindley? We are watching these plants with particular interest.

The colours described above relate to freshly opened flowers before the petals begin to mature and then droop around the swelling ovary.

Once the stigmas have been fertilised, or when the flower is past its prime, it begins to alter, changing to a shade, or tone, of its former colour. The crimsons usually turn a mauvy red, the orange reds to a deep pink or light red, the purple to a lilac, and in one yellow species the faded petals are an attractive salmony pink. How much these observations are related to climate and soil remains to be seen. Mrs. Sima Eliovson in her book "African Flowers for the Garden," includes a page on Gloriosas and extracts about *G. superba* and *G. virescens* are quoted below:—

"The flowers of *G. superba,*" she says, "are pure yellow or bright orange. They are pale when they open and deepen as they mature. The petals expand outwards as they age." The type grown in India has flowers whose petals are bright scarlet with the basal ends yellow.

Mrs. Eliovson in referring to *G. virescens,* states that "the flowers are generally bicoloured, the base of the petals being flushed with yellow and the top half being deep orange in the commonest form. There are other colour forms which include a deep purple outlined in yellow and a deep wine crimson with a yellow base. These are the most attractive." She continues, "When the flower begins to open it is a greenish yellow, thus probably giving rise to its specific name of *"virescens."* This species is presumed to be the same as that grown under the name of *G. Plantii.* Another name, *G. simplex,* is regarded as a synonym of *G. virescens* and the horticultural name of *G. leopoldii,* is also believed to be a form of *G. virescens.*

Tubers. One year old tubers are almost spherical and roughly the size of a pea, some of these develop a slight protuberance on one side. Thereafter each usually forms two arms like a wide open V; the tuber is thickest at the junction of the arms. The shape and size of tubers varies with age and the conditions under which they are grown. In sandy soil the two arms often grow downwards. In heavy soil, however, they are found to lie almost parallel to the surface. Anyone who has grown Gloriosas knows that the tubers are V shaped where grown in sandy soil or in loam. Usually one arm of the V is longer than the other. This is a generalisation, however, for in nature the tubers develop much variation from the typical shape. When constricted by rocks, or restricted by stones, they take on the oddest shapes; some are almost spherical, and some have the two arms twisted around each other into grotesque forms. We have some boomerang-shaped and some with three arms. We have flowering tubers which are only 2½-3 inches long and not more than a third of an inch in diameter. Our largest specimen measures 14″ long, 1½ inches in diameter.

As previously mentioned the tubers are very brittle and need care in handling. The juice contains colchicine and is poisonous.

Up to date we have received contributions of Gloriosa tubers from the following sources:—

Ghana—**G. superba.**—six tubers.
India—**G. carsoni, G. magnifica, G. richmondensis.**—three tubers each.
Kenya—**G. simplex.**—four tubers.

Mozambique—**G. superba.**—three tubers.
Sierra Leone—**G. simplex.**—six tubers.
Sudan—**G. simplex.**—eight tubers.
Zanzibar—**G. superba aurea.**—three tubers.

ARISTOLOCHIA ELEGANS IN TEXAS

Mrs. Paul A. Kane, *Texas*

Common names have long been the bane of careful gardeners, especially when endeavoring to find some muchly desired plant to add to greenhouse or garden collection.

Dutchman's Pipe is the common name throughout the United States for two different species of *Aristolochia.* North of the Mason and Dixon line, *A. macrophylla* (syn. *A. Sipho)* is called by this name. This species has very large leaves, rounded at the point, and comparatively small flowers of a shape truly resembling an old-fashioned, wide-mouthed pipe.

In the southern states, *A. elegans* is also called Dutchman's Pipe, although elsewhere it is known as Calico Flower. The latter name is much more descriptive, since the "pipe" form is lost when the flowers open. The blossoms are from 3 to 4 inches in diameter, velvety in texture and spotted and veined in such a way as to resemble the calico for which it is named. The ground color is a dark chocolate brown, marked with white and yellow. This species does not have an unpleasant odour. It is easily raised from seed and usually flowers the first year.

A. longifolia is a low-growing plant with slender leaves which do not resemble the foliage of the vines mentioned above. The flower is tubular with a suddenly flaring midsection, and the blossom calls to mind the hooded cobra snake of India. The entire flower is only from 2 to 3 inches long, borne about five inches above the ground, so it is easy to overlook it in the wild. It is native to Texas but almost unknown in gardens. It prefers a dry, well drained situation in full sun.

GENUS HOSTA

Nils Hylander presents an article on "The Genus Hosta" in the Journal of the Royal Horticultural Society, LXXXV: 356-369. 1960. He includes the cultivated species; thirteen in number.

DWARF PRUNUS

Mr. H. F. Watson, (in Gardener's Chronicle, page 487, June 11, 1960) discusses the very rare *Prunus prostrata,* which is slow growing and will take many years to reach a height of 2 ft. It is native of the Atlas Mountains of North Africa, Greece and Crete. It is hoped that members who have had experience with this rare plant will report in future issues of Plant Life.

PLASTIC FOR GREENHOUSES

Research at Cornell University has shown that greenhouses covered with two layers of transparent plastic—1 to 2 inches apart—reduced heating costs by 40%. In addition, more light was transmitted than when a single layer was used which allows a film of moisture to collect that shuts out some of the light. (Sheldrake, R. and Langhams, R. W., in Bull. N. Y. St. Flower Grs. No. 166, pp. 1—2).

CULTURE OF AGDESTIS IN TEXAS

Mrs. Paul A. Kane, *Texas*

This graceful vine is often mistaken for *Clematis,* which it much resembles. The white, sweet-scented flowers are small but numerous, borne in dense panicles from August until frost. The leaves are heart-shaped, gray-green and when bruised give off a most unpleasant odour. This smell is very noticeable when frost kills back the plant, so it is advisable to plant it some distance from a residence. The plant springs from a huge tuber, several found in San Antonio have been up to 24 inches in length and six to eight inches in diameter. Smaller tubers may be found and it is easy to propagate by removing these and replanting in rich, moist soil. A sunny situation is best and where it is satisfied it will reach 35 feet in a season. The botanical name of this vine is *Agdestis clematidea* Moc. et Sessé.

RODENTS AND CYCAD SEEDS

Recently the writer received seeds of *Cycas media* from Mr. W. Morris of Warners Bay, N. S. W. The fleshy covering had dried so that it was very hard and difficult to remove. Thus the seeds were planted without removing it. After a short time, rodents began to gnaw on it and actually carried away some of the seeds. An inspection showed that on the remaining three seeds the covering had softened so that it could now be easily removed. It is suggested that when seeds with hard coverings are received, that they be soaked in water until the covering has softened enough so that it can be removed before planting to avoid attracting rodents.—*Hamilton P. Traub*

PLANT LIFE LIBRARY

A RESUME OF THE VERBENACEAE, AVICENNIACEAE, STILBACEAE, SYMPHOREMACEAE, AND ERIOCAULACEAE OF THE WORLD, by Harold N. Moldenke. Publ. by the author, Trailside Museum, Watchung Reservation, Mountainside, New Jersey. 1959. pp. 495. $9.75.

This monumental work by the World authority on these groups includes the valid taxa, geographic distribution and synonymy. A total of 111 genera, 4801 valid species, subspecies, varieties, forms and named hybrids are listed; and a complete dichotomous key to the genera and to the 233 accepted supra-specific and supra-generic subfamily groups is presented for the first time. A total of 9212 rejected names are accounted for. In the course of his researches over a thirty year period, the author critically studied and annotated 155,940 herbarium specimens from the world's leading private and institutional herbaria.

This outstanding book is indispensable to all interested in plant systematics, and is highly recommended.—*Hamilton P. Traub.*

STATISTICAL METHODS IN BIOLOGY by Norman T. J. Bailey, John Wiley & Sons, Inc., New York, N. Y. 1959. pp. 200. $4.50. In the opinion of this reviewer, "Statistical Methods in Biology," is one of the best of the elementary texts on statistics. As a class such books attempt to assist the non-mathematical biologist to grapple with problems of variation in his material. Some turn out to be little more than "cook books", while others, with their awesome array of symbols and formulae frighten away all but those with some previous mathematical training. Dr. Bailey has skilfully avoided these dilemmas. His text can be used as a "cook book", but in the discussion he is careful to give a lucid explanation of the principles underlying each concept. In the Preface he promises that the reader need have no more than an elementary knowledge of algebra to read the text with comprehension; trigonometry, geometry and calculus are not required. Dr. Bailey has fulfilled this pledge surprisingly well.

The book follows the conventional pattern of elementary statistical texts. The contents are indicated by the chapter titles which follow: Variability and frequency distribution; Estimation, standard errors and confidence limits; The basic idea of a significance test: Simple significance tests based on the normal distribution; The use of *t*-tests for small samples; Contingency tables and X^2; X^2 tests of-goodness-of-fit and homogeneity; The correlation of measurements; Regression analysis; Simple experimental design and the analysis of variance; Introduction to factorial experiments; Random samples and random numbers; Partial correlation and regression. The final chapter, "Notes on computing and calculating machines" will be helpful to the novice anxious to master the most efficient methods of solving statistical problems using these machines.

In the rear of the book there is a single page devoted to "Suggestions for more advanced reading". Nine well known statistical reference works are cited. Also there is a "Summary of statistical formulae" consisting of about 28 pages. Included in the Summary is a list of the symbols used, their meanings, and a guide to its use. The guide should be particularly helpful to beginners because it indicates the types of distributions that are likely to occur in biological material and gives an example of each. This is followed by directions for finding the type of analysis required for the specific data under study. Five of the most commonly used statistical tables are reprinted in the Appendix. In addition, there is a useful and accurate index.

Within a space of 200 pages Dr. Bailey has crammed an amazing amount of elementary statistical information, well presented and easily digestible. Biologists in both the theoretical and applied fields could increase the proficiency of their experimental work by frequently consulting this text. *Thomas W. Whitaker.*

INTRODUCTION TO QUANTITATIVE GENETICS, by D. S. Falconer. Ronald Press Co.; New York 10, N. Y. 1960. Pp. 365. Illus. $6.00. Biologists as a group are commencing to realize the importance of quantitative characters as opposed to qualitative ones in studies of evolution, plant and animal improvement, and human heredity. Investigations of the inheritance of characters that differ in degree rather than in kind, and therefore have to be measured, are time consuming to record and difficult to analyze. Development of new methods and new techniques for the

study and analysis of such data have stimulated the production of a number of books on quantitative genetics in recent years.

The author of the text under review is a member of the Agricultural Research Council's Unit of Animal Genetics, located at the University of Edinburgh. A perusal of his published work indicates that he has been mainly concerned with problems of selection, correlation and size inheritance. It is evident that Dr. Falconer is well qualified by experience and training to discuss quantitative genetics in a critical and constructive manner.

The book is not aimed at any particular class of readers, but the prospective user should be warned that some familiarity with genetics and statistics is assumed. The author has purposely stressed general principles. Quite frequently principles are illustrated by examples (labeled as such) which take the form of problems extracted from pertinent literature. The subject matter is organized so that certain chapters can be omitted without loss of continuity should the reader's interest be confined to special topics.

There is a "GLOSSARY OF SYMBOLS" used in the book, an "INDEXED LIST OF REFERENCES" of about 240 citations, and a serviceable "INDEX". Altogether, an excellent book both for teaching and reference.—*Thomas W. Whitaker.*

PRINCIPLES OF PALEOBOTANY, by Wm. C. Darrah, 2nd ed. Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 1960. pp. 295, illus. $6.50. This revised second edition of Prof. Darrah's text after the lapse of twenty years is a significant event. It provides a general introductory survey of the subject for the nonspecialist—a one-quarter to one-semester undergraduate and graduate courses. After discussing biological and geological principles, the aims of paleobotany, paleobotanical techniques, and the plant records are considered. The rest of the text is concerned with discussions on the origin of existing floras; pollen analysis and floristics; fossil plants and evolution; and a reasonable phylogeny. This concisely written text is highly recommended.

DEVELOPING CELL SYSTEMS AND THEIR CONTROL, edited by Dorothea Rudnick. Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 1960. pp. 240. illus. $8.00. This important book contains the papers presented by outstanding authorities at the 18th Symposium of the Society for the Study of Development and Growth. The subjects discussed include development in the cellular slime molds; regeration in hybroids; tissue reconstruction; gibberellins and the growth of flowering plants; hormonel control of growth; regeneration of bony parts in vertebrates; biochemical sequences in mitosis; biochemical and staining reactions of cytoplasmic constituents; and protein synthesis. This stimulating book is highly recommended.

DISEASES AND PESTS OF ORNAMENTAL PLANTS, by P. P. Pirone et al. 3rd ed. Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 1960. pp. 775. illus. $10.00 This third edition of a well-known text on the diseases and pests of ornamentals will be welcomed by gardeners It is concerned with the diseases, pests and other troubles that affect nearly 500 genera of ornamental plants grown outdoors, under glass, or in the home. Part I is devoted to symptoms and causes of plant diseases; insect and other animal pests; and control measures. In Part II, the diseases and pests of particular hosts are arranged alphabetically by names of the hosts.

THE CLASSIFICATION OF LOWER ORGANISMS, by H. F. Copeland. Pacific Books, Palo Alto, Calif. 1956. pp. 302. illus. $7.50. This stimulating book proposes the recognition of two kingdoms—*Mychota* and *Protoctista*—to include the organisms in the borderline zone between the plant and animal kingdoms. The *Mychota* include organisms without nuclei, and the *Protoctista* include organisms "not of the characters of plants and animals." Dr. Copeland has produced a scholarly volume in presenting complete systems of phyla, classes and orders of *Mychota* and *Protoctista,* and also the subordinate groups below the orders to a considerable extent. Here for the first time one finds the strict application of priority to the names of the lower organisms; and also a comprehensive synonymy. This

is an important text and reference work that every student and research worker in biology must have in his private library.—*Hamilton P. Traub.*

STAINING PROCEDURES, ed. 2., by H. J. Conn, Mary A. Darrow, V. M. Emmel, et al. Williams & Wilkins Co., Baltimore 2, Maryland. 1960. pp. 289, $5.00. These procedures are used by the Biological Stain Commission, and are published under its auspices. General methods are presented in the introductory section. Part I is concerned with methods in animal histology—methods for general tissue, and connective tissue; neurological staining methods, methods for blood, bone and bone marrow, and cell constituents. Part II is devoted to methods in plant histology—methods for general tissue, pollen and pollen tubes; and cytological methods. Part III is concerned with microbiology—stains for microorganisms in smears and in sections. This valuable reference work is recommended to all interested in staining procedures.

PLANT PATENTS, 1957 AND SUPPL. 1957, 1958, & 1959, publ. by American Association of Nurserymen, 635 Southern Bldg., Washington 5, D. C. pp. 46, 6, 8, and 6. This series includes plant patents 1 through 1892. These are listed under patent number; type of plant; date patent was granted; originator or discoverer; if assigned, then name of assignee; and common name. For easy reference, there is an alphabetical index by genera, and common name, with patent number under the generic entries. Highly recommended to all interested in plant patents.

COMPARATIVE MORPHOLOGY OF VASCULAR PLANTS, by A. S. Foster and E. M. Gifford, Jr. W. H. Freeman & Co., 660 Market St., San Francisco 4, Calif. 1959. pp. 555. illus. 213. $9.00. This attractive book was prepared with the objective of providing not only a purely factual description of all the main groups of vascular plants, but also to display clearly the procedures, general principles, and objectives of comparative morphology. The concept of homology, and sources of evidence in porphological interpretation, are presented in the first chapter. The salient features of vascular plants, the vegetative sporophyte, sporangia, gametangia and embryology, are covered in the five following chapters. The description and classification of vascular plants are detailed in the next eleven chapters. The last two chapters are devoted to the general morphology and evolution of angiosperms, and the reproductive cycle in angiosperms. This outstanding text is highly recommended to all interested in plant science, particularly to those interested in morphology and systematics.

NATURE AND MAN'S FATE, by Garrett Hardin. Rinehart & Co., 232 Madison Av., New York 16, N. Y. 1959. pp. 375. illus. $6.00. This outstanding book has as its aim to bring the reader abreast of the latest thought in evolutionary theory, and to show him its implications for the future. The author relates the life and discusses the work of Charles Darwin, showing how the theory of evolution was later complemented by the rediscovery of Mendel's laws of heredity, particularly as it was refined by later workers. He shows that generally accepted biological facts make possible man's understanding of the rules that govern all knowledge of life, including the knowledge that may in part determine man's own fate. This most stimulating book, brilliantly written, is required reading for all biologists.

SUCCULENT PLANTS OTHER THAN CACTI, 2nd. ed., by A. Bertrand. Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1959. pp. 120. illus. $4.75. The English text of this edition was edited by Vera Higgins. The chapters are devoted to natural environment of succulents, cultivation, propagation, enemies, the families of succulents, Agavaceae, Liliaceae, Asclepiadaceae, Crassulaceae, Euphorbiaceae, Ficoideae, and various families. This is an excellent brief account with black & white, and color plates.

GARDEN IDEAS AND PROJECTS, edited by R. D. Whittemore. Doubleday & Co., Garden City, N. Y. 1959, pp. 532. illus. $3.95. This practical book presents many ideas on how to make the garden more attractive and livable. It includes sections on tools and equipment; projects with wood, masonary; special gardens;

common garden mistakes corrected; practical calendar for home gardeners; and a self-pronouncing dictionary of plant names. The book is reasonably priced, and is recommended to all gardeners.

JUST BEFORE DARWIN, by Milton Millhauser. Wesleyan University Press, Middletown, Conn. 1959. pp. 246. illus. $4.50. Subtitled "Robert Chambers and Vestiges", this outstanding book presents the story of Robert Chambers, a forerunner of Charles Darwin, and Chambers' book, "Vestiges of the Natural History of Creation" (1844). "Vestiges" became a highly controversial book, and served more than any other to break down resistance to the theory of evolution among laymen and scientists. Not only does Millhauser's book present the story of an outstanding man, but also provides a vivid picture of the intellectual climate in England of the time. This is must reading for all biologists.

LIGHT AND PLANT GROWTH, by R. van der Veen and G. Meijer. Macmillan Co., 60 Fifth Av., New York 11, N. Y. 1959. pp. 161. illus. These eminent research scientists first present the basic facts about the effects of light on plant functioning—measurement of light for plant irridiation; photosynthesis; phototropism; phototaxis and photonasty; photoperiodism; and effect of color of light. This presentation is followed by details concerning the use of artificial light in horticulture. This concise text on an important subject to the gardener is highly recommended.

THE HANDLING OF CHROMOSOMES, 3rd ed., by C. D. Darlington and L. F. La Cour. Macmillan Co., 60 Fifth Av., New York 11, N. Y. 1960. pp. 248. illus. This third edition of an outstanding text, including the advances in the subject of the past ten years, will be welcomed by all interested in cytological technique. The added new methods in autoradiography, and for the estimation of nucleic acid, are timely. After discussing the origin, scope and purpose of the work, chapters are devoted to equipment; living chromosomes; bulk fixation; smears and squashes; paraffin methods, staining and mounting; special treatments; control of mitosis, and fertilization; photography; and describing results. The appendix is concerned with sources of material, standard solutions, schedules of treatment, and catalogue of implements. Errors of omission are few. Unfortunately, with reference to combined fixing, staining and mounting media and procedures, the authors are almost a decade behind the times since they still include the long outmoded and unworkable gelatine method of Zirkle (1940) on pages 47 and 145; and do not include the new arabinic acid method (Plant Life *7:* 155-157. 1951; Euclides (Madrid), *13:* 103-114; 149-159; 289-298; 445-446. 1953; *14:* 222; 61-63. 1954.) Also the citation, Visser (1955), is not included under the references. These, however, are errors that can easily be corrected in a future edition. The book is highly recommended since it is required for constant reference in every cytological laboratory.

BONSAI; JAPANESE MINIATURE TREES, by Kan Jashiroda. Chas. T. Branford Co., 75 Union St., Newtown Centre 59, Mass. 1960. pp. 166+48 plates. $5.75. This fascinating, profusely illustrated book ranks among the outstanding ones on the art of producing Japanese miniature trees. All phases of the subject are adequately treated—history; kinds of styles; technique of dwarfing; raising from seeds and cuttings; miniature bonsai; bonsai culture of chrysanthemum; and cultural directions. Highly recommended.

ENCYCLOPEDIA OF GARDENING, by S. B. Whitehead, Chas. T. Branford Co., 75 Union St., Newtown Centre 59, Mass. 1960. pp. 789. illus. $5.00. This is the U. S. edition of Wright's well-known work written from the English point of view as revised by S. B. Whitehead. This book was originally written by a gardener for gardeners, and this approach has been preserved in Whitehead's revision. In the main body of the book, the subject matter is arranged alphabetically. This is followed by an illustrated calendar of practical garden work; an outline of garden science; and an appendix of modern techniques.

FRAGRANCE AND FLAVORS, by Rosemary Hemphill. Chas. T. Branford Co., 75 Union St., Newtown Centre 59, Mass 1960. pp. 104. illus. $3.00 This U. S. edition of a delightful little Australian book will be welcomed by all interested in the growing and use of herbs. After discussing fragrance and flavor, the author covers growing and harvesting; growing herbs indoors; fragrant gifts; traditions, culture and uses of 25 selected herbs; and herbal teas. Highly recommended.

HERBS; HOW TO GROW THEM, AND HOW TO USE THEM, rev. ed., by Helen Noyes Webster. Chas. T. Branford Co., 75 Union St., Newtown Centre 59, Mass. 1959. pp. 204. illus. The term "herb" is used here as defined by the Herb Society of America—"Any plant that may be used for pleasure, fragrance or physic." This is a comprehensive handbook on herbs and sums up a lifetime devoted to these plants by the late Helen Noyes Webster. After considering the history of the herb garden, chapters are devoted to important herb families and their genera; medicinal herbs; directions for herb gardens; commercial growing of herbs; drying and curing herbs; uses of garden herbs; cooking with herbs; herbs for modern gardens; and herbs of the Bible.

THE BOOK OF PLANTERS, by R. Scharff. M. Barrows & Co., 425 4th Av., New York 16, N. Y. 1960. pp. 191. illus. $3.50. This book is concerned primarily with the type of planter that can be used as an integral part of the decorative scheme of the house. The subjects discussed are portable and built-in planters; suitable plants for planters; interior and exterior planters; care of indoor plants; potting and repotting; and propagation. This is apparently the first book on the subject of planters.

IRIS FOR EVERY GARDEN, by S. B. Mitchell. rev. ed. M. Barrows & Co., 425 4th Av., New York 16, N. Y. 1960. pp. 216. illus. $4.95. This revised edition of the late Sydney B. Mitchell's 1949 edition was prepared by Molly Price, an eminent irisarian. After briefly considering culture and climate, the culture of various types of irises are discussed—bulbous, crested, beardless and bearded. Then follow discussions of the breeding and garden use of bearded irises; the standards for choice iris clones; and the oncocyclus and regelias. This is an excellent book for the American gardener.

THE FLOWER ARRANGEMENT CALENDAR, 1961, by Helen Van Pelt Wilson. M. Barrows & Co., 425 4th Av., New York 16, N. Y. The publishers sponsor an annual flower arrangement calendar contest. In this little book, some of the outstanding photographs of floral arrangements accepted by the publishers are reproduced in calendar form for 1961. This calendar will be most useful to those interested in flower arranging.

DARWIN'S BIOLOGICAL WORK, by P. R. Bell et al. Cambridge University Press, 32 East 57th St., New York 22, N. Y. 1959. pp. 343. illus. $7.50. This stimulating collection of essays, relating Darwin's work to research by later workers, show clearly the great range of Darwin's ability and interests as a biologist. The book includes discussions by P. R. Bell on the plants in response to light; J. Challinor on paleontology and evolution; J. B. S. Haldane on natural selection; P. Marler on animal communication; H. L. K. Whitehouse on cross- and self-fertilization in plants; and J. S. Wilkie on Buffon, Lamarck and Darwin with particular reference to the originality of Darwin's theory of evolution. This outstanding book is required reading for all biologists.

SEDUM OF THE TRANS-MEXICAN VOLCANIC BELT, by R. T. Clausen. Cornell Unversity Press, 124 Roberts Place, Ithaca, N. Y. 1959. pp. 380. illus. $7.25. Subtitled "An Exposition of Taxonomic Methods", this book represents the facts learned and the conclusions reached by the author after almost a quarter century of study. The region under consideration is "one both of great environmental diversity and of disjunction of similar habitats." Thus it serves for appraising the relative importance of the environmental factors in the origin of species. After covering the history of the study of *Sedum*, and the geology of the region, the species and culti-

vated hybrids are described in detail. This is followed by keys to the species, conclusions regarding the relationships of the species, comparison and evaluation of methods of taxonomic study, and conclusions. This outstanding book is recommended to all interested in biology.

THE CELL, by C. P. Swanson. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1960. pp. 114. illus. paperback ed. $1.50; cloth ed. $2.95. This is one volume in a series of modern biology, each volume being complete in itself yet at the same time serving as an integral part of the series as a whole. The present volume is concerned with the cell. After considering the historical background, including exceptions to the cell theory; and the tools and techniques of cytology, the various aspects of the subject are discussed—cell shape, size, number, structure; cell division; the cell in reproduction; cell development; and the cell in death This concisely and clearly written text is highly recommended to the student.

PLANT PROPAGATION, by H. T. Hartmann and D. E. Kester. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1959. pp. 559. illus. $7.95. This is a stimulating new book on the principles and practices of plant propagation. The first part is concerned with general aspects—propagation structures; media; soil mixtures and containers. The second part is devoted to sexual propagation. The third part deals with asexual propagation, and the fourth part, with the propagation of selected plants. It should be noted that in the fourth part, the *fractional scale-stem* method for the propagation of amaryllis (also applicable to bulbs generally), has not been included (see Science 78: 532. 1933; The Amaryllis Manual, by H. P. Traub, Macmillan. 1958). This, however, is a detail that can be easily corrected in a future edition. On the whole this is an excellent presentation, and the book is highly recommended.

PLANT MORPHOGENESIS, by E. W. Sinott. McGraw-Hill Co., 330 W. 42nd St,. New York 36, N. Y. 1960. pp. 550. illus. $12.50. The publication of this new book on plant morphogenesis by Dr. Sinnott is an important event for all plant scientists. After an introductory chapter to the subject, the various subdivisions are discussed in detail—growth in general,—its cellular basis, and meristems; phenomena of morphogenesis, correlation, polarity, symmetry, differentiation, regeneration, tissue mixtures and abnormal growth; and the morphogenetic factors—light, water, temperature, physical factors, chemical factors in general, growth substances, genetic factors and organization. This stimulating, well-written book is highly recommended to all plant scientists.

BOTANY; A TEXTBOOK FOR COLLEGES, by J. B. Hill et al. 3rd ed. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. 1960. pp. 571. illus. $8.95. This third edition of a well-known text on plant science will be welcomed by teachers and students alike. After considering the distribution and importance of the plant kingdom, the remaining chapters are devoted to plant cells; coloration in plants; leaves; food synthesis; roots; absorption of water and inorganic substances; stems; growth and movement; flowers; fruits; seeds and seedlings; digestion, respiration, and fermentation; heredity; divisions of the plant kingdom; algae; bacteria, viruses, actinomycetes and slime molds; fungi; liverworts and mosses; and vascular plants—lower and higher groups. This attractive, well-written text is highly recommended.

INTRODUCTION TO PLANT GEOGRAPHY, by Nicholas Polunin. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. 1960. pp. 640. illus. $10.00. Written by an eminent plant scientist, this outstanding new text is concerned with plant geography and some related sciences. After considering plant geography in general, the author discusses the main groups of plant life; adaptations and life-forms; dispersal and migrations; evolutionary development; foundations of modern distributions; types and area of natural distributions; distribution of crops and weeds, and their economic importance; environmental factors; main habitats, successions and climaxes; vegetational types of temperate, polar and high altitude, and

tropical, lands; vegetational types of fresh and inland saline waters, and of the seas; landscapes and vegetation; and plant adjustments and applications. Highly recommended.

PHOTOCHEMISTRY IN THE LIQUID AND SOLID STATES, arranged by L. J. Heidt et al. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 174. illus. $6.00. This timely book on photochemistry is based on a symposium sponsored by the National Academy of Science and the National Research Council It contains contributions by a group of outstanding authorities in the fields covered. After the general introduction, the various contributions are grouped under photochemical reactions; photosensitized reactions; fluorescence; kinetic considerations; role of the triplet state; photochemical reactions involving chlorophyll; photoreactions in solids; and conclusions. This is required reading for photochemists and physical chemists; and also for all interested in solar energy, including applications to photosynthesis in plants.

ANATOMY OF SEED PLANTS, by Katherine Esau. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 376. illus. $6.95. This text was written mainly for students who have had relatively limited experience in plant study. It combines the clarity and conciseness which an introductory work should have together with the scholarly treatment of the subject that distinguished Dr. Esau's earlier *Plant Anatomy*. The developmental and functional viewpoint that characterized the earlier work is retained, and the selection of material fully takes into account the intensive research of the last decade in plant anatomy and related fields. Highly recommended.

BIOCHEMISTRY OF PLANTS AND ANIMALS, by M. F. Mallette, P. M. Althouse, and C. O. Clagett. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 552. illus. $8.50. Although this attractive text was prepared for undergraduates, it is also of interest to all others professionally concerned with biochemistry Part I is devoted to general biochemistry—history; properties of matter; carbohydrates; lipides; proteins; enzymes; and energy transfers and biological oxidations. Part II is concerned with plant biochemistry—plant structure and composition; plant metabolism; seed germination; plant nutrition; and growth regulation. Part III is devoted to animal biochemistry—body tissues; vitamins; mineral metabolism; feeds; digestion; carbohydrate, lipode and protein metabolism; and energy. Highly recommended.

PRINCIPLES OF GENETICS, by E. J. Gardner. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 366. illus. $7.50. Although this excellent text was written especially for the first course in college genetics, it is also of interest to plant and animal breeders, agricultural agents, and experiment station staff members. After a general introduction, the chapters are concerned with Mendel's experiments; probability; cells and heredity; interaction; multiple gene inheritance; sex chromosomes and sex linkage; linkage, crossing over and chromosome maps; chromosome structural modifications and position effects; sex determination and hormonal influence on gene action; chromosome numbers; mutations; alleles and compound loci; genes and their action; physiological genetics; population genetics; systems of mating; and applications in agriculture and human genetics. Highly recommended.

FOREST AND SHADE TREE ETOMOLIGY, by R. F. Anderson. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 428. illus. $8.50. The purpose of this excellent text is to provide the forestry and entomology student with a fundamental understanding of insect life, and also to prepare him to deal with actual forest insect problems. Section I is concerned with structure, physiology and development of insects; insect classification, ecology and control; insecticides; methods of applying insecticides and forest insect surveys. Section II is devoted to defoliating, inner-bark boring, wood-boring, sapsucking, bud-, twig-, and seedling-damaging, root-feeding, cone- and seed-destroying, insects. There is a host index, and an adequate general index. This is an outstanding text.

PRINCIPLES OF PLANT BREEDING, by R. W. Allard. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 485. illus. $9.00. This attractive text was written mainly for the undergraduate student in agriculture, and it is assumed that he has a genetic background equivalent to that found in standard texts. After considering introductory topics, the author discusses the genetic basis of breeding self-pollinated and cross-pollinated crops; breeding methods with self-pollinated and cross-pollinated crops; breeding for disease resistance; polyploidy in plant breeding; interspecific hybridization; mutation breeding; and distribution and maintenance of improved varieties. This stimulating book will be welcomed by the teacher and student.

MODERN INSECTICIDES AND WORLD FOOD PRODUCTION, by F. A. Gunther and L. R. Jeppson. John Wiley & Sons, 440 4th Av., New York 16, N. Y. 1960. pp. 284. illus. $8.50. This text is "designed to provide a general and comprehensive insight into the whys and wherefores of modern insecticides and acaricides, the problems of, and arising from, their use." After considering the insect and its hosts, the authors discuss methods of insect control; modern insecticides; effectiveness of insecticides; formulation and application of insecticides; deposits and residues; resistance of insects to chemicals; acaricidal, organochlorine, and organophosphorus compounds; petroleum products; botanical, fumigant, soil-treatment, and other insecticidal compounds; and attractant and repellent compounds. The appendices are devoted to the approx. mammalian toxicities of insecticides; originators of modern insecticides; and Latinized names of pests mentioned in the text. Highly recommended.

COMMERCIAL HYDROPONICS, by Maxwell Bentley. Bendon Books (PTY) Ltd., P. O. Box 62, Orange Grove, Johannesburg, S. Afr. 1959. pp. 750. illus. 15 pounds; 15 shillings. This limited edition was written to serve as a guide to those interested in the future of hydroponics on a commercial scale, with particular reference to South Africa. Part I is concerned with the system and crop notes; Part II with operational details; Part III with facts and figures; Part IV with constructional details; Part V with nutrient solutions—their make-up and control; and Part VI with water control. The volume is notable for the many excellent illustrations, including some color plates.

THE BEST OF REDOUTE'S ROSES, selected by Eva Mannering. Viking Press, 625 Madison Av., New York 22, N. Y. 1959. Pierre-Joseph Redouté produced his magnificent folios "Les Roses" from 1817 to 1824 from living roses provided by the Empress Joséphine from her extensive collection at Malmaison. The present volume, 11¾" x 16", contains reproductions of twenty-nine outstanding color portraits of roses from Redouté's folios as selected by Eva Mannering. These are prefaced by a section giving the original text descriptions from Redouté. This is a most charming volume that will appeal to all gardeners. Highly recommended.

WATER AND AGRICULTURE edited by R. D. Rockensmith. American Association for the Advancement of Science, 1515 Massachusetts Av., N. W., Washington, D. C. 1960. pp. 206. 21 illus. Index. $5.00. The papers included in this symposium were presented by thirteen outstanding authorities at the 1958 meeting of the American Association for the Advancement of Science. The discussions deal primarily with water and agriculture, and other phases of water are considered only in so far as they are associated with water or agricultural uses. Part I is devoted to water for the future; Part II, to water sources; Part III, to water planning and use; and Part IV, to methods and techniques of water control. This important book is highly recommended to all interested in water in connection with agriculture.

[PLANT LIFE LIBRARY, continued on page 75.]

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

Registrar: Mr. W. D. Morton, Jr., Registrar of Amaryllis Names.

Correspondence about the registration of plant names should be sent directly to 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

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Miss Elaine Brackenridge, *Texas*
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AMARYLLIS SECTION

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All accredited Amaryllis judges of the AMERICAN AMARYLLIS SOCIETY are members of the COUNCIL.

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TABLE OF CONTENTS

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PLANT LIFE, VOLUME 17, NO. 1. 1961—AMARYLLIS YEAR BOOK
GENERAL AMARYLLID EDITION

3. GENETICS AND BREEDING

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PLANT LIFE, VOLUME 17, NOS. 2—4, INCL, 1961
GENERAL EDITION

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