

PLANT LIFE

1964

AMARYLLIS
YEAR BOOK



*Amaryllis
calyptrata*

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EDITED BY

HAMILTON P. TRAUB

HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY

Box 150, La Jolla, California

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CORRIGENDA

PLANT LIFE, VOL. 19. 1963

Page 17, under "LITERATURE CITED", 2nd line from bottom, for "Vol. 18. 1963" read "Vol. 18. 1962".

Page 55, under "Tribus Traubieae, etc.", 1st line, delete "genus *Brunsvigia* Heist."

THE GENERA OF AMARYLLIDACEAE, BY HAMILTON P. TRAUB; PUBL. 1963

Page 17, under "44. HABRANTHUS", "*H. brachyandrus*", change "48" to "24".

Page 36, under "10. TRISTAGMA", "Syn.—", delete reference to "*Gardinia* Bert.", which is a *nomen nudum* (see *Plant Life*, Vol. 20. 1964).

Page 54, 15th line from bottom, "for "Buty" read "Bury".

(CONTINUED from page 130.)

EXPLORING THE UNIVERSE, edited by Louise B. Young. McGraw-Hill, 330 W. 42nd St., New York 36, N. Y. 1963. Pp. 457. Illus. \$6.95. This stimulating book is based on contributions of fifty-three outstanding ancient and modern scientists. The subject matter included is calculated to up-date the adult members of society on the rapid progress in science in recent times. The selections are arranged under convenient headings—what is the nature of science?; is there a scientific method?; is there an order in nature?; is truth scientific?; what is a scientific fact?; is there a limit to man's understanding of nature?; are theories true?; how was the universe created?; is there other life in the universe?; why explore space?; and what are the values and limitations of science? This thought-provoking book is highly recommended to all adults who wish to keep up with recent progress in science.

THE NEW YORK TIMES GARDEN BOOK, edited by Joan Lee Faust. Alfred A. Knopf, 501 Madison Av., New York 22, N. Y. 1962. Pp. 368 + i—xi. Illus. \$6.95. Outstanding authorities contribute articles on various phases of gardening to the Sunday edition of the New York Times. The garden editor has selected more than 100 of these for inclusion in this attractive book. The subject matter covers a wide range. Part 1 is devoted to landscaping; Part 2, to trees and shrubs; Part 3, to garden flowers; Part 4, to lawns; Part 5, to places to garden; Part 6, fruits and vegetables; Part 7, to propagation; Part 8, to house plants, and Part 9, to the four seasons in the garden.

PLANT PATENTS; WITH COMMON NAMES, 1 THROUGH 2207, 1931-1962. Published by the Amer. Assoc. of Nurserymen, 835 Southern Bldg., Washington 5, D. C. 1963. Pp. 74. \$2.00. This is a revised edition of "Plant Patents; Common Introductory Names" which has been reviewed in previous issues of Plant Life. The new directory, page size 8½ x 11", contains all of the information of the previous directory and the five annual supplements, and the information on the plant patents granted to the end of 1962. The new directory, as the old, provides separate numerical and alphabetical listings. The numerical listings show besides the plant patent number, the date of issue, the kind of patent, the common name assigned the plant, the name of the originator, and the name of the person or company to whom the patent has been assigned, providing the patent had been assigned prior to issuance of the patent. The common names are alphabetized by species. The combined list of originators and persons to whom the patents have been assigned, is also arranged alphabetically with mailing addresses.

AN ANNOTATED CHECKLIST OF CULTIVATED PALMS, by H. E. Moore. The American Palm Society, 7229 S. W. 54th Av., Miami, Fla. 33143, Pp. 65. \$2.00, including postage. This 65 page publication is the culmination of several years' work by Dr. Moore. It represents an up-to-date compilation of the correct botanical names of the palms now known in cultivation, also names frequently used in the trade, country of origin, authorities, and references in botanical literature. It will become an essential part of the library of anyone who is interested in the correct identification of palms.—*David Barry, Jr.*

THE DEVELOPMENTAL ANATOMY OF ISOETS, by D. J. Paolillo, Jr. Univ. of Illinois Press, Urbana, Ill. 1963. Pp. 130. Illus. Paperbound. \$2.50; cloth-bound, \$3.50. This is another volume in the important series of Illinois Biological Monographs. In this research project, the developmental anatomy of the *Isoetes* was established on the basis of comparisons in the structure from the sporling to the adult stages. This includes observations on growth of the shoot tip, lateral meristems and root-producing meristems, and on procambial differentiation, root initiation, and the growth of the apical meristem of the root. The 19 plates at the end of the book are excellent. This outstanding book is highly recommended to the plant scientist.

(CONTINUED on page 5.)

PLANT LIFE, VOL. 20, NO. 1, January, 1964

AMARYLLIS

YEAR BOOK

1964

Year Book of
The American Amaryllis Society
31st issue

GENERAL AMARYLLID EDITION

EDITED BY
HAMILTON P. TRAUB
HAROLD N. MOLDENKE

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

PREFACE

The outstanding cover design featuring *Amaryllis calyptрата* is the work of the Artist to the Society, Prof. Penrith B. Goff of the University of Chicago. Again, he is to be congratulated on an excellent job.

It is fitting that the 1964 issue of THE AMARYLLIS YEAR BOOK is dedicated to Mr. Samuel Y. Caldwell, who is known to his many friends as Sam Caldwell, for his outstanding contributions toward the advancement of various amaryllids, particularly *Lycoris* species and hybrids. Your editor had been interested for a long time in the genus *Lycoris* and it had been difficult to make progress toward interesting the general gardening public in this utterly beautiful subject until Mr. Caldwell took up the cause. He made a collection of as many species as he could obtain and flowered them at his home in Tennessee which is an ideal location for many of the species, excepting the very tender subtropical ones. He furnished herbarium specimens to the writer so that they could be worked into the *Lycoris* identification project. During the past two decades most of the species have been identified. Only a few still have to be traced down. Mr. Caldwell's contribution toward determining the garden value of *Lycoris* in the United States is outstanding. He not only assisted in the identification of species, but he also began the breeding of Hybrid *Lycoris* is earnest and the outstanding results he has obtained are reported in a paper in the present issue. For his eminent service toward the advancement of *Lycoris*, and other amaryllids, the 1964 WILLIAM HERBERT MEDAL has been awarded to him. The best wishes and congratulations of the entire membership go with this award. Mr. Caldwell contributes a charming autobiography to this issue.

Mr. Percy-Lancaster again favors the members with his charming reports on his trip from India to Rhodesia and return, and on his holiday in Southern Rhodesia. Mrs. Clint reports on an interesting trip to the Mexican West coast.

The articles on *Amaryllis* in the present issue include a report on the flowering of *Amaryllis calyptрата* by Mr. Buck, and on the growing of this species by Mr. Clouette. Mr. Crochet and Mrs. Barry write on *Amaryllis* breeding, and on the growing of these plants in pots. Mr. Buck reports on the outstanding Angell *Amaryllis* hybrids; Mr. Morris presents an article on species *Amaryllis* as grown in Australia; Mr. Clouette, Mr. Beckwith Smith and Mrs. Pickard, write about *Amaryllis* culture. Mrs. Herold indicates the landscape value of *Amaryllis*; Mr. Perrin reports on overwintering *Amaryllis*, and Mrs. Tebben writes about the effects of the freeze in Florida on *Amaryllis*. Mr. Sudd writes on the culture of *Amaryllis* under artificial light. Mr. Goedert again favors the members with an excellent review of the *Amaryllis* season just past. The Supplement to the present volume consists of the "Catalog of Hybrid *Amaryllis* Clones."

The other amaryllids are not neglected. In addition to the fine *Lycoris* report by Mr. Caldwell, there are articles by Mr. Hunt on a new pink *Lycoris* and the creamy white species; and on hybrid *Lycoris* by Dr. Takemura. Mr. Higginson and Mr. Hannibal, and Mr. Hannibal

write about Crinums. Mrs. Shirley again contributes a fine article on American Crinums. Mr. Korsakoff writes about the preparation of herbarium specimens, and about his interest in the Zephyrantheae. Dr. Flory reports on chromosomes in *Hemerocallis*. Mrs. Clint writes about a fine hybrid involving *Zephyranthes bifolia*. Mr. Decker reports on growing amaryllids on tap water; and Mr. Hunt on winter hardiness in amaryllids.

There are other articles, including also reports on the *Amaryllis* exhibitions in 1963; a report on the honors received by Mrs. Pickard, and other contributions.

Contributors to the 1965 issue of THE AMARYLLIS YEAR BOOK are requested to send in their articles by August 1, 1964, in order to insure earlier publication of this 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. Your cooperation toward earlier publication will be greatly appreciated.

December 15, 1962,
5804 Camino de la Costa,
La Jolla, California 92-037

Hamilton P. Traub
Harold N. Moldenke

TRAUB'S "AMARYLLIS MANUAL", SECOND PRINTING

Word has been received from MacMillan Co., 60 5th Av., New York, N. Y. 10011, that the second printing of this work will be ready on July 14, 1964.

TRADE CATALOG RECEIVED

Bloem Erf Nurseries, P. O. Box 210, Stellenbosch, South Africa. "Catalogue of South African Native Bulbs, Seeds and Plants" 36th Edition. Jan. 1964-1965. Mrs. L. Richfield, proprietor. Among amaryllids, the following genera are represented—*Brunsvigia rosea* (syn.- "Amaryllis belladonna Herb. 1821, non L. 1753"), *Boophone*, *Clivia*, *Crinum*, *Haemanthus*, *Nerine*, *Tulbaghia*. Although there is blank space, it is stated that *Cyrtanthus* are not listed because "It is simply not possible to describe these year after year, when so many other items are offered." Thus the enthusiast interested in South African amaryllids misses *Cyrtanthus* (including *Vallota*), *Agapanthus*, *Ammocharis*, *Cybistetes*, other *Brunsvigia* species, *Anoiganthus*, *Cryptostephanus*, *Gethyllis*, *Apodolirion*, *Hessea*, *Carpolyza*, *Strumaria* and *Pancratium trianthum*. It is hoped that these deficiencies may be made good in a future catalog.

JACK'S NURSERIES, Jack & Jean Bester, P/bag, Meyerton, Transvaal (J. J.), South Africa. This price list is concerned with various plant species, but seeds of the large-flowering *Amaryllis* hybrids represent the only amaryllids offered. The Besters report on collection trips, and possibly they will list other amaryllids in later price lists.

THIS EDITION
DEDICATED TO
SAMUEL YONGUE CALDWELL

(CONTINUED from page vi.)

PRINCIPLES OF NUMERICAL TAXONOMY, by R. R. Sokal and P. H. A. Sneath, W. H. Freeman & Co., 660 Market St., San Francisco 4, Calif. 1963. Pp. 359. Illus. \$8.50. There has been a need for a text on the application of mathematical procedures to the grouping of organisms into lineages, and the authors are to be congratulated for producing the first book on the subject. The necessary formulas are given along with the text discussions, and in the appendix, brief illustrative examples are presented for the assistance of those who have not been exposed to mathematical computation by means of electronic computers. The authors are apparently under the impression that they must demolish the customary Neo-Adansonian procedures that are presently used by the great majority of lineagists which have served well. These consist in (a) making groupings on the basis of overall similarities with or without the use of electronic computers; and (b) then making adjustments, if necessary, on the basis of bioevolutionary theory and its application. They claim that the procedures generally followed are incorrect, and they believe that it is necessary to set up a straw-man to be demolished. However, in the last analysis they agree that their method is quite similar to the customary Neo-Adansonian method as already indicated, but they emphasize the use of electronic computers in making the partial correlations. The fundamental flaw in their argument is in confusing the two phases of lineagics—the basic phase (what is true in nature?) and the applied phase (what is useful?). Aside from this unnecessary effort to demolish their straw-man, the book fills a definite need, and is a necessary addition to the library of every lineagist.—*Hamilton P. Traub*

MANUAL OF VASCULAR PLANTS OF NORTHEASTERN UNITED STATES AND ADJACENT CANADA, by H. A. Gleason and A. Cronquist. D. Van Nostrand Co., 120 Alexander St., Princeton, N. J. 1963. Pp. 810. Illus. \$11.75. This is a companion volume for "The New Britton and Brown Illustrated Flora". However, in the presentation, the junior author has taken into account recent studies concerning the plants included. The book covers the vascular plants, including ferns, grasses, trees, weeds, and wild flowers in northeastern United States and adjacent Canada. This book is highly recommended to the layman, professional plant scientists, and students, including foresters, conservationists, county agents, scout masters, and the serious amateur plant scientists.

(CONTINUED on page 52.)



Herbert Medalist—Samuel Yongue Caldwell beside a group of *Lycoris squamigera* Maxim., in his garden, Nashville, Tennessee.

SAMUEL YONGUE CALDWELL

An AUTOBIOGRAPHY

What prompts a person, brought up and educated for the legal profession and following it for a time, to wander off and make a career in the completely unrelated field of horticulture, where he has no formal training at all? That query comes up sometimes at the conclusion of programs I do, which the garden club people generously refer to as "lectures."

It is not entirely facetiousness when I explain that lawyers often have to work for people who are mad at each other. They get involved in disagreements, arguments, bickering, strife and contentiousness. Horticulturists, on the other hand, work not only with plants, which are fascinating and beautiful, but also with the very nicest kind of people—gardeners—who are kinder, friendlier, more generous and more pleasant to be around than the average run of human beings.

That, of course, over-simplifies my reasons for changing vocations. I gravitated into my present work because I happen to like plants and people.

I was born November 8, 1904 on a farm belonging to my grandparents in the pleasant rural community of Brentwood, just 12 miles south of Nashville, Tennessee. My father was a doctor, and with an older brother and two younger sisters I grew up in the Nashville area. Underweight and sickly as a child, I was out of school a good deal and spent the time in the country on the farm. Fishing, hunting and keeping an odd assortment of pets—the best was a young raccoon—were chief interests. I also became intensely interested in photography—so much that when in the winter of 1918 I made "big money" selling hides of muskrats and minks trapped along a little creek in the farm meadow, I spent nearly all of it on a big, professional looking camera that made postcard size pictures on glass plate negatives.

In and out of school, as health permitted, I eventually received a Law degree from Vanderbilt University in 1932 and was admitted to the State Bar. Meanwhile, some indications of a stronger-than-average liking for plants and gardens were showing up. I ordered seeds each year from the famous old Peter Henderson and Henry A. Dreer catalogs and cultivated both flowers and vegetables with enough success to have our place included a couple of times on local spring garden "pilgrimages." New and "different" plants attracted me particularly. Aquatic plants became a major interest, and during the summer of 1928 I worked at the William Tricker waterlily nursery near Cleveland, Ohio. It was a happy time, as other nurseries of various kinds were nearby and I was constantly associated with professional plantsmen.

At summer's end I made a round-about home trip in my Model T Ford, spending several days in St. Louis, where I was thrilled to meet

in person a noted waterlily hybridizer, Superintendent George Pring, at the Missouri Botanical Garden. He was the first of many "names" I have come to know over the years in the field of horticulture, and to this day I count him a friend.

But there were many different plant interests, and amaryllids were among the early ones. During my sophomore year at Vanderbilt a lady who lived across the street from my fraternity house gave me a bulb and the most fascinating flower I had ever seen—something called "red spiderlily." I was already growing "*Amaryllis hallii*." Numerous descendants of these original bulbs remain with me today, but the names have been changed, for we now know them as *Lycoris radiata* and *L. squamigera*.

During the 'thirties' I practiced Law briefly, then did legal research work for our State Department of Education. Also I continued gardening and began free-lance writing for farm, garden, photographic and home workshop publications. By this time my photographs were up to professional standards and they sold many of my articles. Still underweight and never in robust health, I managed to store up extra vitality by two months of outdoor life each summer, serving as a staff member at a boys' camp in the East Tennessee mountains.

World War II brought changes. I went into the Infantry in 1942 and got basic training at Camp Wolters, Texas. There I "discovered" dozens of native wildflowers, and during ten-minute "breaks" used to gather seeds and store them in my cartridge belt to send home later. Incidentally, the showy "Texas Plume," *Gilia rubra*, did very well back in Tennessee, and in later years I was to see it thriving in Nebraska gardens.

My early liking for guns paid off in the army; I became one of Fort Benning, Georgia's "90-day-wonder" boys, was commissioned and continued until 1946, mainly as an instructor in weapons, at Infantry replacement training centers. More than two years were spent at Camp Blanding in northern Florida, and offtime hours brought opportunities to cultivate many garden-minded friends. Right at Blanding I found Major Henry R. Totten, "Mr. Botany" to Carolinians because of his long service to the University of North Carolina as head of the Botany Department. With him and Mrs. Totten I trekked the woods of Penny Farms and journeyed to Jacksonville for meetings with groups of wonderful garden club people who even during the war years gave beautiful camellia and orchid shows and planned the splendid Garden Center that was to come.

Having been a member of the American Amaryllis Society and other plant societies for several years, I knew that I was near centers of horticultural interest. I got acquainted with Dr. H. H. Hume and Prof. John V. Watkins in Gainesville, spent pleasant Sunday afternoons with John R. Heist and his bulb plantings in St. Augustine, and had stimulating visits with Wyndham Hayward and the late Ralph W. Wheeler in Winter Park. In Orlando I was awed and entranced by the hospitality of Mulford and Racine Foster; their Orchidario on Magnolia

avenue became a week-end Mecca, and I spent Christmas leave time with them in 1943, '44 and '45. Years later I was to visit at their marvelously interesting new home, Bromel-La, outside Orlando.

Thus in spite of the relative grimness of war years I began to acquire a sort of informal horticultural education "by association."

Terminal leave as an army captain in 1946 allowed me a two-month California tour which included such highlights as a visit with the late Fred Howard in Montebello—I'm still growing choice clivias selected from some 2,000 hybrids he had in bloom; a never-to-be-forgotten stop with Mr. and Mrs. Cecil Houdyshel in La Verne; seeking peak bloom on irises with the late Carl Milliken in Arcadia, and meeting J. N. Giridlian at his memorable Oakhurst Gardens, also in Arcadia.

Returning to civilian work, I knew it had to be something connected with plants, so I became associated with the American Iris Society as editor and executive secretary, at the central office, then located in Nashville. And my grandparents' farm became my own home; here there was room to grow all the shade and ornamental trees, the evergreens and flowering shrubs, the perennials and bulbs I desired. I still live there, by the way, along with my mother and an aunt; I have never married.

A neighbor and gardener friend was the late Thomas A. Williams, then doing a weekly question-and-answer session for amateur gardeners as the Old Dirt Dobber on CBS Radio's Garden Gate program. I had occasionally contributed items for Mr. Williams to use on the air, but had no idea that he had suggested me to CBS executives as a possible successor. However, in 1949 he passed away suddenly after a heart attack, and within a week I was the new Old Dirt Dobber with a coast-to-coast radio audience through more than 200 stations.

That started a hectic but wonderful ten-year period. I studied, traveled, visited gardens, asked questions and listened to plantsmen. Then on Saturday mornings I passed along to radio listeners some of the things I'd learned.

By the late 'fifties, however, television had taken over as the top medium in the broadcasting field, and big-time network radio was passing out. I went out with it.

Actually, at the present time I am doing more radio work than ever, but simply have smaller audiences. I do one program for listeners in my local area and another that is transcribed and heard in a number of states. Then I've done numerous television shows about plants and gardens, have written and illustrated a couple of small books, and as time permits I contribute occasional articles and photographs to garden magazines. Another job is acting as horticultural advisor for a chain of garden centers.

Happily, my work allows me time for a great deal of gardening "in person." I enjoy planting and growing a very wide variety of plant materials, and every season brings something new. Although not naturally a joiner, I do belong to most of the plant societies—everything from the African Violet Society of America to the Northern Nut Growers

Association. Their publications held keep me up-to-date on what's happening in the world of gardening. I've been especially close to the American Iris and American Hemerocallis societies and have appeared many times on their national convention programs; also I've been convention speaker for the peony, daffodil, rose, African violet and gesneriad societies. Attending meetings of these organizations has meant wonderful friendships with gardeners and plantsmen all over the country.

All plants interest me, but I'll admit a special feeling for the moderately rare or at least uncommon things. That probably accounts for my long-time devotion to lycorises. Their strange growth and flowering habits and unpredictability, along with great beauty in some species, make them most intriguing. Naturally it is exciting to see my new hybrids come into bloom each year.

But more remarkable than any planned progress with lycorises was my involvement in a purely accidental occurrence. Let's face it; in all the world there just aren't many dyed-in-the-wool lycoris "nuts"—people who through a lifetime go out of the way to acquire every species available. I happen to be one of them. May our small tribe increase, but meanwhile it is admitted that we are few and far between. Well, away back in 1925 the mother of a Methodist missionary stationed in Huchow, China, returned to the States, bringing along a few "spiderlily" bulbs collected from the wild in hills outside Huchow. Had the law of averages been working, these would have been any one of several nice but not uncommon bulb flowers that China has contributed to gardens. As events later proved, they were actually a type of hardy golden lycoris quite unknown in cultivation.

Again, the law of averages would have brought the good lady home to Peoria or South Bend or Binghamton, or any one of innumerable communities where no ardent lycoris fancier lived. With no one around to recognize their possibilities, the pretty spiderlilies might have remained indefinitely in obscurity.

But things didn't work out that way. By incredible coincidence this lady was from Nashville, Tennessee, my own home town, where she returned and planted the bulbs. It is true that for 33 long years we lived here—the bulbs and I—as strangers, just a few miles apart. Then in 1957 a local gardener who had seen them learned of my interest in flowers of that type and told me about them. When finally I saw a clump flowering, August 15, 1958 (see photo, page 78, PLANT LIFE 18: 1962), it was like finding fabled gold at rainbow's end. I knew from their remarkable size and beauty and their record of having lived outdoors here in a climate where sub-zero winter temperatures are common, that they were vastly different from *Lycoris aurea* grown in our Deep South—different, in fact, from any lycoris species thus far recorded. It was a thrill to photograph them and report the find to Dr. Hamilton P. Traub (see "A Hardy Golden Lycoris," page 97, PLANT LIFE 14: 1958).

This is a big and showy lycoris and may eventually be a widely grown garden subject. However it may be finally identified or named—

and we currently call it "L. sperryi" for convenience—I am happy to have had even a chance part in "discovering" a golden garden treasure.

FROM INDIA TO AFRICA AND BACK

SIDNEY PERCY-LANCASTER, *National Botanic Garden, Lucknow, India*

In February 1963 I took passage by the S. S. Karanjia, a B. I. S. N. boat, for a four month holiday in Southern Rhodesia with a view to collect my library, clothes and bring back my *Gloriosa* tubers, as I had decided to spend the last few years of my life in India. Bad luck seemed to have dogged my steps this trip.

The first Port we visited was Karachi, in Pakistan, I had not contacted friends in this City and therefore had to be satisfied with a quick round of gardens along the main thoroughfare. We sailed across to Mombasa, on the African coast where I expected to meet a friend and be taken to a Nursery 12 miles from the City. There was no sign of him and to aggravate matters, we stayed in Port two extra days—and I waited for some message. Later I heard that he had visited Nairobi and there fallen ill, returning to Mombasa only after the boat had sailed. I had picked up "flu" from a fellow passenger and was quite ill but game to go ashore. As there was no cargo or passengers for Dar-es-salaam, we went to Zanzibar and I stayed aboard. Then back across the Ocean we went to the Seychelles, here I had promised myself a walk to the Botanic Garden to photograph the Double Coconut Palms and get seeds and *Gloriosa* tubers. Passengers were not allowed to go ashore till after 4-30 p. m. and as it was a miserable dull day, with light showers, I stayed in my cabin. Our last Port was Beira but, though we reached on time, there was some delay that prevented the discharge of cargo and I spent another night on board. I had telegraphed my daughter-in-law telling her of my delay but rather than risk over-tiring myself in wandering about the City I spent the day at the station, which has no passenger facilities. In due time I landed in Salisbury and spent the next few months enjoying myself.

On the return trip to India, I left for Beira, on the 15th August to catch the S. S. Kampala which sailed on the 17th. We called at Mocambique but I did not go ashore, at Dar-es-salaam I walked two miles to the Public Garden, there I picked up two *Sansevieria* leaves, also seeds of a *Crinum* and of a couple of trees. Next day we were at Zanzibar and I went ashore as soon as I could, met the Director of Agriculture, was passed on to the Superintendent of Parks and Gardens, and I discovered another five new varieties of *Sansevieria* and a few other interesting plants. It was a successful visit! Mombasa was again a disappointment, the friend could not be traced while the Superintendent of Parks and Gardens was on sick leave. I was given a plan of where he lived but though I spent the next five hours discovering new parts of Mombasa I failed to find his home.

Our last Port was Mahé, in the Seychelles, and I kept my fingers crossed, would I be lucky and get what I wanted? I met the Director

of Agriculture, went round the garden, saw their wonderful collection of Palms, was able to supply names of several plants and and collected two *Crinum* bulbs and a couple of tubers of *Gloriosa superba* that might differ slightly from our Indian species. With several new *Sansevieria*, I had obtained in Salisbury, and two *Crinum* species and a *Boöphone* (Buphane) gathered from the "bundu," the wilds of the capital, as well as an assorted collection of South African bulbs, several dozen *Hemerocallis*, and a number of *Stapelia* species from Wankie, I carried two large parcels with Phytosanitary Certificates, and hoped to get through the Customs without much trouble. Fumigation was demanded and I had to submit the contents for the "death" chamber, resulting in the loss of the names of the *Hemerocallis*. I hope that what survives will give some value to my holiday!

HOLIDAY IN SOUTHERN RHODESIA

SIDNEY PERCY-LANCASTER, *National Botanic Garden, Lucknow, India*

I had an opportunity of visiting some of the "high lights" of Southern Rhodesia before I left Africa and send you a short note of the trip in case it may be of interest to your readers. To see, for instance, the Victoria Falls in an illustration is not quite the same thing as viewing it "in the flesh" and you fail to get the thrill when you come face to face with this stupendous spectacle. However I would ask you to wait a bit and hear something about Salisbury, the Capital of the Federation, where I have lived for three years. It is quite a young city, 75 years old, situated at an elevation of 5000 feet, and with seasons the reverse of those in the northern hemisphere. Traffic is entirely motorised, the roads excellent, precautions against overspeeding in the city are numerous, and attempts to "keep the city clean" are very successful. Salisbury has the largest Sales centre, in Tobacco, in the world, and in the busy season 700 to 800 bales of tobacco leaf are auctioned *every hour!*

This trip was undertaken really at the wrong time, from an horticultural point of view for it is winter at this time of the year,—July-August—and everything was drab and dry, only a little colour from the aloes and not many autumn tinted bushes, or trees. We passed through Bulawayo to pick up food for our stop at the Matopos, for though one can hire the huts at the camp, there are no arrangements for meals. We spent two days at the Marleme Rest Camp, saw the small Game reserve, the Dam, and drove along the main drives. Two caves were visited with rock paintings, both very exposed to the weather, and dating back to 40,000 B. C. for the first occupants and to 1 A. D. for the last. The floor of the huts was wood ash, 14 feet deep. The chief attraction was the tomb of Cecil Rhodes, and near by lie two other pioneers. A Memorial is raised a little distance away to 33 soldiers who were killed in an attempt to arrest the Matabele King who had

stirred up rebellion. The Matopos are a low range of hills, composed of large blocks of rocks, some precariously balanced; in some places the hills are densely covered with vegetation, in others a "rock" scape meets the eye with huge euphorbias. All rivers I noticed on the trip were named; some were dry, others carried a trickle of water and very few could be called streams. The roads are excellent; every few miles there are "Lay by's" where, in a deep bay of the road, motorists can stop. There are no shade trees, or shelter, but every bay has a blue painted drum with LITTER in large letters! The injunction to "Keep the City clean" seems to have been extended to the country-side! Our next stop was Wankie, the National Game Reserve and as we could not get accomodation in the Rest Camp we had to stop at an Hotel in Dett, 15 miles away. I was very unfortunate with my camera, three films, used for scenes at the Matopos and at Wankie failed—24 snaps—because I had been supplied with the wrong class of film. At Wankie the animals were decidedly inquisitive; they did not bolt when the car drove by (25 miles per hour is the speed limit); they stood, and stared, and then quietly melted into the light forest background. The deer walked a few paces into the tall grass and disappeared. Elephants were everywhere—we were held up by a pair on one occasion while they indulged in a dust bath, they saw the car but blocked the highway; when we drove on after they had given us a clear passage, we met a herd of some 50 elephants that had crossed the road and left these two loiterers behind! Then another experience was when we were compelled to stop as there, on the drive, lay five young lionesses, in cat like attitudes, after a heavy meal off a Gnu (wildbeest). They were perhaps 20 feet from the car, but not nine feet away two other lionesses tore the last hunk of meat off the bones of the Gnu. They were too busily engaged to worry about the spectators! Buffaloes looked terrifying, they were always in large herds of 50 or more. At the observation Post animals came morning and evening for a drink and we saw zebra and giraffe in company, buffalo in herds but what was most interesting was a herd of elephants from the tiny toddlers to old stagers. After the drink there was a little horse play—rather elephant play!!—pushing and squirting of water over each other. The number of animals that you see on a trip depends on the season, and your luck, we saw the following numbers, an approximate guess, for many more may have been in the background of the herd: Elephants, 200—Gnus (wildbeest), 500—Buffalo, 400—Deer of at least a half a dozen species, 200—Zebra, 100—Giraffe, 80—Apes and Baboons, 100—Warthogs, 60—Lions, 19—Lionesses, 8—Ostrichs, 40—Hyenas, 3—Rhinoceros, 1—and birds in great variety. The area of this Game reserve is about 30,000 acres, there are 14 dams and water pans in different places. It is estimated that there are 4500 elephants alone in the Game Reserve and other animals must be in like proportion.

From Wankie we drove to the Victoria Falls, arriving late in the evening and restraining our impatience to see the actual Falls, we walked from the Rest Camp to the banks of the placid Zambesi, saw

the immense plumes of spray and retired. Next morning, after a meal, we drove to the Falls and walked down to the Eastern Cataract. When faced with the real Falls you stand with your emotions, more or less paralysed. Your admiration of the beauty gives place to the awe of the spectacle and this is followed by fear while you take especial care that you do not take that fatal step and end up 300 feet below in the 200 feet wide chasm! So many have tried to snap some particular sight, and—failed!! The river only loses control of itself about 100 yards from the lip, then in a fury, with wild tossed mane, the river leaps into the chasm, sending up a spray cloud 1000 feet high or more. To get a photograph of the entire Falls is all but impossible, even at this season, with the river at its lowest one would have to wait till the spray was blown aside. The Victoria Falls are one and a half times as wide and twice as high as Niagara, the figures for the quantity of water that goes over the lip every minute and what it weighs did not interest me as much as the actual sight. There is a strip of land on the opposite side of the Falls, called the Rain Forest, most of the area is bare of even bushes though there are trees in the background, but the spray from the Falls which varies from a "Scotch mist" to a light shower, keeps this spot wet all the time. I noted patches of *Gladiolus primulinus*—and the capsules contained germinated seeds, some seedlings 2 to 3 inches long, *Haemanthus multiflorus* was in leaf, there were many tangled masses of *Solanum seaforthianum*, *Lantana camara*, *Plumbago zeylanica*, and the ubiquitous *Ageratum mexicana*.

Boababs are a feature of this part of Africa and while trees with a diameter of 10 to 12 feet are common one near the Victoria Falls is 22 feet in diameter! I have seen in Mombasa, specimens up to 18 feet.

From Victoria Falls we went to Livingstone, seven miles away, first for a two hour trip up the Zambesi, then to a Model Craft Village with many interesting exhibits, and finally to the Rhodes—Livingstone Museum which displayed in addition to relics and mementoes of these two great men exhibits of the Bantu people who inhabit the Rhodesias, their customs, implements, clothing, etc. I might here mention that their wood carving is very well done and the Curio sellers do a roaring trade in all tourist centres; the Curio sellers at the Falls have excellent representations of wild animals—though some exaggerated peculiarities make the poor animal a caricature of itself.

We travelled to Lusaka, the Capital of Northern Rhodesia, on our way to Kariba which has been called "the most ambitious engineering scheme". This immense man-made lake imprisons the Zambesi and releases a miserable stream from the base of the Dam. It has been calculated that at flood tide, when the six gates release water, the volume is more than that of the Victoria Falls. Unfortunately not one gate was discharging when we were there. As far as the eye can reach is one stretch of water.

From Kariba we drove back to Salisbury where we stopped over Sunday and Monday, looked over Ewanrigg again and left on Tuesday

for Umtali on the Portuguese border of Mocambique. From here onwards to Cashel, where we stopped the night at the Black Mountain Inn, the weeds were very beautiful and I noted a *Melastoma*, very near *Tibouchina semi-decandra* but slightly paler and carrying bunches of flowers, a *Hypericum*, *Iboza* in white and two shades of mauve, *Leonitis* in addition to the normal orange, white and pale salmon pink, and many of the *Labiatae*. The scenes were beautiful in spite of the fact that in the first 36 miles you encountered 800 curves and bends! We passed over the Birchenough Bridge, the third largest single span Cantilever Bridge in existence! Then to Fort Victoria which we bypassed so as to get to Zimbabwe before it became dark. It was now 4:30 p. m. and Zimbabwe was only 17 miles away. The car was parked at the base of the hill and I started up the slope which had steps, with a two-inch rise, but had to stop three times for breathers!—blowing like a porpoise—! We looked over the stone work, the original wall made up of neatly dressed stone tiles laid without mortar and fitting perfectly. Other repairs, and walls, were not so well done. The general theory is that the ancestors of the Bantu built Zimbabwe but that a race, who since time immemorable have built daub and wattle rondavels, should suddenly develop a genius for building quite a distinct type of building—with stone, perfectly dressed and with no practice, seems a little incredible.

This was the end of the trip and I said goodby to my son and family who drove down to their home in East London; the following day I was taken by a friend to Salisbury.

I could have amplified the article by relating incidents that have been omitted owing to lack of space.

1963 TRIP TO THE MEXICAN WEST COAST

KATHERINE L. CLINT, *Brownsville, Texas*

Although we had heard of "*Zephyranthes*" *tepicensis*, it was only vaguely and we knew very little about it. During conversation with Drs. Walter S. Flory and R. O. Flagg while on a trip through Mexico with them in 1961 we learned that this species reportedly "had no tube." My interest quickened—"Why, that sounds like *Habranthus*!" None of us had seen the species but were now headed for the area where it was discovered: the "Territory of Tepic," for we were driving from Guadalajara through Tepic to San Blas, on the Pacific. It was a disappointing trip insofar as *Zephyranthes* were concerned, for it was bone dry all the way to the Pacific. Just north of Tepic, we questioned a nurseman about *Zephyranthes* and *Hymenocallis* and were told that they both bloomed with the "first thundershowers, about the first week in July." We left our name and import number and asked that he collect some of both bulbs and send them to us, but he never bothered to do so.

Subsequently, Drs. Flory and Flagg received one bulb of "*Z.*" *tepicensis*, bloomed it and in April, 1963 sent it on to us. It was a

small bulb with very narrow, fine leaves. Surely this is not *Habranthus*, I thought. Yet when the bulb bloomed, the small, delicate flowers certainly looked like *Habranthus* to me. One lone bulb plus a small offset (more or less on loan) and a few tiny seedlings were wealth indeed, but the itch to collect the species in its native habitat was too great to ignore, so our 1963 trip to Mexico was planned and timed with this the prime objective. Available weather data and collecting dates from Herbarium data supplied by Dr. Flory seemed to coincide with the information supplied by the nurseryman near Tepic.

It was decided to drive from Brownsville to Mazatlan via Saltillo, Torreon and Durango, then south along the coast through Tepic and on into Guadalajara. We left Brownsville on July 9. Our first misgivings came when we noted signs of long and abundant rainfall just west of Durango. With the appearance of *Milla biflora* in abundant bloom we knew that chances of finding any of the *Zephyranthes* or their kin in flower was mighty slim. However, Durango rains began in June, so perhaps it will be dryer as we go west. Instead, it was greener! When we turned south from Mazatlan, we were again optimistic that we might find it dryer farther south, but it was greener than ever. In Tepic we learned that normally the first showers appear about May 15, with the "rains" starting around June 15, instead of the first of July. This year they had arrived even earlier. In spite of this knowledge, we actually did not give up hope of finding *H. tepicensis* in leaf until we were almost into Guadalajara, for Morris can spot rain lily leaves no matter what odds are against him.

This great disappointment did not keep us from enjoying the things we did find in bloom: *Hymenocallis horsmanii* (?) was heavily in bloom from Mazatlan almost into Guadalajara. Primarily an upland species, flowering bulbs were seen in almost every conceivable environment and from elevations of 300-400' up to 4500' or more: on low ground in a *Sabal rosei* thicket, growing in standing water in a low bar pit below the highway, on sloping pastures, on mountain ledges, on high banks of small, seasonal streams. One of the strangest sights was a small, sugar-loaf hill which was a mass of white from top to bottom. *Milla biflora* was much in evidence everywhere. We saw *Bessera* in bloom for our first time, lovely violet purple ones on a hill not far from Mazatlan, the usual red ones farther south and east. A sight we shall long remember was the picture of the blooming of a small blue and white irid, literally covering the landscape. Just before entering the state of Jalisco we ran across a thrilling sight: a small rocky gully with clear, running water literally choked with bulbs of our *Hymenocallis* No. 658. The open flowers had been ruined by rushing floodwaters the night before. We had originally collected this species in 1955 northeast of Guadalajara in a similar rocky stream. We wondered if we should also find our *Hymenocallis* No. 604 in bloom. We did find them in some number, but not until the next day, north and east of Guadalajara. Apparently, No. 604 does not extend into the western Sierras, nor did we find *H. horsmanii* east of these same Sierras. These

two species are slightly similar in leaf and bulb, but when found in bloom one could never mistake them for the same species.

As we left Guadalajara (via Mexico 110 to Irapuato, thence on Mexico 45 to Queretaro) we soon entered the area we considered home base for *Zephyranthes*, Central Mexico, and we began to find *Zephyranthes* once more—in leaf only, for the season was long over. Even in this territory we found many former collection spots completely barren of *Zephyranthes* above ground.

The final highlight of the trip was finding the blue cenizo in bloom near Ciudad del Maiz. It was a beautiful sight. A different species from those seen in Texas and north Mexico and very rare, these compact bushes were masses of true royal blue flowers. More important, bloom had been under way long enough for a few ripe seed to be found. Thus, each trip has its compensations.

IN MEMORIAM—GEORGE HOWARD HAMOR (1887-1962)

The members will be saddened to hear that George Howard Hamor died at Homestead, Fla., May 9, 1962. He was helpful to the other members of the Society in obtaining stock of *Zephyranthes bifolia*, and he was the first to establish the native habitat of this species (see *Herbertia* 9: 60—62, 1943). He also contributed notes on *Pyrolirion flava* (see *Herbertia* 12: 136—137, 1945). See *Brittonia* 5: 204—207, with portrait, 1963, for a brief biography.

IN MEMORIAM—WILLIAM P. BAIN

We are sad to record the death of William P. Bain on December 3, 1962, at Mobile, Alabama. He was an accredited Official Amaryllis Judge, and a great amaryllisarian who worked with his wife on the favorite plants for many years. At his death they were cultivating about 300 potted Dutch named hybrids. His widow, Mrs. Bain, will carry on with Amaryllis.

MRS. A. C. PICKARD HONORED

In 1957 the Houston Amaryllis Society was organized with Mrs. A. C. Pickard as founder and first president. The objectives of the Society are "Knowing, Growing, Showing and Sharing." The activities of the Society have very greatly stimulated interest in Amaryllis in the Houston area. Realizing that Mrs. Pickard has been responsible in great measure for this progress in the appreciation of Amaryllis, she was awarded a Life Membership in the Houston Amaryllis Society and a handsome engraved bronze plaque for her loyalty and faithful service to the organization in 1963.

Mrs. Pickard is the Official Amaryllis Instructor for the Houston Area, and has formed the Houston Council of Judges for the Houston Amaryllis Society. Mrs. Pickard is also a member of the National Amaryllis Judges Council, which includes the Official Amaryllis Judges from all the regions of the United States. In recognition of her services on the National level, the other members of the Houston Amaryllis Society voted her a Life Membership in the American Amaryllis Society, which is affiliated with the American Plant Life Society.



Fig. 2. Presentation of the 1963 William Herbert Medal to Mr. W. D. Morton, Jr., by Mrs. A. J. Haydel.

PRESENTATION OF HERBERT MEDAL TO W. D. MORTON, JR.

Mr. W. D. Morton, Jr., Registrar of the American Amaryllis Society, which is affiliated with the American Plant Life Society, was presented the Society's William Herbert Medal for 1963 for his outstanding contributions toward the advancement of Hybrid Amaryllis as reported in the 1963 Amaryllis Year Book.

The award was made at a dinner in Lenfant's Restaurant sponsored by the Garden Circles Amaryllis Club, Saturday night, Jan. 20, 1963, which was also attended by members of the Men's Amaryllis Club of New Orleans. Mrs. A. J. Haydel, a national amaryllis judge, and former president of the Garden Circles Amaryllis Club, made the presentation. She also read the citation from National Headquarters of

the American Amaryllis Society, affiliated with the American Plant Life Society.

TRAUB'S "THE GENERA OF AMARYLLIDACEAE"— A REVIEW

WYNDHAM HAYWARD

An essential tool for the advanced research worker and a helpful and interesting guide for the amateur fancier in the Amaryllis family of bulbs has at long last arrived in Dr. Hamilton P. Traub's new monograph on "The Genera of Amaryllidaceae." (American Plant Life Society, Box 150, La Jolla, Calif., 1963, 85 pages, paper-board covers, price \$5.00.)

It is no discredit to Dr. Traub to say that this work is long overdue, has been for many years, in fact is the only monograph on the Amaryllids in English since Baker's "Handbook of the Amaryllaceae" published in 1888, now long out of print and very scarce, occasionally found in European catalogues at \$25 per copy or more. It supplants, of course, the Pflanzenfamilien monograph in German on the Amaryllidaceae by Pax and Hoffmann, latest edition, about 1930.

No complete monograph of *Amaryllidaceae*, species as well as genera, has been attempted since Baker's Handbook, and that is one of the next things on Dr. Traub's agenda, as he has recently outlined. Besides the Pax-Hoffmann work and Baker there is only William Herbert's limited volume on the Amaryllidaceae which appeared in 1837.

This new "Genera of Amaryllidaceae" is the fruit of half a century of Dr. Traub's study, wisdom and judgment in the field of his favored bulb family. The grouping of this family which he has presented in this work provides the most modern and scientifically conceived treatment of this horticulturally important segment of plant life, and will raise the eyebrows of even the most up-to-date taxonomists in some regards. It will furnish the means to a better understanding of the relationships within this major family for the new student as well as explaining many perplexing problems which the veteran trained plant scientists have encountered. One may say that a true and logical concept of modern Amaryllis family fundamentals cannot be reached without reference to Dr. Traub's latest work.

EDITOR'S MAIL BAG

Mr. James T. Potter, 18 Rowan Place, Doubleview, Western Australia, writes under date of May 5, 1963, that he is interested in the breeding of *Amaryllis* and other amaryllids, and would be pleased to correspond with breeders in the United States and elsewhere. He is interested in exchanging Blandfordias and other Australian wild flowers,

and various amaryllids which he has under culture, for *Amaryllis* and other amaryllids.

Your editor enjoyed a visit from Mrs. Walter D. Wells, Sr., Houston, Texas, of the Greater Houston Amaryllis Club; and Mrs. Esther Harris, of Riverside, Calif., on July 8, 1963.

Dr. Paul Carpenter Standley, born 1884, noted authority on the tropical flora of America, died June 2, 1963, at Tegucigalpa, Honduras.

IN MEMORIAM—CECIL AND ETHEL O. HOUDYSHEL

It is with the deepest sadness that we report the death of Cecil Houdyshel and his wife, Ethel O. Houdyshel. Mr. Houdyshel died on Thursday, May 7, 1964; his wife had died on February 17, 1964. Mr. Houdyshel received the WILLIAM HERBERT MEDAL in 1938 (see HERBERTIA 1938, pp. 70-75, for his biography).

The members will be pleased to hear that Mrs. Virginia L. Richter, Mr. Houdyshel's grand-daughter, and her brother, Mr. Gordon W. Brooks, will continue the Houdyshel business uninterrupted at 1412 3rd St., La Verne, Calif. Mrs. Richter reports that they will miss her grand-father's ready wit, advice and knowledge.

LINEAGICS

"Lineagics", by Hamilton P. Traub, 145 pages, 8 illustrations, \$5.00 postpaid, is now available. This is a brief outline text which was prepared for those members of the Society who are interested in what was formerly known as biosystematics, the science concerned with the grouping of organisms into lineages. The text is divided into four parts: (a) the history of lineagics, and lineagics as an integrated science; (b) basic lineagics; (c) applied lineagics, and (d) research methods in lineagics. This outline text may be obtained from the Executive-Secretary, Dr. Thomas W. Whitaker, Box 150, La Jolla, Calif.

1. REGIONAL ACTIVITY AND EXHIBITIONS

THE PALESTINE (TEXAS) AMARYLLIS SOCIETY

MRS. ARCOLA N. HERRINGTON, *Secretary*

The Palestine (Texas) Amaryllis Society was organized as an affiliate of the American Amaryllis Society on January 8, 1963 with five members which has grown to ten members at this writing (Aug. 18, 1963).

The members meet every first Tuesday at 3 p. m. at the home of one of the members. At each meeting the topic for discussion is some phase of Amaryllis breeding and growing. Light refreshments are served. During the autumn we will have speakers at some of the meetings. We study the Amaryllis Manual by Dr. Traub, and follow the directions given by various dealers in Amaryllis. We have completed our new Year Book and these will be presented to each member. We are enthusiastic about our future plans.—839 *Tennessee Ave., Palestine, Texas.*

SAN ANTONIO JUDGES COUNCIL ORGANIZED, 1963

Mrs. Robert E. Herold, 203 Cromwell Dr., San Antonio, Texas, reports that the San Antonio Judges Council of Nationally Accredited Amaryllis Show Judges was organized on September 24, 1963; Pres., Mrs. Edward Story, V-Pres., Mrs. Robert E. Herold, Sec.-Treas., Mrs. Robert H. Parkinson. She also reports that an Amaryllis Society will be organized on a later date.

HATTIESBURG AMARYLLIS SOCIETY

MRS. R. A. FOWLER, *P. O. Box 670, Hattiesburg, Mississippi*

Our Amaryllis Show had to be canceled on account of the severe winter weather which damaged many of our bulbs. We are planning an Official Show for 1964. We have learned much about overwintering Amaryllis bulbs as a result of the extreme cold weather of the past two winters.

1963 AMARYLLIS SHOWS

In spite of the severe cold weather of the past two years, most of the local Societies were able to hold creditable Official Amaryllis Shows in 1963. These are grouped in the order in which they were held from March 30 to April 27-28.

OFFICIAL MEN'S AMARYLLIS CLUB SHOW, 1963

WALTER R. LATAPIE, *Show Standards Chairman*

The Men's Amaryllis Club of New Orleans held their Sixth Annual Show on March 30th and 31st, 1963. In spite of the second severe winter in the City of New Orleans large quantities of Amaryllis were exhibited. Comments continue to come in, indicating that we had again scored a huge success for our efforts.

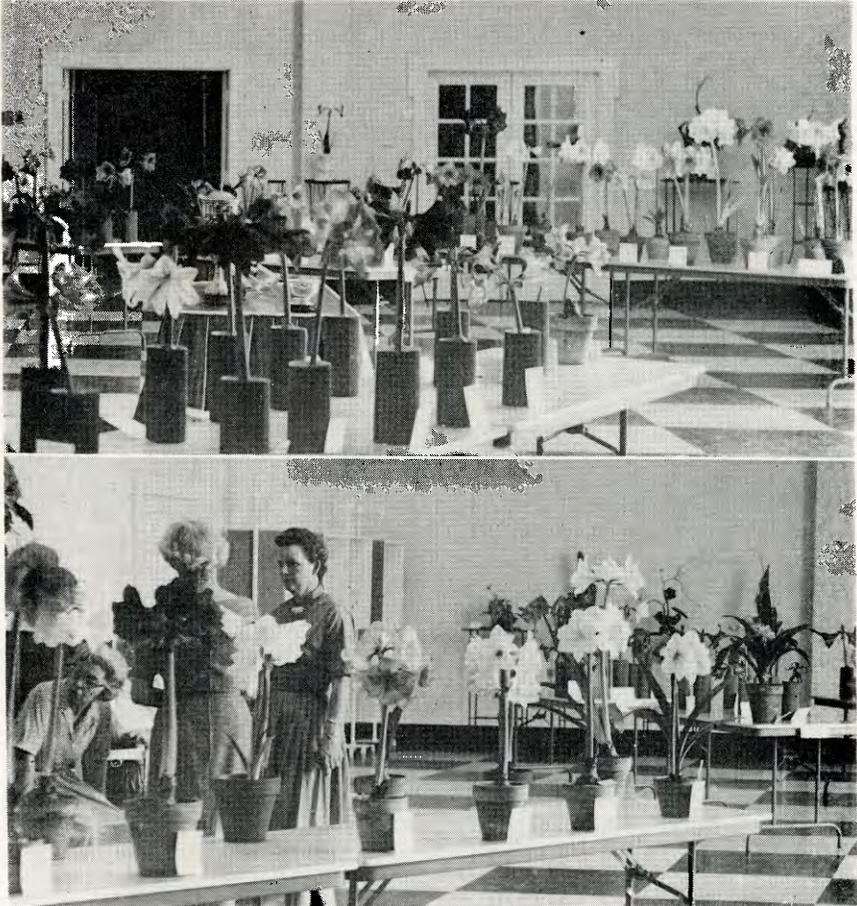


Fig. 3. Partial view of exhibits at the 1963 Official Men's Amaryllis Club Show, New Orleans, La.

Registered attendance was in excess of 600. As in the past, a number of out-of-town visitors also enjoyed our flowers. They came from Baton Rouge, Prairieville, Hansville, Luling, Thibodaux, Raceland,

Belle Chase, Bastrop, Shreveport, Covington, Destrehan, Port Sulphur, in Louisiana. From out of the state, Amaryllis lovers came from Mobile, Ala., Gautier, Miss., and Dothan, Ala.

Awards in the horticulture section were received by: A. J. Haydel, the Jessee Nursery award, Tri-color winner in Dutch Hybrid class; Melvin Zwicke, the Reuter Seed Co. and T. T. Swetman trophies for sweepstakes in Dutch Hybrid class; Mrs. John Klein, Jr., Newsham Bechel Tri-Color winner in American; Stephen Gasperez, The Men's Amaryllis Club award, most blue ribbons won by a member; and Santo Cuchinotto, sweepstakes winner, most blue ribbons, American.

Awards of Merit of the American Amaryllis Society were received by: Jerome E. Peuler, 'Love's Desire'; Melvin A. Zwicke, 'Golden Triumphator'; Melvin A. Zwicke, 'Siren'; Mrs. John Klein Jr., 'Halley' and Stephen Gasperez, 'Little Sweetheart'.

Preliminary Commendations were awarded to: Milo C. Virgin (2), Mrs. Walter Gonzales, and Stephen Gasperez.

Mr. Frederic Schmitz, Assistant Professor of Horticulture, Plaquemine Parish Experimental Station, Diamond, La., showed colored slides and held discussions on Amaryllis during the afternoon of Sunday March 31st.

Chairman of the Show was Vincent J. Peuler, and Co-Chairman was Barry W. Clark.

1963 COASTAL BEND AMARYLLIS SHOW

MRS. CARL C. HENNY, *P. O. Box 3054, Corpus Christi, Texas*

The Coastal Bend Amaryllis Society held their annual show in conjunction with the Lola Forrester Flower Show, in Corpus Christi, Texas, March 30th and 31st, 1963. The Theme of the flower show was "Heaven's Above—Zodiac".

Mrs. Rudolph Studer, staging chairman for the Amaryllis Society, prepared twelve posters depicting all the signs of the Zodiac, with planting instructions for each period of time. She also displayed large oil paintings of several types of hybrid amaryllis which helped to make the display more attractive. Mrs. Studer, being an artist, painted these pictures in oil from slides which were taken of the amaryllis while in bloom.

Mrs. L. Materne was awarded the (Ludwig Cup) Ludwig's Challenge Trophy for her display of Ludwig's Streaking Stripes—potted bulb—which received the highest score in the potted plant section of the Ludwig bulbs exhibited. Mr. Reed Rogers received a Silver Trophy for 'Ludwig's Dazzler', highest scoring cut scape in the registered amaryllis section.

Only 94 specimens were entered this year, due to reverse weather conditions in this area. Corpus Christi suffered five northers of freezing and below freezing temperatures, which damaged and retarded many of our plants. Therefore, our society did not have National Judges

to attend the show to judge our specimens, as there were few which were worthy to be judged. Local judges judged our entries for the show. We hope that we will have better luck with our entries during the coming year—spring 1964.

FIRST OFFICIAL SHOW, GREATER HOUSTON AMARYLLIS CLUB 1963

MRS. W. S. WHEELER, *President, 4506 Bellaire, Bellaire, Texas*

The Greater Houston Amaryllis Club of Houston, under the chairmanship of Mrs. Walter D. Wells, Sr., presented its First Annual Amaryllis Show of April 6-7, 1963 in the Garden Center.

The theme of the show was "Amaryllis on Tour" honoring our neighboring Gulf Coast clubs.

Seven arrangements were displayed on pedestals by:

Mrs. Jesse Haver, honoring Corpus Christi, "Sailing Sailing"
 Mrs. B. A. Russell, honoring Dallas, "Big D"
 Mrs. Z. K. Toliaferro, honoring Hattiesburg, Miss., "Plantation Days"
 Mrs. Walter D. Wells, Sr. honoring Mobile, Ala., "A Southern Port"
 Mrs. Henrietta Taylor honoring New Orleans, La., "The Crescent City"
 Mrs. R. C. Willie, honoring San Antonio, Texas, "A Japanese Garden"
 Mrs. Clint R. Black, honoring Valdosta, Georgia, "Southern Hospitality"

All arrangements were made using one or more amaryllis. They added much beauty to our show.

The judging was done by official Amaryllis judges, and ten silver trophies were awarded to exhibits that merited them. Award of Merit for 'Floriade' (Warmenhaven), the most outstanding potted horticultural specimen of the show, was made to Mrs. Walter D. Wells. Also, a silver trophy was awarded to Mrs. Wells. Other top awards were made to Mrs. W. S. Wheeler, Mrs. Clint R. Black, Mrs. R. A. Fawcett and Mrs. Charles Pease.

An important non competitive feature of the show was the educational display on the growing of *Amaryllis* from clone with ripened seed pods to blooming clone step by step. This display created quite a lot of interest and comments from the newly interested public. Members of our organization gave first hand information to our interested guests on buying, and from what nursery in Holland the bulbs may be purchased.

Amaryllis lover members of Amaryllis clubs from cities in the surrounding area, along with many local enthusiasts, viewed the show and expressed their pleasure and congratulations for one of the outstanding amaryllis shows in Houston.

GARDEN CIRCLES AMARYLLIS CLUB
OFFICIAL SHOW, 1963

MRS. A. J. HAYDEL, 516 Gordon Ave., New Orleans, Louisiana 70123

The Garden Circles' Amaryllis Club of New Orleans is affiliated with the American Amaryllis Society, also a member of The Federated Council of New Orleans Garden Clubs, The Jefferson Parish Council of Garden Clubs and the Louisiana State Federation of Garden Clubs.



Fig. 4. Presentation of the Tricolor Award to Mr. James E. Mahan by Mrs. A. J. Haydel at the 1963 Official Amaryllis Show of the Garden Circles Amaryllis Club.

Mrs. A. J. Haydel was show Chairman, Mrs. John Klein, Jr. was honorary Chairman.

The show was judged by accredited Amaryllis judges.

The Garden Circles' Amaryllis Club sponsored the Official Horticulture Amaryllis Show at Reuter's Seed Co. 320 N. Carrolton Ave. The

show was opened to the public Saturday April 6 from 3 to 5 P.M. and Sunday April 7 from 8:30 A.M. to 5 P.M.

The Tri-Color was won by Mr. James E. Mahan on his "Queen of the Pinks". Another top winner in the show was Miss Antoinette Weed who won the Harry St. John award for the most outstanding registered American Specimen. Mr. Santo Cuchinatto, recipient of the Sweepstake award for the most blue ribbons in the American Horticulture Division. Mrs. Walter R. Latapie won the sweepstakes award in the Dutch Horticulture. Mrs. Harry St. John for the best American Seedling.

The Preliminary Commendation Awards from the American Amaryllis Society went to Mrs. Harry St. John, Mrs. A. J. Haydel, Mrs. Lewis Lloyd, Mr. Milo C. Virgin and Mr. E. M. Beckham.

The Awards of Merit from The American Amaryllis Society went to Mrs. A. J. Haydel, Mr. James E. Mahan, Mr. Melvin Zwicke and Mr. E. M. Beckham.

Blue Ribbon winners in Dutch Horticulture were Mrs. Miriam G. Authement, Mrs. A. Autry, Mrs. A. J. Haydel, Mrs. Harris Hebert, Mrs. John Klein, Jr., Mrs. Walter R. Latapie, Mrs. Lewis Lloyd, Mr. A. R. Oddo, Mrs. W. J. Perrin, Mr. E. M. Beckham, Mr. Barry W. Clark, Mr. James E. Mahan, Mr. George Mertz Jr., Mr. Milo Virgin and Mr. Melvin Zwicke.

Blue ribbon winners in the American Horticulture Division were Mrs. Harris Hebert, Mrs. John Klein Jr., Mrs. Miriam G. Authement, Mrs. Harry St. John, Mrs. Walter R. Latapie, Miss Antoinette Weed, Mrs. Charles F. Durr, Mr. Santo Cuchinatto and Mr. Toby Mullen. Entry was open to all Garden Clubs and Non Gardeners.

There were six invitational arrangements displayed on pedestals by non-competitive guest artists who were Mrs. V. P. Grundmann, Mrs. F. J. Cuguet, Mrs. Robert Larue, Mrs. Russell Kullman, Mrs. Wayne E. Williams and Mrs. Tully Ward.

There were 250 entries in Horticulture and over 750 attended the show. There were a number of visitors from out of State.

The all Horticulture Amaryllis Show of New Orleans was displayed by Divisions 1 to 9 and by Growers.

VALDOSTA (GA.) OFFICIAL AMARYLLIS SHOW, 1963

GUY RICE, 606 Gornto Road, Valdosta, Georgia

The Official Valdosta Amaryllis Show of 1963, sponsored by the Men's Garden Club of Valdosta, was held on Saturday-Sunday, April 20 and 21, 1963. Mrs. Richie Rosa of Tallahassee had the best horticultural entry—a huge pot of white Amaryllis in full bloom, which was held at the Valdosta Garden Center auditorium. This is the 7th show staged in cooperation with the American Amaryllis Society.

The judges were well pleased with the quality of the Show in spite of the fact that due to the severe cold of the past winter many fine

bulbs had been lost. There were not as many entries under named clones, but the quality of all of the blooms was excellent. Growers from several south Georgia and north Florida cities brought their blooms to the show.

Winners in the Court of Honor, the top entries were, in addition to Mrs. Rosa, William Hart, with 'Picotee' for the best named clone in a pot; Mrs. Willis Register, with a light red bloom in a pot; Mrs. Mary Newton, with a red bloom with star in a cut scape; Dr. Gregg Smith, with a white with red stripe for the best entry in the hybridizer's class, cut scape; and Mrs. Leonard Mederer, with an orange red seedling, for award in hybridizers class, in a pot.

Many other blue ribbons were awarded. Robert D. Goedert, of Jacksonville, Fla., received a green ribbon for his outstanding commercial exhibit.

1963 OFFICIAL HOUSTON AMARYLLIS SOCIETY SHOW

MRS. A. C. PICKARD, *Official American Amaryllis Society Show Standards Chairman, 1702 N. Blvd. Houston 6, Texas*

The spacious Houston Garden Center auditorium was turned into an Amaryllis heaven on April 21, as more than 1000 Sunday visitors toured the Third Official Show of the Houston Amaryllis Society.



Fig. 5. Trophy table and winning award specimens at the 1963 Official Houston Amaryllis Society Show.

Modern arrangers interpreted the theme of the show "Forecast of the Amaryllis" with five classes, namely "Signs of the Zodiac," creating exciting experiences in color sensation with Amaryllis flowers predominating.

There were invitational classes in Artistic and Horticulture classes. This was a standard competitive specialty show, judged by National Accredited Flower Show Judges in the Artistic Division, and the Horticulture sections judged by Accredited National Amaryllis Judges.

The Educational section included the Life Cycle of *Amaryllis* from seed to clone and all methods of vegetative propagation with examples of planting and information thereof.

Five American Amaryllis Society awards in Horticulture were awarded to the meritorious exhibits. In addition to the ribbon and awards of merit, five silver perpetual trophies were awarded to their winners. These trophies are perpetual and may be kept permanently by exhibitor when won two (2) consecutive years or three (3) times at intervals.

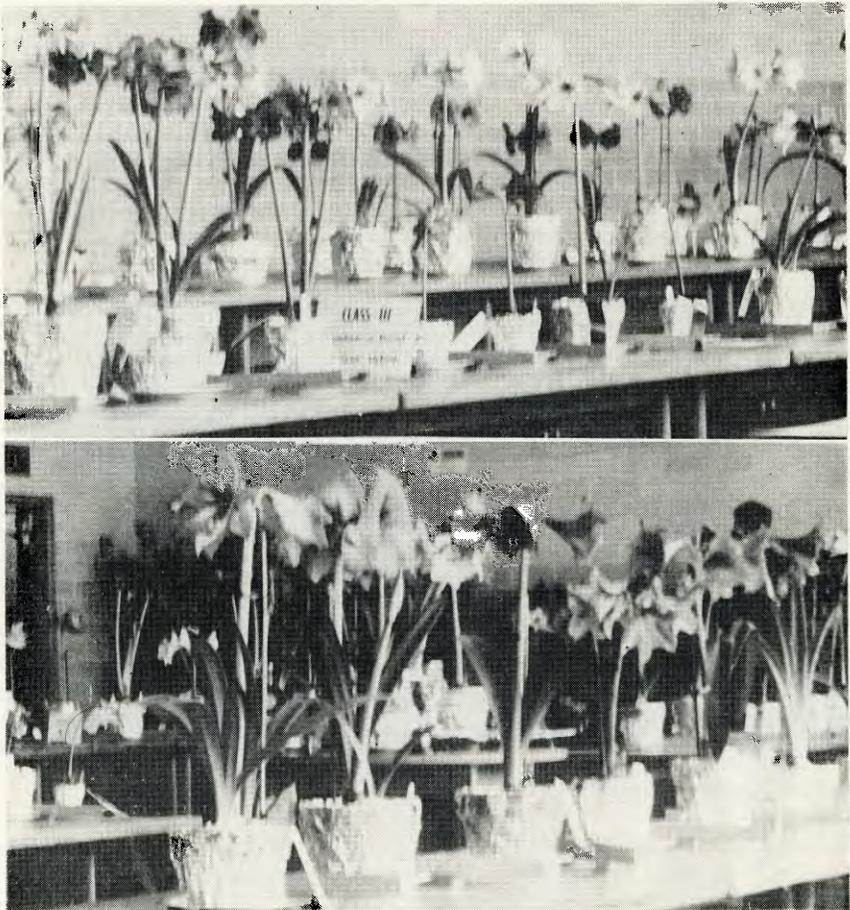


Fig. 6. Partial view of exhibits at the 1963 Official Houston Amaryllis Society Show.

Top award winners were Mr. Kermit Warnasch, Mrs. A. C. Pickard, Mrs. M. E. Shelton. A number of blue ribbons were given in the different divisions and classes as the Houston Amaryllis Society followed the official rules of the "American Amaryllis Society."

Awards of Merit and Preliminary Commendations were given as follows: 'Anna Paulowna' (WSW), A. M.; 'Beacon' (Warm.), A. M.; and 'Bouquet' (Lud.), A. M., Mrs. A. C. Pickard; 'Home Decorator' (Lud.), A. M. & Ludwig Cup, Mrs. M. E. Shelton; 'Marion' (WSW), highest A. M., Mr. Kermit Warnasch; 'Sight Show' (Lud.), A. M., and 'Superba' (VM), A. M., Mrs. A. C. Pickard; and Breeders Class, Dutch Seedlings, P. C., Mr. Kermit Warnasch.

In the Artistic division, Mrs. C. R. Swanson took top honors with Mrs. W. L. Offenbacher second. Guest entries were given special awards.

Mrs. W. W. Cone, General Show Chairman, was elected President for 1964.

11th OFFICIAL GREATER GULF AMARYLLIS SHOW, 1963

WILMER R. SMITH, *General Show Chairman, Mobile, Alabama*

The Amaryllis Society of Mobile staged their Eleventh Annual Greater Gulf Amaryllis Show April 27 and 28, 1963 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 On The Gulf" which was carried out by having a large sail boat surrounded by baskets of *Amaryllis* as the focal point.

Entries in the show were as follows: American Potted Amaryllis, 48; American Cut Amaryllis, 59; Dutch Potted, by color, 12; Dutch Potted by name, 68; Dutch Cut, by color, 28; Dutch cut by name, 23; Seedlings, potted, 32; Seedlings, cut, 27; and the following single bloom Amaryllis: Dutch by name, 36; American by name, 13; Unnamed Dutch, 22; Unnamed American, 74. Hobby Tables 3. This made a total of 445 entries in the Horticulture Division. We also had 46 Artistic Arrangements and 27 Art Entries. These entries made a grand total of 518 entries in the show.

The show also had four educational tables which created a great deal of interest. Attendance for the two days was well over 3,000 which included many visitors and friends from nearby towns and cities. One thousand program books were given away.

Another feature which was repeated this year was that people attending the show could deposit self-addressed stamped envelopes for free seed when it was ready. We have mailed over four hundred of these envelopes and each one contained several dozen seed. Our program states the object of our show is to present a competitive display of *Amaryllis* that will stimulate and broaden interest in their growth, and to encourage those attending to grow and propagate *Amaryllis*

for their enjoyment and cultural benefit. We feel that by giving the seed this helps to carry out the object of the show.

This year we included another new section and that was the Single Bloom *Amaryllis*, with four classes, Dutch by name, American by name, Unnamed Dutch and Unnamed American. This added interest and we believe it will be even larger next year.

Eighteen accredited judges from Hattiesburg, Mississippi, Pensacola, Florida and Biloxi, Mississippi judged the show, and a total of twenty-two sterling silver awards were made. Mr. W. C. Strain acted as Master of Ceremonies and after making appropriate opening remarks assisted Mrs. A. B. Palmer, Chairman of Awards & Trophies in making the awards to the following:

Mrs. Gertrude Marshall of Gautier, Miss., was sweepstakes winner having won nine of the awards. Of the nine awards three were won by Mrs. Marshall for the third time and therefore became her permanent trophies. Her awards were as follows: winner of the most Blue Ribbons in Show, including Horticultural & Artistic Arrangement Divisions; most Blue Ribbons in Horticultural Division; most Blue Ribbons in Dutch Named Varieties, most Blue Ribbons in Single Bloom named Division; most Blue Ribbons in Combined Dutch Hybrid Potted & Cut *Amaryllis* Divisions; most Outstanding Horticultural Potted Bulb Specimen of Dutch *Amaryllis* in Show; most Blue Ribbons in Dutch Hybrid Potted *Amaryllis* Division; most Outstanding Horticultural Cut Specimen of Dutch *Amaryllis* in Show; most Blue Ribbons in Dutch Hybrid Cut *Amaryllis* Division.

Mrs. Palmer awarded trophies to other winners as follows: Mrs. J. C. McRae, winner most Blue Ribbons in Artistic Arrangement Division. Mr. Joe Brummitt, most Outstanding Horticultural Potted Bulb Specimen of American Hybrid *Amaryllis* in show. Mrs. W. A. McCollum, most Outstanding Artistic Arrangement of *Amaryllis* in Show. Mrs. Virginia Sherwood for best Painting of *Amaryllis* (Adult Division). Phillip Dubois, best Painting of *Amaryllis* in Junior Division.

The Rose Garden Club was winner in the Invitational Class. Mrs. Melvin Sanders most Artistic Composition of *Amaryllis* in Show. Junior Trophy for most Blue Ribbons was won jointly by Miss Darby Hickson and Miss Janet McRae. Mrs. R. E. Chason most Blue Ribbons in the Single Bloom unnamed division. Wilmer R. Smith won for the most outstanding Hobby Collection of *Amaryllis* and also for the most Blue Ribbons in the Unnamed Cut Seedlings.

Mr. W. C. Strain awarded to Mrs. A. B. Palmer two trophies, one for the most Outstanding Horticultural Cut Specimen of American Hybrid *Amaryllis* in Show and the other for the most Blue Ribbons in the unnamed Potted Seedlings.

At the conclusion of the ceremonies President Dewey Hardy and Show Chairman Wilmer Smith expressed their appreciation to the membership and show entrants for their wonderful cooperation and assistance in putting on a very successful show. Co-Chairmen serving

with Mr. Smith were: Mr. J. C. McRae, Mr. Joe Brummitt, and Mr. S. A. Shannon.

At our May 1963 meeting officers were elected to serve for the 1963-1964 term and they are as follows: *President*: Mr. Wilmer R. Smith, Forest St., Chickasaw, Ala. Gl 6-7193; *Vice-Pres.*: Col. Robert Pollock, Brookley AFB, Mobile, Ala. He 8-6011; *Treas.*: Mrs. A. B. Palmer, 301 Hillside Drive, Chickasaw, Ala. Gl 6-7940; *Secy.*: Miss Mildred Laughlin, 701 Dauphin Is. Pkway, Mobile, Ala. 473-7448; *Historian*: Mrs. H. A. Allen, 210 Alpine, Chickasaw, Ala. Gl 6-8525.

We shall resume our regular monthly meetings in September on 4th Monday night, 7:30 P.M. at Garden Center, 1835 Dauphin St., Mobile. For our summer activities we shall have our annual picnic on July 13 at the Municipal Park.

AMARYLLIS JUDGES CERTIFICATES

Since the last report in the 1963 Amaryllis Year Book (page 35), the following named Amaryllis Judges Certificates have been issued by the American Amaryllis Society—

118. Mrs. Isabel Anderson, A Bar A Ranch, Medina, Texas (Horticulture only).
119. Mrs. E. M. Anderson, A Bar A Ranch, Medina, Texas (Horticulture only).
120. Mrs. Frank Hopwood, 620 Patterson Ave., San Antonio 9, Texas (Horticulture only).
121. Mrs. Bob E. Herold, 203 Cromwell Dr., San Antonio 28, Texas (Horticulture only).
122. Mrs. Paul A. Kane, 1001 McIlwaine St., San Antonio 1, Texas (Horticulture only).
123. Mrs. Larry H. Miller, 115 W. White Ave., San Antonio 14, Texas (Horticulture only).
124. Mrs. Sam C. Montgomery, 140 Harriet Dr., San Antonio 16, Texas (Horticulture only).
125. Mrs. Robert H. Parkinson, 1623 Hillcrest Dr. E., San Antonio 28, Texas (Horticulture).
126. Mrs. Edward T. Story, 307 Northhaven Dr., San Antonio 29, Texas (Horticulture only).
127. Mrs. John C. Watkins, 1910 W. Magnolia Ave., San Antonio 1, Texas (Horticulture only).
128. Mrs. C. R. Frampton, 803 Worthshire Rd., Houston 8, Texas.
129. Mrs. Clint R. Black, 1832 Forest Hill Dr., Houston, Texas 77023.
130. Mrs. Christine Hymers, 3403 Nottingham, Houston, Texas 77005.
131. Mrs. R. A. Wilder, 126 Whipple Dr., Bellaire, Texas.
132. Mrs. Sally Fox, 1527 Castle Court, Houston 6, Texas (Horticulture only).
133. Mrs. Charles H. Pease, P. O. Box 19265, Houston 24, Texas (Horticulture only).

AMARYLLIS EXHIBIT AT THE ATLANTA FLOWER SHOW, 1963

BECKWITH D. SMITH, 3479 Rockhaven Circle, N. E., Atlanta 24, Georgia

The Atlanta Flower Show Association presented their Seventeenth Spring Flower Show at Lenox Square, Atlanta, Georgia, which was held on the Mall in two large tents for horticultural exhibits, and in the Auditorium of Lenox Square for flower arrangements. Two days, April 17-18, 1963. The Show was held in conjunction with the National Convention of Federated Garden Clubs of the United States.



Fig. 7. First showing in the United States of Buller Hybrid Amaryllis at the Atlanta Flower Show, 1963. Mr. Beckwith D. Smith is in the foreground.

Twenty-three pots of A. C. Buller, Cape Town, South Africa *Amaryllis* were exhibited in bloom during the two day show under the Educational Division, which bulbs had been held in cold storage since the fall of 1962 for this purpose. Many expressions were heard from garden club visitors that the *Amaryllis* display was the "focal point" of the show. *Amaryllis* for the show were brought into bloom by Beckwith D. Smith.

THE HOUSTON JUNIOR AMARYLLIS SOCIETY

The Houston Amaryllis Society sponsors a Junior Amaryllis Society. The Houston Junior Amaryllis Society was organized August 23, 1963 (Friday), in the home of Mrs. W. W. Cone, president of the Houston Amaryllis Society.

Mrs. A. C. Pickard, founder of the Houston Amaryllis Society and now founder of the Houston Junior Amaryllis Society organized and

installed the first officers of this Society. Mrs. Pickard is a National Appointive Officer.

These officers will take office for two years:

President, David Koon
Vice-President, Dottie Pearle
Secretary, Debbie Stevenson
Treas., Robert Gunther
Cor. Sec., Bobby Pearle

There are seven members on Roll Call. This age group ranges from 8-14 years old. Three very interested mothers of the children attended



Fig. 8. Buller Hybrid Amaryllis in a group exhibited at the 1963 Atlanta Flower Show—colors: red, wine red, peach, salmon, rose, pink, bicolors, and white.

this meeting which showed interest in child development as gardeners. Mrs. E. E. Koon is Junior Club Chairman.

To be a Charter member one has the month of September to join. Closing date is September 30, 1963. The members of this group are from different areas in the city of Houston; this is not a neighborhood group of children.

Persons applying for membership should be gardeners or interested in becoming gardeners. This is considered a Horticultural Society Organization. Five meetings a year. The mothers suggested this due

to bringing the children. Meetings will be held in the evenings, 7 p. m.-8:30 p. m. This organization has no connection with school activities.

This organization is a member of the Texas State Garden Clubs, Inc. and National Council of Garden Clubs. The Junior Society will also include in their program all activities and procedures of a regular Junior Garden Club.

At the August meeting the Houston Junior Amaryllis Society met with the Houston Amaryllis Society and was formally introduced. On this date the children composed a constitution and by-laws, program, projects, etc., as would fit the group and their capabilities. The first Year Book will be ready for the September 30, 1963 meeting.

They will be included in the Spring Houston Amaryllis Society Official Show with a special place for their exhibits.

(CONTINUED from page 74.)

and with *Z. bifolia* have all failed. Pollen of *H. immaculatus* has not been available, nor has it been possible to cross back any of the seedlings on *H. immaculatus*. Even though we have the sterile form of *Z. bifolia*, this back cross was attempted and failed.

Many of the seedlings have set small offsets at the base of the bulb, but these have been strangely slow, even when removed from the mother bulb.

At this date we cannot report on the performance of this new hybrid under garden conditions. After the disaster of January, 1962 and the damage was discovered, all bulbs were potted as the original six had been, and kept in the greenhouse. We dislike the risk of planting them once more in the shade house (about two miles from our home), nor do we wish at present to trust them to the heavy soil in the garden, though we shall eventually do so.

Two attempts of a repeat cross failed in 1962, probably because improperly stored pollen was used, but we naturally wondered if our first cross was just a lucky one. This year, a heavy rain in late spring gave us a bonanza of flowers on *H. immaculatus* and *H. concolor*. This time we were prepared with lots of fresh pollen, for Morris has learned how to bring flowers on *Z. bifolia* almost at will, any time from late winter until fall. He keeps the pots very much on the dry side, then waters several days in a row, rather heavily.

The following successful crosses were made: *H. immaculatus* x *Z. bifolia*, *H. concolor* x *Z. bifolia* and *H. concolor* x *H. immaculatus*. Careful emasculation was carried out in all cases. From general signs and appearances of the growing seedlings, I would say that all three crosses are true hybrids. X. *Sydneya morrisii* was not just a lucky "take," after all.

2. LINEAGICS

[DESCRIPTION, CLASSIFICATION, EVOLUTION, AND PHYLOGENY
OF LINEAGES]

A NEW PORCELAIN PINK LYCORIS

WILLIAM LANIER HUNT

For ten or fifteen years, I have been climbing up and down a 75 foot hill in the heat of July, August and September to make crosses in the lycoris beds in my wilderness arboretum. As other victims know, the



Fig. 9. A pink-flowered *Lycoris*, observed in the garden of William Lanier Hunt at Chapel Hill, North Carolina in 1963. This bulb as well as *L. radiata* were intermixed in a shipment of *L. elsiae*.

combination of 90 degree heat and a bad case of lycorisitis produces definite hallucinations. On certain days, I have been able to conjure up the image of a bright pink—instead of fire red—*Lycoris* seedling as big as *L. elsiae*. This vision has come to me for so many years, now, that when, on September 4th, 1962, I went down to the lycoris beds and saw right before my eyes the very thing about which I had been dreaming, I thought for a moment that heat had got me.

Fortunately for Southern gardeners, this *Lycoris* queen was no illusion. She stood on a 26-inch scape. Her five flowers measured over eight inches across! In a bed of *L. elsiae*, she stood out like a pink gem.

Individually flowers of this new lycoris are wider and the tepalsegs longer even than those of *L. elsiae*, making it a dramatic flower indeed. The color is a bright, slightly dusky pink: "Porcelain Rose", H.C.C. 620 down the middle of the tepalsegs, with a band of 620/1 on each side. *L. elsiae* is so delicate that it does not stand up to summer rains very well—especially in the hurricane season—but the new pink flower stood up well to an all-night downpour. Her color never faded until the last few days when it lightened slightly to a beautiful soft pink.

The appearance of this bright pink *Lycoris* in a shipment of *L. elsiae* and the occurrence of *L. radiata* in the same batch of bulbs (they bloomed at the same time, and, oh, how different they were!) seems to point to a possible *L. elsiae* x *L. radiata* cross. This was the very way I had contemplated creating this beauty. Has this wedding taken place in Japan whence these shipments come? Anyway, it might have taken at least five years to accomplish it from seeds.

Surely this experience and those of Mr. Caldwell, Mr. Morrison, Mr. Hayward, Mr. Houdyshel and others will make us all the more eager to import bulbs in quantity to see what we will get. Perhaps this large pink *Lycoris* has already appeared in someone else's collection. We hope so in order to get stock of it built up as fast as possible.

Foliage of the new flower was a little wider and a little bluer than that of *L. elsiae* and almost identical with that of the new creamy white described in PLANT LIFE, Vol. 17, No. 1, January, 1961 and poorly illustrated at pages 125-127; and again in this issue.

FURTHER NOTES ON A CREAMY WHITE LYCORIS

WILLIAM LANIER HUNT

In PLANT LIFE, Vol. 17, No. 1, Jan. 1961 at pp. 125-127, I wrote up a vigorous new creamy white *Lycoris* and published a poor illustration of it from a kodachrome. The plant which Mr. Caldwell describes in PLANT LIFE, Vol. 18, 1962 and illustrates at page 80 I believe to be the identical same plant.

In 1957, I sent a scape of this plant to Dr. Traub, and he made a botanical specimen of it and numbered the specimen #589 with the following description in his letter to me of Sept. 29th: "Tepaltube 18—18.5 mm. long (Reportedly as Dresden yellow)". I might add here that tepalsegs are 1 cm. wide.

My bulbs of this robust new *Lycoris* have increased both in pots and in the open. The foliage is of about the same degree of tenderness to cold as that of *L. elsiae*. Scapes are extremely robust. Frequently, they produce seven flowers to the scape, and the scapes are 19 inches and more tall.

Like Mr. Caldwell, I have tried pollen of everything I had in my garden or in the dessicator, in which I store and refrigerate pollen, on this new lycoris—all to no avail. This year, however, I do have seeds on the late fertile *L. radiata*. Will they be parthenocarpic?



Fig. 10. A creamy-white *Lycoris* as flowered in the garden of William Lanier Hunt, Chapel Hill, North Carolina, in 1963.

X CRINODONNA CL. 'DOCTOR STAFLEU'

HAMILTON P. TRAUB, *California*

In 1961 an outstanding clone of X *Crinodonna traubii* Moldk., bloomed for the first time. Such hybrids are the result of crossing *Brunsvigia* x *parkeri* Wm. Wats. ex Traub, and *Crinum moorei* and are notable in showing quite a range of variation. In contrast X *Crinodonna corsii* Ragion. ex Traub which result from crossing *Brunsvigia major* Traub (1963) and *Crinum moorei*, give relatively uniform progeny.

The outstanding X *Crinodonna traubii* Moldk., clone was again observed in the 1962 and 1963 flowering seasons and in each case came up to expectations. It was thus considered as a candidate for naming. It has been named in honor of the lineagist, Dr. F. A. Stafleu of the University of Utrecht, Netherlands.

X *Crinodonna traubii* Moldk., cl. 'Doctor Stafleu' (Traub, 1964)

The vegetative characters are similar to those previously described by Traub (1961) for X *Crinodonna traubii* Moldk.

The umbel is many-flowered; the individual flowers are slightly declined, funnel-shaped, fairly wide open, somewhat star-shaped; the lower half of the tepaltube is yellowish-greenish, white above to half the length of the tepalsegs; the upper half of the tepalsegs delicately painted pink—between rhodamine pink (HCC-527/3) and Persian rose (HCC-527/3)—delightfully fragrant; pedicels at anthesis up to 2.6 cm. long; ovary oblong, flattish, 2 cm. long, 6x8 mm. in diam.; tepaltube curved, somewhat triangular, 3 cm. long, 5x6 mm. in diam. (base), 10 mm. diam. (apex); tepalsegs lanceolate, apex acute to bluntly acute; setsegs 9.2 cm. long, 3 cm. wide; petsegs 8.5 cm. long, 2.4 cm. wide; stamens 2/3 as long as the tepalsegs, upper 1/3 pinkish; style longer than the stamens, somewhat shorter than the tepalsegs, upper 1/3 pinkish, deeper toward stigma which is deep pink, capitate.

Holotype: Traub No. 955 (TRA), cult. La Jolla, Calif. 9-15-63.

LITERATURE CITED

Traub, Hamilton P. The Genus X *Crinodonna*, 1921-1960—Catalog of X *Crinodonna* Cultivars. *Plant Life* 17: 65—74. 1961.

Traub, Hamilton P. *Brunsvigia major* Traub. *Plant Life* 19: 59. 1963.

THE ENIGMA OF THE CULTIVATED CRINUM KIRKII

L. S. HANNIBAL, *Fair Oaks, California*

For some years the writer has grown *Crinum kirkii*, or what has long been called *C. kirkii* in the south, along with *C. sanderianum* which seems to be a smaller form of the above *C. kirkii*. At no time has the writer been able to obtain seeds or viable pollen from either plant. Similar experiences have been reported from Texas and Louisiana. Inquiry concerning *C. kirkii* discloses that it is common to the Rift

Valley in Kenya and grows well above 7000 ft. there. Also, that the plant rarely produces offsets and is best established by seed. This statement by Lady Jex-Blake is somewhat in contrast to our experience as the local form produces frequent offsets.



Fig. 11. *Crinum kirkii* as grown by William Morris in Australia. It is typical of high elevation species and grows best when nights are cool.

The matter recently came to a head when William Morris submitted several bulbs found in a garden near Sydney, Australia, which were presumably *C. kirkii*, but had much larger bulbs and broader, less erect foliage. On checking with Baker's original description and colour plate (Bot. Mag. pl. 6512) of *C. Kirkii* we find that this Australian bulb and its foliage to be in close agreement. The bulb is globose and the foliage which is 10 to 15 cm. broad spreads in a semi rosette

from a very short neck. The adult leaves are relatively limp and droop upon the ground. They are not channeled.

In the light of this evidence it is possible that the so called *C. kirkii* in the United States are hybrids, and from the long slender channeled leaves we could suspect that *C. bulbispermum* is involved in the cross. Further investigation is necessary to confirm this, but in the verification of species there is no better proof than obtaining actual material from the wild. In this instance this should be done.

CRINUM FLACCIDUM AND A YELLOW FORM

A. R. R. HIGGINSON * and L. S. HANNIBAL

We have now grown and flowered several forms of *Crinum flaccidum* Herbert in the open for a sufficient length of time to be fairly familiar with most of the plant's distinct habits or features, several of which are well worth noting. The Darling River forms of north central New South Wales are probably better adapted to our Gulf states where summer rains occur, whereas the South Australian strains are ideally adapted to California's arid summer environment since the two climates are near identical. The superficial environment under glass or in Florida for a desert plant which normally experiences six inches of rain or less can cause a number of erroneous conclusions regarding these near unknown desert types. This is particularly true in reference to flowering, the Darling River and central desert forms flowers in late summer after the summer storms, but the South Australian form flowers in late autumn just preceding the winter rains. Most desert plants usually find it necessary to economize on foliage and we often find chlorophyll in petals and other floral parts. In *C. flaccidum* the flower buds are a vivid chlorophyll green until an hour or two before opening, then this green suddenly turns to a chartreuse, then amber, and finally to a white as the tepalsegs open up. In a greenhouse or on a warm evening the flowers usually open into a trumpet shape showing a curved tepaltube with declinate filaments, but when the temperature makes a decided drop of fifteen or twenty degrees as occurs in a desert at sundown the tepaltube becomes quite rigid and the tepalsegs assume an open patent position with spreading anthers.

Several other features are to be noted; in lieu of producing small offsets as occur with most Crinums, *C. flaccidum* splits rather suddenly into two plants in a manner similar to *C. asiaticum* or *C. pedunculatum*. Both the spreading of the anthers and splitting of the bulb are in my observation subgenus *Platyaster* features, however, a number of *C. flaccidum* forms have rather broad elliptical tepalsegs which appear contrary to the linear pattern prescribed for *Platyaster*. It is rather apparent that the identification key is in need of rectification.

The attractive yellow flowered form which comes from the rocky Pichi-Richi pass near Port Augusta in South Australia shows sufficient

* Deceased.

variation to be considered as a form. The color of the blossoms is rather an obvious feature. It is associated with the decomposition of the chlorophyll and may possibly occur due to the plant's adaptation to an alkaline soil of pH 8 or 9. The color is intermediate between a chartreuse green and dresden yellow (RHS 663/3 or/2 and 64/3 or/2). The color varies some from plant to plant, according to the age of the flowers, and according to the air temperatures. The deeper colors occur in cool weather. Secondly, the blossoms of the yellow form are about 60% the size of the type, have quite a pronounced elliptical tepalseg pattern, are prone to be quite patent with widely spreading anthers, and are inclined to develop quite a curvature to the tepaltube during the heat of the day. But the most distinctive of all features is the phototropic behavior of the scape and umbel which tends to face all of the blossoms into the sun and turn as does a sunflower. This particular behavior is not present in the other forms which tend to distribute the individual blossoms radially in the umbel and do not track the sun.

Other distinctions are that the filaments are yellow whereas those of the type are white, the style is amber whereas the type is purple in the upper portions, and only one or two blossoms open daily whereas the type opens two or three in a radial pattern. On the basis of the bulb and foliage there are no apparent distinctions, but the scape of the yellow form carries some rust-red pigmentation near the groundline whereas the other forms indicate only a slight trace of pigmentation. In most cases with other species the scape or bulb pigmentation is associated with plants having red or pink blossoms. However, there seem to be exceptions.

The Quirindi group of the Darling River *C. flaccidum*, which is the most easterly group thus far reported, is unique as far as variability of color and tepalseg shape are concerned. The colors range from white through pink to a wine red. This pigmentation is on the exterior of the tepalsegs. Tepalsegs may range from long slender ray-like to elliptical forms which are half as broad as they are long. We know of no other species with which this group of bulbs could have crossed naturally but if such a cross did take place in rather recent geological times then not enough time has elapsed for the genetic upset to become stabilized by natural selection. The diversity is rather fascinating. It is unfortunate that the imported plants do not tend to flower easily so we do not know if the group are entitled to the rank of form or not, but the plants do bear watching as the colored blossoms reportedly resemble magnolias.

FURTHER NOTES ON AMERICAN CRINUMS

MRS. CARL SHIRLEY, 1540 Forsythe Street, Beaumont, Texas

The notes will be arranged by collection dates. It appears that three different forms grow together since we have found them blooming at different times in the same places. There seems to be a slowing

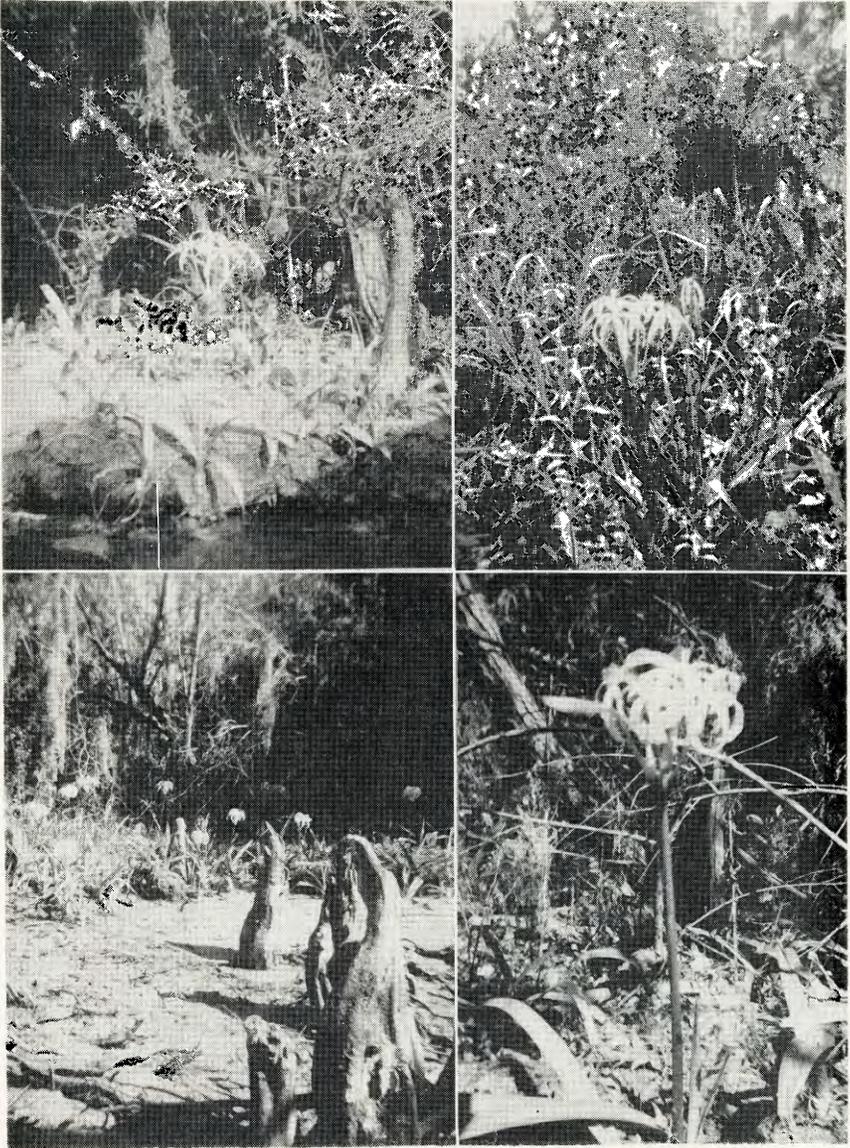


Fig. 12. Native American *Crinum*s observed on the banks of the Neches River, Beaumont, Texas. Upper left, weak grower, apparently *Crinum americanum*, photo July 5, 1963; upper right, robust grower, apparently *Crinum strictum*, photo Sept. 14, 1963; lower left and right, robust growers, apparently *Crinum strictum* var. *traubii*, photo Nov. 11, 1962. All photos by Mrs. Carl Shirley.

The Cypress (*Taxodium distichum*) "knees" in lower left, protruding from the ground, function in conducting air to the roots of the tree.

up between the blooming of each of the forms and this may account for their apparently not intermixing.

We have had an exceptionally dry summer in 1963, except for the 20-inches of water in our yard during the downpours caused by hurricane "Cindy" in September. They have not bloomed well. I plan to pot some and keep the moisture up and note if this will help. I am hoping to have blooms on the "pink" ones this year, and we are looking forward to our trip in November to see if we are able to find more of these plants.

July 5, 1963.—Collections were made in Jefferson County, about 2 miles south of State Highway 90 bridge across the Neches River, in a little bayou. These are some of the very small-type (see Fig. 12). Evidently they bloom at different times here too.

July 27, 1963.—There were not many blooms in evidence on this trip. It appears that *Crinum americanum* finishes its blooming season around the end of July. We originally believed that their blooming season began in July, but have since found some in bloom in mid-June. Thus the flowering season may start earlier.

August 17, 1963.—We found very, very few blooms on this trip. Seeds were mature from earlier blooms, and we collected some. They were large seed-pods with the antenna-like projection on top.

September 14, 1963.—We collected a few bulbs in bloom on this trip (see Fig. 12). These apparently are *Crinum strictum*.

October 26, 1963.—We collected some bulbs in bloom, but they were few and far between. We collected many seeds that apparently are *Crinum strictum* that bloomed in September.

November 11, 1962.—We found many blooms. This was the first time we were able to reach these. The water was at a very low level at that time of year, and had not been before, and has not since, in our memory, been that low. We were able to get some close-ups (see Fig. 12). Some of these were of the "pink-hued" kind. These very late flowering plants apparently are *Crinum strictum* var. *traubii* Moldk.

All of these different kinds—*Crinum americanum*, *C. strictum*, and *C. strictum* var. *traubii*—appear to grow together and bloom at different times. There is apparently a slowing-up of bloom between the flowering periods and this accounts for little if any interbreeding.

DECREASE IN SIZE OF HERBARIUM SPECIMENS DUE TO DRYING

HAMILTON P. TRAUB

In connection with the drying of *Hymenocallis kimballiae* leaf specimens on January 20, 1962, preliminary data on the decrease in width and length of leaf measurements were obtained. Duplicate leaf specimens of *Hymenocallis kimballiae* were dried between blotters separated by corrugated aluminum separators in the plant press with heat supplied from an air circulation furnace outlet. The measurements before and after drying are shown in Table 1.

Table 1. Decrease in size of herbarium specimens (leaves) of *Hymenocallis kimballiae* Small ex Traub due to drying.

	At start cm.	After drying cm.	Extent of decrease cm.	Percent of decrease
Width	8.6	7.7*	1.1	12.3
	10.4	9.1*	1.3	12.6
Length	82.5	79.2	3.3	3.0
	82.0	80.9	1.1	1.3

* It should be indicated that the extent of shrinkage at cross-sections was less than indicated.

The important conclusion from Table 1 is that the loss for percentage width is relatively much greater than for percentage length.

These results are to be considered as a preliminary sampling, and should be followed up with a larger number of measurements under specified drying conditions so that there could be available data that might be useful as the basis of allowances to be made when describing dried specimens.

HOW I PREPARE PLANT SPECIMENS FOR IDENTIFICATION

ALEK KORSKOFF, 2975 Shipping Ave., Miami, Florida, 33133

In preparing plant specimens to be sent in for identification, I prefer to use paper toweling (2 attached sheets). At the beginning I tried the plants with the flowers unopened, but found that it was difficult to make the identification on that basis. Therefore, I am now opening the amaryllid flower to show the relationship of the parts—tepaltube, tepals, stamens and pistil—so that the person who is to make the identification may have a better chance to make it. So, I cut the tepaltube, if there is any, on through the ovary and part of the pedicel—about half way. The flower is then spread out with the inside showing which exposes all of the parts for ready observation. If a second flower is available, one of these is placed so as to show the way it actually appears in bloom.

To hold the plant and flower in place, I use tiny strips of masking tape or similar tape, for holding down the unruly parts. I believe that it is best to tape every part which is mounted—roots, leaves, scape, and flower parts, before pressing.

If there is no facility for quick drying, the following procedure is followed: The specimen on the towel paper is covered with another layer of towel paper, a few layers of newspaper are placed below and above mounted specimen to be dried, and the whole is placed under a stack of heavy books. This works well for *Zephyranthes* and similar small amaryllids.

If the specimen is a large *Amaryllis* for instance, then the large parts such as the scape and the ovary, are split lengthwise and one half is discarded. This will aid in drying.

When sending in the specimen, if the plant is not too large and thick, it is even possible to fold the towel paper with mounted specimen

for insertion into an envelope, but better results are obtained by using two thicknesses of cardboard without folding.

REGISTRATION OF NEW AMARYLLID CLONES

*Mr. W. D. Morton, Jr., Registrar,
Mr. Edward Authement, and Mrs. Emma D. Menninger,
Assistant Registrars*

This department has been included since 1934 to provide a place for the registration of names of cultivated *Amaryllis* and other amaryllids on an International basis. The procedure is in harmony with the INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE (edition publ. 1961) 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, were published in 1960 Plant Life, with additions to both in Plant Life 1961. In Plant Life 1961, the first edition of THE GENUS X CRINODONNA was 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 named clones of *Amaryllis* and other amaryllids are eligible for awards and honors of the AMERICAN AMARYLLIS SOCIETY at Official *Amaryllis* Shows.

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.

THE TERM "STRAIN" DROPPED

In "The International Code of Nomenclature for Cultivated Plants," edition 1961, adopted by The International Commission for the Nomenclature of Cultivated Plants, Article 12, it is stated that the "practice of designating an improved selection of a cultivar (variety) as a strain or equivalent term is not adopted in this Code." In harmony with this provision, the American *Amaryllis* Society, affiliated with The American Plant Life Society, will discontinue using this term in all official publications.

Under Article 12, it is indicated that any such selection showing sufficient difference from the parent cultivar (variety) to render it

worthy of a name is to be regarded as a distinct cultivar (variety). Thus, *Amaryllis* clones when named should be referred to the proper Division, and should no longer be indicated as belonging to the "Mead Strain," or any other "strain." The breeder's name should be indicated in the registration procedure.

Cultivated *Amaryllis* hybrids are divided into eight main Divisions, and one Division to take care of any that do not fall within any of the seven, as explained in Traub—The *Amaryllis Manual*. 1958.—

Cultivated wild *Amaryllis*, or Division 1 (D-1)

Amaryllis 'Elegans Hybrids,' or Division 2 (D-2)

Amaryllis 'Belladonna Hybrids,' or Division 3 (D-3)

Amaryllis 'Reginae Hybrids' or Division 4 (D-4); subdivision D-4A and D-4B

Amaryllis 'Leopoldii Hybrids,' or Division 5 (D-5); subdivisions D-5A and D-5B

Amaryllis 'Orchid-Flowering Hybrids,' or Division 6 (D-6)

Amaryllis 'Double Hybrids,' or Division 7 (D-7)

Amaryllis 'Miniature Hybrids,' or Division 8 (D-8)

Amaryllis 'Unclassified Hybrids,' or Division 9 (D-9).

ZEPHYRANTHES X RUTHIAE CLONE 'ELLEN KORSAKOFF'

HAMILTON P. TRAUB, *California*

Under date of July 23, 1963, Mr. Alek Korsakoff, 2975 Shipping Ave., Miami, Florida, sent a dried specimen of a *Zephyranthes* hybrid he had duplicated. A similar cross had been made by Dr. Howard of San Antonio, Texas: *Z. rosea* x *Z. citrina*, and it was named *Zephyranthes* x *ruthiae*. Mr. Korsakoff repeated the cross Oct. 1, 1960, and first blooms were obtained June 21, 1962; only one seedling survived. However, this is a particularly beautiful hybrid and the clone has been named for the late wife of Mr. Korsakoff:

Zephyranthes x *ruthiae* cl., 'Ellen Korsakoff'

Bulb globose up to 1 inch in diam., brown to black, with neck about $\frac{1}{2}$ inch in diam.; offsets produced freely; prefers full sun; leaves 10—13" long, about $\frac{1}{4}$ inch wide, shape and color of *Zephyranthes rosea*; flowers buttercup yellow, (HCC-5/2), shaded on edges and tips with mandarin red (HCC-17/2) with center of Cyprus green (HCC-59); open to $2\frac{7}{8}$ inches wide; tepaltube about $\frac{1}{4}$ inch long; tepalsegs $1\frac{3}{4}$ inches long, setsegs, $\frac{1}{2}$ inch wide; petsegs $\frac{5}{8}$ inch wide; pedicel about 2 inches long; peduncle 9 inches long, round.

Holotype: No. 954 (TRA), cult. Alek Korsakoff, Miami, Florida, 7-23-63.

GROWING WORSLEYA RAYNERI FROM SEEDS

(In 1962, Mr. Robert D. Goedert, of Jacksonville, Florida, paid a collector to gather seeds of *Worsleya rayneri* from a mountain top in Brasil. These seeds were made available to his customers. It will be most interesting and helpful to record the successes and failures of those who experimented with these rare and valuable seeds. Two reports are included in the present issue. It is hoped that others will send in reports of their experiments for publication here without any special request from the editor.—*Editor*).

1. REPORT FROM SAN DIEGO, CALIF., by Burr Clouette

The seeds of *Worsleya rayneri* was very difficult for me to germinate. I had to obtain two batches of seeds, about 60 in all, to obtain only two plants, after losses suffered. Only one of these is thriving, and the other has lost its roots and leaves although the bulb seems to be sound.

I tried three different ways for the germination of the seeds: (a) planted in Black Magic planter mix—some germination, but all seedlings damped off; (b) floating seeds on mineral water (the kind for human consumption)—no germination; and (c) planted in vermiculite—about a fourth of the seeds germinated, 5 seedlings in all—only two seedlings have survived.

The sound seedling mentioned above is doing well and seems to be able to make a go of it. It is now almost a year old. The neck is a couple of inches long, and about as big around as a lead pencil. The bulb is about a half inch in diameter (see Fig. 22).

This seedling is planted in a square 2-inch plastic pot in Black Magic planter mix. I fertilize it and all of my other *Amaryllis* every two weeks with a half strength liquid fertilizer. Occasionally instead of a complete fertilizer, I use one of the so-called acid fertilizers which is low in nitrogen and high in phosphorus.

2. REPORT FROM LA JOLLA, CALIF., by Hamilton P. Traub

In 1940-1942, the writer obtained a few seeds of *Worsleya rayneri* from Rex Pearce Seed Company. These were germinated at Beltsville, Maryland. The writer noticed what appeared to be mycorrhiza on the roots of the seedlings, but before he could finish the research into this the war intervened. When he returned to Beltsville, Maryland, in 1945, the seedlings had died from neglect.

In 1962, he received seeds of *Worsleya rayneri* from Mr. Robert D. Goedert of Jacksonville, Florida. These were floated on tap water and every seed germinated. Mr. Clouette who tried mineral water had no success and this may be due to the mineral water that he used.

The seedlings are being grown in two potting mixtures: (a) equal parts of garden loam and granulated peat; and (b) Black Magic planter mix, and also a similar mix made by the writer. They are growing very slowly in both mixtures, but seem to be a little larger in the second. The seedlings are not higher than 2 to 2½ inches. Lately a slowly available fertilizer has been used and this appears to be effective. In

the second report, the writer hopes to record better success with this most difficult species.

CHROMOSOMES OF HEMEROCALLIS 'GEORGE GILMER'

WALTER S. FLORY, *Wake Forest College, Winston-Salem, North Carolina*

In the 1959 PLANT LIFE (15:28-29) Dr. H. P. Traub described a new yellow-flowered daylily under the title "The 'George Gilmer' Diploid Daylily."

Since that time the vigor of this clone—coupled with its lush growth, profusion of flowers, and other meritorious characteristics—has led to the suspicion that 'George Gilmer' might actually be a polyploid, perhaps a tetraploid, type. In the spring of 1963 Dr. Traub had a division of this variety sent to us and at his request we have examined the chromosomes of this plant.

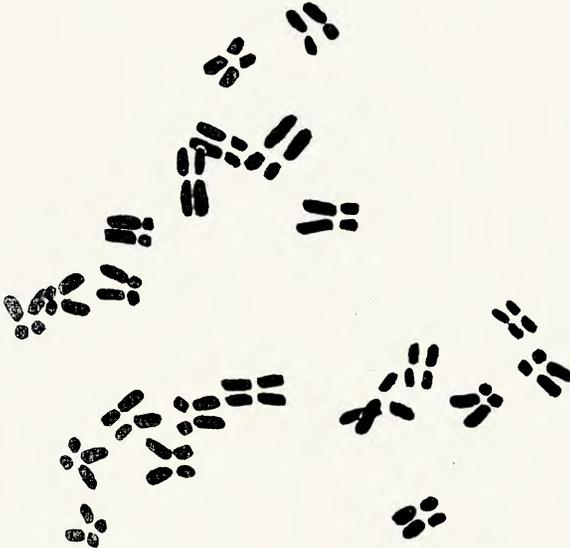


Fig. 13. Somatic chromosomes from a root-tip of *Hemerocallis* clone 'George Gilmer'. $2n = 22$. X 1500.

The 'George Gilmer' variety has 22 chromosomes and hence is a diploid as suggested in its original description. Thus while the variety does possess certain characters most usually found in tetraploid daylilies, these must here be attributed to either, or both, the type or the arrangement of genes present.

The accompanying figure (Fig. 13) depicts the somatic chromosomes at metaphase, as drawn by camera-lucida from a rather typical root-tip nuclear division. This root-tip had been treated for 4 hours in a 0.2% colchicine solution, fixed in acetic-alcohol (3:1) overnight and squashed

in 1% acetic-orcein. The chromosome pretreatment was sufficient to permit the two chromatids of each individual chromosome to separate slightly. The chromosomes range in length from about 3.3 to 6.7 microns, with the majority being from 4 to 5 microns long and having subterminal centromeres. At least one of the longest, and one of the shortest, chromosome pairs have median, or near median, centromeres.

AMARYLLID NOTES, 1964

HAMILTON P. TRAUB

Hymenocallis lobata Klotzsch, in Otto & Dietr., Allg. Gartenz. 11: 124. 1843, *nomen nudum*. This is indicated as a new species introduced by Ed. Otto from Caracas, Venezuela, which had not flowered in culture up to 1843. Thus, it was never described.

Nothoscordum inodorum (Ait.) Nichols (syn.—*N. fragrans* (Vent.) Kunth) has recently been collected for Robert D. Goedert, of Jacksonville, Fla., by his collector in Santa Caterina, Brasil. Local name "Acucena"; flowering range, March-January; alt. 63 m.; average range 20°—35° C. Growing in half shade, near the river.

This plant has proved to be a weed in California, but apparently is not so noxious in the humid East and Southeast. The flowers are small, whitish tinged light pinkish; delightfully fragrant.

"*Gardinia Bertero*", **nom. nudum**

"*G. purpurascens Bertero*", **nom. subnudum**

In 1929, Bertero published a "List of plants observed in Chile" in "Mercurio Chileno", nos. 12, 13 & 14, Mar., Apr., and May, 1829. In this there appeared a brief reference to "*Gardinia purpurascens Bertero*", "A bulbous plant resembling the *Allium* and the *Ornithogalum*, L., which I have seen only once in the inclosures along the road leading to Quinta, not far from the houses of Zamorano. It is called "mapolita azul", and merits cultivation in gardens on account of the elegant color of its flowers".

An article based on the above was published as "Liste des plantes observées au Chili, dans l'année 1828, par le Dr. Bertero (Mercurio Chileno, no. 12, 13 et 14, mars avril et mai 1829)" in "Bulletin des sciences naturelles et de géologie, rédigé par MM. Delafosse, Guillemin, et Kuhn. 2nd Section du Bulletin Universel, publié sous les auspices de Monseigneur le Dauphin, par la Société pour la propagation des connaissances scientifiques et industrielles, et sous la direction de M. le Baron de Férussac". v. 20. pp. 105—112. 1930. On page 112, there is a reference to '*Gardinia purpurascens*, Bertero. Cette plante est le type d'un nouveau genre, que l'auteur place entre L'*Allium* et L'*Ornithogalum*'".

This article was also translated into English by W. S. W. Ruschenberger, M. D., U. S. Navy, and sent to the editor of "The American Journal of Sciences and Arts", and was published in that publication in vol. 19: 63—70; vol. 20: 248-260; vol. 23: 78—96, 250—271. 1931—33. On page 81, appears the brief reference to "Gardinia purpurascens Bertero".

Although the generic name "Gardinia Bertero" was never published, it is listed in Index Kewensis, along with the species name, "Gardinia purpurascens Bertero". In Steud., Nom. ed. II. i. 667, it is listed as "Gardinia violacea Bert. ex Steud."

It is thus clear that the generic name "Gardinia Bertero" was never published and is thus a *nomen nudum*. "Gardinia purpurascens Bertero" is not validly published since it is not possible to identify it from the general reference. The new name for it by Steudel, without a description is also a *nomen subnudum*.

THE NAMING OF CRINUM GIGANTEUM

The amateur grower is usually confused about the application of the epithet 'giganteum' as applied to a certain average-sized *Crinum*. He believes that such a name has to refer to a 'very large' plant. However, according to the Code, no matter how inapt the name first given to a plant, it has to be used forever thereafter. Thus, the confusion about the name, *Crinum giganteum* which represents an average-sized plant. When confronted with a very large to them unknown *Crinum* species, some readers assumed that it was *Crinum giganteum* and wasted much time and effort trying to prove it. To settle this matter, the following quotation from Richard Anthony Salisbury (1761-1829)—The Genera of Plants; a fragment containing the Part of Liriogamae. 1866—is reproduced:

"... *Crinum giganteum* of Botanist's Repository was ridiculously so called, owing to the blunder of a Scotch Gardener, as it is by no means a very large plant; but a little before it was first figured by Thompson in 1798, I had proposed the name of *Gigas* for a true *Crinum* in the *Marchioness* of Rockingham's collection, just sent to her from Port Jackson, the *Pedunculatum* of Mr. R. Brown, which is really gigantic in size; and this Scotch gardener happening to be present in the stove at its christening, when he returned to Lee and Kennedy's, mistook one of the Sierra Leone plants given to them by the Marchioness, for a young sucker of that from Port Jackson, and told them it was so called, transforming by his Northern pronunciation *Gigas* into *Jagus*, in which latter way the name is printed in the work above mentioned; afterwards when the figure of the Botanist's Repository came out, Mr. Kennedy changed *Jagus* to *giganteum*. . . ."

Since 'jagus' is really a misspelling of 'gigas' and can be corrected according to the Code, the corrected first name of *Crinum giganteum* Andr. Bot. Rep. pl. 169. (1798) is really *Amaryllis gigas* Thompson, Bot. Displ. pl. 6. 1798, err. *Jagus*. But *Crinum gigas* Nakai (1930),

the giant *Crinum* on the Island of Iwo Jima, is a different plant—a form either of *Crinum asiaticum* or *C. pedunculatum*. Thus, *Crinum giganteum* Andr. (1789) has to stand, and *Crinum gigas* (Thompson) Dandy, in Jour. Bot. Lond. lxxvii. 64. 1939, err. *Jagus*, is a synonym.

COLOR FORMS OF CRINUM GOUWSII

In the 1950's, the writer obtained seeds of *Crinum gouwsii* Traub by crossing siblings because no seeds could be set by self-pollination. These seeds were distributed as widely as possible. A few were sprouted here. Three were set in a location where they would not be over-watered, and one seedling had been blooming since 1960. However, no seeds could be set by self-pollination. In June 1962, two seedlings bloomed at the same time, and it was possible to set seeds by crossing the two siblings. It was noted that the flowers of one of the seedlings were streaked a deeper purplish in contrast to the color noted in the original description (see Plant Life 38: 38—41, plate 8. 1954). Thus the seeds distributed should carry the genes for this deeper colored form and it should be possible to establish it as a true breeding form by inbreeding. This is a challenge to those who received seeds from this season's crop.

FRUITS AND SEEDS OF CRINUM BULBISPERMUM

The various varieties of *Crinum bulbispermum* differ in the capacity to produce seeds. The variety *roseum* does not flower as freely

Table 1. The fruits and seeds of *Crinum bulbispermum* var. *album*, from open pollination, 1962.

shape	Fruits		Number of seeds *
	length cm.	diam. cm.	
round	2.5	2.5	1
triangular, rounded edges	3.3	5.1	3
	3.5	3.5	5
irregular (lumpy)	4.8	5.2	8
	4.4	6.5	9
globular	6.5	7.0	42

* Seeds are round or roundish if solitary in the fruit; irregular, angled from pressure when several are in the fruit. Length and diameter of seeds:—

length cm.	diam.	length cm.	diam.
1.5	1.1	2.3	3.0
2.3	2.2	3.1	3.5
2.5	2.0	2.4	3.7
2.5	2.8		

as variety *album* and thus the latter produces many more seeds.

The variety *album* has a yellowish-green tepaltube, and the white tepalsegs are banded inside and outside with yellowish-green. The fruits are yellowish-green, stained amber where exposed to the sun. The fruits of variety *roseum* are light green, stained brownish-reddish where exposed to the sun.

The variety *album* produces so many seeds by *open pollination* that it is a real task to transport them to the trash can. If left on the ground, hundreds of seedlings will soon spring up. In June 1962, the writer again noted some of the huge globular fruits up to 7 cm. in diameter along with the smaller fruits. The data is summarized in Table 1.

ANTHER COLOR AS DIAGNOSTIC FACTOR IN BRUNSVIGIA HYBRIDS

When deanthering large numbers of the flowers of *Brunsvigia major*, and various *Brunsvigia* x *parkeri* clones in a breeding project, it was noted that the anther color differed markedly before dehiscence: *B. major* (dull whitish anthers); *B. x parkeri*, (English group) received as "*B. x kewensis*" (light lavender anthers); *B. x parkeri* (Zwanenburg group) clone 'Johannesburg' (faintly lavender anthers); *B. x parkeri* (Australian group) clone 'Hathor' (white anthers); and *B. x parkeri* (American group) Hannibal clone (anthers reddish).

It is thus important to compare anther color in the hybrids with that of the reported parents—*Brunsvigia rosea*, *B. josephinae*, *B. orientalis*, *B. grandiflora* and other *Brunsvigia* species. Thus something could be learned about the parentage of the hybrids since the various characters tend to segregate in the progeny after the first generation.

Lycoris x jacksoniana Traub, **hybr. nov.**

Plantae hybridae reciprocae inter *L. sprengeri* et *L. radiatam*; foliis *L. radiata* fusco-viridioribus; scapo usque ad 55 cm. alto; spatha anguste lanceolata 3.5—4 cm. longa; umbella 5—6-8-flora; floribus *L. radiata* minus subpurpureo-rubellis usque ad magis subpurpureo-rubris; pedicellis 1.7—4 cm. longis; ovario 5 mm. longo; tubo tepalorum 8—10 mm. longo; segmentis tepalorum 4.7—4.8 cm. longis 0.9—1.3 cm. latis.

Originated by Sam Caldwell of Nashville, Tenn.

Holotype: No. 960 (TRA), collected by Sam Caldwell, Aug. 16, 1963. Paratypes: Nos. 958, 959 (TRA).

(CONTINUED from page 5.)

THE FLOWER ARRANGEMENT CALENDAR, 1964, by Helen Van Pelt Wilson. M. Barrows Co., 425 Park Av., So., New York 16, N. Y. 1963. \$1.50. 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 1964. This calendar will appeal to those interested in flower arranging.

JUNIOR FLOWER SHOWS, by Katherine N. Cutler. M. Barrows & Co., 425 Park Av., So., New York 16, N. Y. Pp. 145. Illus. \$3.50. This is a guide calculated to help stage flower shows in which children from the elementary grades on through high school may participate. It will appeal to parents, teachers, garden-club members, and scout leaders, and also to the children themselves.

THE NEW COMPLETE BOOK OF AFRICAN VIOLETS, by Helen Van Pelt Wilson. M. Barrows & Co., 425 Park Av., So., New York 16, N. Y. Pp. 299. Illus. \$5.95. This is a revised and enlarged edition of the author's earlier book on the same subject, incorporating new material on genetics, club programs, selling, photographing, and a chapter on other gesneriads. Profusely illustrated.

THE MICROBIAL WORLD, by R. Y. Stanier, M. Doudoroff, and E. A. Adelberg. 2d ed., Prentice-Hall, Englewood Cliffs, N. J. 1963. Pp. 753. Illus. This revised, up-dated edition of this highly valued standard text on microbiology will be welcomed by students and teachers. A new feature of this edition is the introduction of biological principles at appropriate points in the text which allows for a more coherent and unified development of fundamental topics such as cell structure, metabolism and nutrition. The introductory portion is followed by a survey of the principal microbial groups; an exposition of microbial nutrition, metabolism and physiology; an account of bacterial cytology, genetics and classification; and discussions of the role of microorganisms in the cycles of matter, their mutualistic and parasitic relationship with other forms of life, and their utilization by man; recent discoveries about the fundamental structure of cells, and the nature of viruses; and recent developments in molecular genetics. This is required reading for all who are interested in microorganisms; and this outstanding text is highly recommended.

BIOCHEMICAL SYSTEMATICS, by R. E. Alston and B. L. Turner. Prentice-Hall, Englewood Cliffs, N. J. 1963. Pp. 404. Illus. This outstanding new text will be welcomed especially by all who are interested in biosystematics. The authors have brought together for the first time a summary of the biochemical data which has bearing on the grouping of organisms into lineages, and they are to be congratulated on an excellent job. Following the introduction, there are chapters on taxonomic principles; plant taxonomy; introduction to biochemical systematics; serology and systematics; amino acids; fatty acids; carbohydrates; alkaloids; cyanogenetic substances; phenolic substances; quinones; terpenoids; misc. compounds; biochemical studies of hybrids; and general evaluation. This original contribution is required reading for biochemists and biosystematists. Highly recommended.

ADVANCES IN AGRONOMY, Vol. 15, edited by A. G. Norman. Academic Press, 111 5th Av., New York 3, N. Y. 1963. Pp. 415. Illus. \$13.50. This 15th volume in the series includes contributions from fourteen outstanding authorities. The topics covered are competition among crop and pasture plants; chemistry of the micronutrient elements in soil; impact of chemical weed control on farm management practices; the physics of wind erosion and its control; plant nutrient losses from soils by water erosion; creeping alfalfas; and silica in soils. Highly recommended.

MICROBIAL CLASSIFICATION, edited* by G. C. Ainsworth and P. H. A. Sneath. Cambridge Univ. Press, 32 E. 57th St., New York 22, N. Y. 1962. Pp. 483. Illus. \$9.50. The papers included in this book were delivered at the 1962 London microbiological symposium in which twenty-three authorities participated. The papers are concerned with current approaches to the classification of microorganisms—protozoa, algae, fungi, bacteria and viruses. Morphological biochemical and genetical approaches are evaluated against a theoretical background; and the procedures in classification, nomenclature and identification are discussed. This stimulating book should serve as an introductory text in the field of microbial classification, and is highly recommended.

THE ARCHITECTURE OF MATTER, by Stephen Toulmin and June Goodfield. Harper & Row, 49 E. 33rd St., New York 16, N. Y. 1962. Pp. 399. Illus. \$7.50. This outstanding new book on the philosophy of science will be welcomed by all scientists. In Part 1, the authors trace problems concerned with matter from ancient to early modern times. In Part 2, the activities of the inanimate are explored beginning with Boyle and Newton, and on through to quantum theory. In Part 3, the structure of living things is examined. In an epilogue, the possibilities of a reunified view of matter and life is considered. Apparently the chemical elements, as such, are neither inorganic or organic but they may potentially function in either the one or the other role. This stimulating book is required reading for all scientists.

(CONTINUED on page 116.)



Fig. 14. *Lycoris* species and hybrids between them. Extreme left, *L. sprengeri*, and extreme right, *L. radiata*; flowering scapes of four hybrid seedlings between these two parents are grouped in the center. The new hybrid has been named *Lycoris x jacksoniana*, in honor of President Andrew Jackson whose home, The Heritage, is near Nashville, Tennessee. Photo by Sam Caldwell

3. GENETICS AND BREEDING

LYCORIS REPORT—1963

SAM CALDWELL, *Tennessee*

The good old summertime in middle Tennessee, where I live, is not always good from the gardener's viewpoint. It can be beautiful when the rains come occasionally, but too many summers are hot and dry, and gardens and gardeners languish.

No matter what the weather, one of the things that thrill me on a July day is to be walking along a flower border and discover greenish white spearheads pushing up out of bare ground. Nearby will be a label reading "lycoris sanguinea," and while it is not one of my favorites, it lets me know that the Lycoris season is getting under way and that exciting things will be happening on through August, September and into October.

Aside from the fact that many lycorises are such beautiful flowers that anyone would covet them, it is certainly true that part of their appeal lies in being so "different"—with strange growth habits—and in the fact that we still have much to learn about them. There are problems of identification and nomenclature along with problems of culture; and there are wonderful opportunities for gardeners with a creative bent who may wish to cross-breed them.

Authors of garden encyclopedias and bulb books have not done a very good job of covering the genus *Lycoris*, and it is mainly through the experiences of bulb fanciers, reported in publications like this one, that we shall gradually accumulate a reasonably full store of factual information about these bulbs. Progress is slow, because lycorises just don't do things in a hurry. But each year we are able to tie up a few loose ends—to verify an identification, perhaps, to approximate a hardiness rating, to determine what conditions promote bloom in a particular species. In keeping with these thoughts the following report is offered.

SPRENGERI-RADIATA HYBRIDS

From crosses of *L. sprengeri* and a fertile strain of *L. radiata* made in 1954 and '55, I began to get bloom in 1961, and through the current year (1963) have had some thirty scapes. They appear in August over a period of two to three weeks, covering the season when their parent species are also blooming. Varying among themselves in color, and to a lesser degree in form, they make a most interesting and beautiful display. One distinctive form has fairly narrow, smooth-edged segments of rich, dark purple-red (a good color reproduction of it appeared in the September, 1963 *Horticulture Magazine*). Others range through shades of rose to fairly light pink, but practically always with a faint purplish or lavender tinting. As flowers age, strong violet markings develop at the segment tips, no doubt an inheritance from the blue-tipped *L. sprengeri*. Segments vary in width and some are deeply

colored along the midribs, but there is very little of the crisping and crinkling of edges so conspicuous in *L. radiata*.

Most umbels carry seven flowers, but there may be fewer or more, and they vary from about 6 to 7½ inches across, from tip to tip of extended stamens. The accompanying picture of "parents" and "children" (fig. 14) shows how the hybrids appear intermediate in form between the species. Since *L. sprengeri* and *L. radiata* do not at all resemble each other, the hybrids create a "new look" in the genus; they are unlike any other lycoris I have observed.

Regrettably, in spite of the great hardiness of *L. sprengeri*, the hybrids seem more susceptible to winter damage than even *L. radiata*. They make foliage growth in the fall, in the manner of *L. radiata*, and the bluish green leaves are hurt by near zero weather. In fact, though bulbs survive under outdoor cultivation here in Tennessee. I have never had one of them to bloom. All my flowers are on bulbs grown in a cold-frame protected by a plastic-covered sash in winter. I think they will prove satisfactory in Mid-South and Deep South gardens, but will need protection wherever winter temperatures consistently drop to 5 degrees or lower. I still have more than 100 bulbs to flower and am hopeful that some individuals may prove hardier than the average.

Incidentally, if you have *L. sprengeri* and a fertile *L. radiata* (I presume it is really *L. radiata* var. *pumila*), the cross is easy to make, using either one as the seed parent. My seedlings with *L. sprengeri* as the seed parent grew off a little faster and were first to bloom, but now that a dozen or more of the reciprocal cross have also flowered, I can tell no difference between them; that is, the same variations occur in both lots. It is of interest, too, that the hybrids are highly fertile to their own pollen; and I have crossed them back successfully on both parents and on *L. haywardii*.

In previous writings in this and other publications I have used the term "Sprenrad Hybrids" as a convenience to designate these crosses. In the present issue of Plant Life they are given the permanent name, *L. x jacksoniana*.

OTHER CROSSES

For any who may wish to try lycoris hybridizing, I will repeat that it is a fascinating activity and one can still get into "on the ground floor." The one requisite is enormous patience for lycoris seedlings take a long time to flower (I haven't had one to bloom short of six years). It is true that our cultivated stocks of *L. squamigera* and the common September-blooming *L. radiata*—and in my experience, *L. incarnata*, *L. caldwellii*, *L. houdyshelii* and *L. elsiae*—appear to be completely sterile and thus useless to the would-be hybridizer, but it is possible now to get a fair number of seed-bearing kinds. They all seem to cross readily with each other. To date I have made the following crosses and have at least a few seedlings of each coming along:

- L. chinensis** x *L. "cinnabarina"*
- L. haywardii** x **L. chinensis**
- L. haywardii** x **L. sanguinea** and the reverse

L. haywardii x **L. "sperryi"** and the reverse
L. haywardii x **L. x jacksoniana**
L. radiata x **L. haywardii**
L. radiata x **L. chinensis**
L. radiata x **L. "sperryi"**
L. radiata x **L. sprengeri** and the reverse
L. radiata x **L. x jacksoniana**
L. radiata x **L. traubii**
L. sanguinea x **L. "sperryi"** and the reverse
L. sprengeri x **L. haywardii**
L. sprengeri x **L. "sperryi"**
L. sprengeri x **L. x jacksoniana**
L. sprengeri x **L. traubii**

The *L. "sperryi"* is unidentified Chinese species; see page 77, *Plant Life* 18, 1962.

Only the *sprengeri-radiata* seedlings have flowered thus far, but some of the others are five years old, and I look forward with eagerness to their blooming during the next few years.

Cross pollinating lycoris flowers is very simple. All anthers must be removed from the seed parent flower while it is in the bud stage, before pollen is released, to prevent self pollination. Pollen of the male parent is brushed onto the stigma of the seed parent flower; I do this on several successive days, beginning when blooms first open, but the first application is probably sufficient. Seeds are harvested in fall and planted immediately in pots or flats kept in a cool greenhouse. After two years in the containers, seedlings are transferred to the coldframe for growing on to flowering size. Undoubtedly there are other equally satisfactory methods for handling seeds.

NEAR WHITES

For a number of years it has been possible to buy from mail order dealers as well as garden centers and even dime stores over the country lycoris bulbs under labels such as "White," "albiflora," "alba" and the like. When these bloomed they have always produced pretty flowers but if one ever turned out to be truly white, news of it has escaped me. With typical spiderlily form, similar to *L. Radiata*, they tend to vary in color somewhat, depending partly on temperature and light exposure at the time of flowering. In general the coloring involves soft pastel tints of cream, pale yellow, buff, salmon and pinkish—often with a deeper pinkish line along the middle of segments. Commonly they fade close to white a few days after opening.

Seeing a few here and a few there in different gardens and in different locations on my own place, I thought for years that they were probably all the same lycoris, the small differences noted among them being due to soil, light or some other cultural factor. To remove doubts I transplanted all of my stocks of this general type into one coldframe where they could grow under their various labels within a few inches or feet of each other under uniform conditions. Incidentally, they have prospered greatly and flowered freely in the frame which is covered with a sash in winter, for they are less hardy than *L. radiata* and really were never satisfactory bloomers when grown outdoors here.

Now, after checking the blooms carefully through several seasons,

I am aware that in spite of a general over-all resemblance, different forms do exist. Mainly these fit into three groups, and it may clear up confusion if I list names under which I received bulbs, sources and dates, and the result of bloom comparisons.

First is a large group—a majority of the bulbs, in fact—which came under many names but have proved to be identical; they are the soft salmony tinted type named *L. elsiae* by Dr. Traub in Plant Life 14, 1958. In this group are "L. radiata alba," from Bob Anderson, Los Angeles, Calif. (1948); "L. radiata alba," from Rex Pearce, Moorestown, N. J. (1950); "L. radiata carnea," from Pearce (1951); "L. alba," from San Francisco Nurserymen's Exchange, through Wyndham Hayward, Winter Park, Fla. (1951); "L. albiflora carnea," from Cecil Houdyshel, La Verne, Calif. (1952); "L. alba," from Growers Exchange, Farmington, Mich. (1952); "L. albiflora" (two out of three bulbs), from Mrs. U. B. Evans, Ferriday, La. (1959); "White No. 3," from B. Y. Morrison, Pass Christian, Miss. (1961).

A second group has flowers larger than the *L. elsiae* type, broader segments, crisped and reflexed, and little if any pinkish influence in the color but rather a pale, soft yellow throughout, which gradually fades toward white. It is an extremely pretty lycoris. Photographs of this form and of *L. elsiae* appear on pages 80 and 82 of Plant Life 18, 1962, and it is easy to see differences between them even in the black-and-white pictures. I received bulbs of this group as "L. albiflora" (one out of three bulbs), from Mrs. Evans (1959); as "White No. 1," from Mr. Morrison (1960); as "L. albiflora," from Mr. Morrison (1961), along with a note that this was from the original stock he received under this name from Japan while he was with the USDA in 1940; and as "Cream No. 1," from Caroline Dormon, Saline, La. (1962). Miss Dormon wrote that her bulbs came nearly 20 years ago from Col. Russell Wolfe, Orangeburg, S. C., simply as a "White" lycoris.

A third group is what catalog writers might call "improved elsiae," because they are truly bigger and better than the *elsiae* type. On strong scapes 20 or more inches tall, these have umbels up to 8½ inches across. The color is not very stable but runs through apricot shadings definitely to pink. A well developed scape is one of the finest lycorises imaginable. I have these in one small purchase of "White" lycoris from a local garden store (1959), where the owner advised me they had come from Van Waveren, in Holland, billed as "L. alba"; and also in two lots of bulbs from Mr. Morrison (1959 and 1961) which he had received as "L. albiflora carnea" from the Walter Guille wholesale bulb firm, Syosset, L. I., New York.

Well over 90% of my near white lycorises fit into the three groups described above. There are a few individual bulbs, including a small-flowered deep pink one from Mr. Morrison, about which I am uncertain, and there are still others that have not flowered. All of these make lush leaf growth, starting in the fall in the manner of *L. radiata*, but leaf blades are perhaps twice the size of *radiata* leaves. Although not exactly common, near whites are well distributed among bulb fanciers

in the South. Probably there are other forms I haven't seen. We all enjoy them but I am sure there are other gardeners along with me who would like to know what to call them. At present the names are hopelessly confused.

A NEW YELLOW—PERHAPS

In October, 1962, a local garden center received lycoris bulbs from Springtime Bulb Farm (wholesalers), Lebanon, Ohio. They arrived in wooden cases stenciled "L. aurea" and "Grown in Japan." But printed cards enclosed in the cases said: "New Import—Hardy Golden Spiderlily—Plant 5" deep in semi-shade or sun. Bloom August in North, July in South. Height about 2 feet. Will bloom year after year if left in ground."

For years my sense of curiosity has impelled me to buy samples of bulbs like these, although experience has shown that nearly all the Japanese "aureas" turn out to be *L. Traubii*, which is definitely *not* hardy here in Tennessee. But I was intrigued by the "New Import" and "Hardy" claims for these bulbs and so bought a couple of dozen at first and later an entire case (they were not expensive).

I've been able to observe these now through the 1963 growing season from foliage alone—none bloomed. Judging from the leaves, there were a few *L. Traubii* bulbs mixed in, but most of these really are something different. If the year's performance is typical, they make foliage in late winter and very early spring, in the manner of hardy types such as *L. squamigera*, and the leaves actually look like those of the rare hardy yellows, *L. chinensis* and *L. "sperryi"*.

Of course these may turn out to be disappointing in flower, but they strike me as being worth watching. They really may be a hardy yellow lycoris—perhaps *L. chinensis* or *L. "sperryi"* or something similar. I suppose these bulbs were marketed all over the country, and I hope others who have experience with them will send reports to Dr. Traub.

EFFECT OF HARD WINTER

As in many other localities, the 1962-'63 winter gave our Nashville, Tennessee area the coldest temperatures ever recorded. Mid-December and late January cold spells brought night temperatures of 4 below zero twice, 6 below, 7 below, 13 below and the all-time record of 15.2 below. All my outdoor-grown lycorises that make foliage in the fall were badly hurt. Leaves would have killed off entirely had there not been 3 or 4 inches of snow protection when the bitterest weather came. Leaf blades "burned" down to the snow line, and as a result there were very few blooms on the common *L. radiata* in September and none at all on my cherished white *L. houdyshelii*. The fertile *radiata* flowered fairly well; leaves were damaged all right, but this type always seems to bloom, anyway. No bulbs were killed as far as I can tell; all appeared to be sending up leaves as usual in the fall of '63.

The winter certainly proved the value of a coldframe for questionably hardy species. All my *L. elsiae* bulbs and other near whites are

in a large frame with a plastic sash cover. It is not a tight frame at all and there was a little whitening of leaf tips by the extreme cold. But foliage survived and bloom was almost normal.

The hardy species that make foliage here in late winter and early spring were very puzzling in performance. All made excellent leaf growth, as it didn't start until our severest weather was over. But summer bloom was below par for several of them. There were nice blooms on *L. squamigera* and *L. sprengeri* but not half the usual number of scapes. Oddly enough, it was possibly the best year ever for *L. incarnata*, which flowered freely in all locations. *L. sanguinea* and *L. caldwellii* were about normal. Experience is showing that these do best under deciduous trees (mine are under dogwoods). They get sun during the foliage cycle but are shaded at flowering time.

L. chinensis, the rare hardy yellow, of which I received one bulb in 1958, produced a scape; it has not failed to flower now in three years. Just a foot away from it are several bulbs of *L. "sperryi,"* the other hardy yellow, but they didn't bloom. However, Miss Aileen Bishop, who has the original stock of *L. "sperryi"* here in her garden, had four scapes—not as many as usual.

We do not know whether to attribute the scarcity of bloom on certain species to the cold winter or to abnormal spring weather. The usual April showers never came; instead there was a hot, dry month with 26 rainless days, three of which set all-time records for *high* temperatures.

MISCELLANEOUS NOTES

In correspondence with Prof. Ei-ichi Takemura, in Japan, Mr. B. Y. Morrison received a color slide and pressed flower of what is purported to be *L. straminea*, and I have been privileged to see them. The slide shows an umbel with three flowers open and four buds. Color appears to be ivory or very pale strawy yellow with no markings. Segments look fairly broad with smooth edges—no undulations—and tips are somewhat reflexed. Segments are longer than stamens but the pistil extends beyond them. The picture does not conform to descriptions of *L. straminea* I have read, but it is an interesting flower and different from any species I know. Unhappily, Prof. Takemura advised that he lost all of his bulbs in the 1958 Kanogawa hurricane and has been unable to locate any more in all of Japan.

Mr. Robert D. Goedert, Jacksonville, Fla., amaryllis dealer and fancier of many amaryllids, has been getting lycoris bulbs from Japan which will be interesting to watch. I have several test plantings, including bulbs he received as "*L. Vermillion*" and "*L. aurea Vermillion.*" Future bloom seasons will reveal what they really are.

Some bulbs I received back in 1957 from H. E. Saier, Dimondale, Mich., finally bloomed in September of this year. I believe Mr. Saier had imported them from India and they were labeled simply "*Nerine.*"

They turned out to be a very nice form of *L. radiata*—apparently the same as those grown widely over the South.

Bulbs of "L. purpurea" that I have had from many sources have always turned out to be *L. sprengeri* upon flowering. There are still three lots of "purpurea" that haven't bloomed, and I keep hoping for something different, but the foliage looks just like *L. sprengeri*.

If you read this report and get the impression that names under which lycoris bulbs are sold mean little, please do not feel hard toward American dealers. Many of them are my good friends and I know they do the best they can. I am grateful for their making some very beautiful flowers available to us. Most lycoris bulbs marketed come from Japan. Economically, it is not usually possible for retailers to test grow and flower the bulbs before any are sold, so they have to rely largely on sometimes inaccurate information from suppliers. If even our advanced plantmen and botanists are unsure about much of the lycoris nomenclature, you can hardly expect collectors, growers, shippers and retail dealers to be better informed.

EDITORIAL NOTE.—The fertile so-called *lycoris radiata* var. *pumila* is in fact the biological norm (diploid) of *L. radiata*, and should be indicated as *L. radiata* var. *radiata*. The larger, infertile form is a triploid.

Hardier forms of *lycoris* x *jacksoniana* can be expected among the progeny of selfed individuals; and also from the back-crosses on *L. sprengeri*, and crosses with other hardier species.—*Hamilton P. Traub*

AMARYLLIS ROUND ROBIN NOTES, 1963

MRS. FRED FLICK, *Chairman, Carthage, Indiana*

A Round Robin is a letter club, consisting of ten to twelve members. A Robin should make a round in three months. When the Robin reaches a member he takes out his old letter; and includes his new letter. At the time the Round Robin is mailed to the next member, a courtesy card, or note is mailed to the Director of the Robin. This is the only way that a director can know the location of the Robin.

A member sends the Robin on in seven days, or less if possible. In case of illness, a member of the family should be instructed to mail the Robin on to the next member.

The postage is usually from fifteen to twenty cents on the Robin.

[The following notes were extracted from Round Robin letters by the Chairman of the Amaryllis Round Robins.—**Editor**]

Len Woelfle.—"It has been an exciting year for me; as three new *Hymenocallis* hybrids bloomed for the first time. One was a new golden yellow with a greenish overcast. It was much darker yellow than 'Sulphur Queen'. The greenish glow gives excitement to the flower. I have named it *Hymenocallis* clone 'Green Gold'. It is a back cross of *H.* clone 'Pax' on *H. amancaes*.

The second one to bloom has been named *H.* clone 'Fiesta'; and it is a glorified 'Festalis', if that is possible. At least it is different; a little larger in all parts; a more robust plant; and the umbel is fan-shaped like *narcissiflora* instead of radial, like the usual *Festalis*."

Opal R. Flick—"Len Woeffe's hybrid *Hymenocallis* clone 'Pax' bloomed beautifully for me in early June. Our Garden Club Flower Show was to be the middle of June. How I wished that it had waited to bloom for the Show. Then to my surprise, it sent up a second scape; and the day of the Show had seven lovely blooms and buds.

I entered it as a specimen *Ismene*. It really stood out, when compared with the others entered. Naturally, it won the blue ribbon."

LYCORIS HYBRIDS REPORTED FROM JAPAN

EI-ICHI TAKEMURA, *Tokyo University of Education,*
Otsura, Tokyo, Japan

HYBRIDS BETWEEN LYCORIS AUREA AND *L. RADIATA*

[The following summary is taken from an article published by Dr. Takemura in the *Botanical Magazine, Tokyo*, Vol. 75. Pp. 324—330. 1962.—*Editor*]

SUMMARY

1. Morphological and cytological studies were carried out on F-1 plants raised from *Lycoris aurea* Herb. ($2n = 14 = 8V + 6R$) x *Lycoris radiata radiata* (syn.—*L. radiata* var. *pumila* Hort.), $2n = 22 = 22R$.

2. The morphological characteristics of the F-1 hybrids are intermediate between the parents and resemble closely the natural hybrid, *L. albiflora* Koidzumi.

3. The chromosome number in somatic cells of the F-1 plants are $2n = 18 = 4V + 14R$, i. e., the sum of the numbers in the gametic cells of both parents.

4. At the 1st metaphase in microsporogenesis of F-1 plants, 4 heteromorphic triplets and 3 bivalents are usually observed.

5. This artificial hybrid is almost completely similar to *L. albiflora* Koidzumi in morphological characters, karyotype, chromosome behavior in meiosis, etc. These facts apparently prove that the view of Inariyama that *L. albiflora* Koidzumi may be a natural hybrid between *L. aurea* and the diploid *L. radiata radiata* (syn. *L. radiata* var. *pumila* Hort.) is correct.

AMARYLLIS BREEDING REPORT, 1963

C. J. CROCHET AND MRS. J. S. BARRY, *Rt. 1, Prairieville, Louisiana*

Mature seeds from selected crosses are planted in six-inch red clay pots each spring. The seedlings are kept growing in the greenhouse for a full year and planted in open beds in June and July of each

year. The beds are five feet wide and seedlings are spaced four inches apart by using a board with notches cut at four inch intervals. A bulblet is planted so that the entire bulb is covered with soil. Amaryllis beds are tilled before planting, and we incorporate bone meal, cow dung, German peat, and sand, mixing well with the soil. Beds are 100 feet long and are 4 inches higher than the surrounding soil surface, to allow for good drainage (see Fig. 15).



Fig. 15. General view of hybrid Amaryllis beds of C. J. Crochet and Mrs. J. S. Barry at Prairieville, Louisiana, 1963.

For the first year, weeding the beds is a necessity, but for the following years, weeding is at a minimum because the amaryllis leaves tend to shade the beds, thus discouraging weed growth. Growing from 4 to 5 thousand seedlings per year makes close planting necessary as growing space would soon be exhausted. Each summer seedlings are shaded with sesbania, which gives dappled shade. Sesbania is planted from seed in the middle of the beds and thinned to one plant per five foot interval. The following spring they are easily removed from the beds, leaving a valuable nitrogen supply from their decomposed leguminous root systems. Each November, the *Amaryllis* beds are mulched with three inches of sugar cane waste, which is received shredded and packed in bales. This mulch is used as a protection against cold damage. It does not pack, it allows for rain penetration, and

provides warmth through its heat of decomposition. This mulch is replenished each November.

The sugar cane waste serves four purposes: (1) it keeps the ground surface cool during the summer months (2) it adds organic matter to the surface of the soil (so important in successful *Amaryllis* culture), (3) it insulates the beds during winters, and (4) it keeps weeding to a bare minimum. With this procedure, no bulbs were lost during the extremely cold winters of 1962 and 1963.

"Fertilome" is applied in March of each year at the rate of 25 lbs. per 5 x 100 foot bed. Lush leaf growth does not permit more than one application per year and "Ra-Pid-Gro," a foliar nutrient is applied each month until October, when the last application is made.

This procedure has resulted in spectacular bulb growth and many seedlings bloom in three years.

All seedlings are kept and through the years about 50 have been segregated for further performance evaluation. These will be vegetatively propagated. All have the worthy characteristics of color, size, texture, uniqueness, growing ability, and hardiness. (see Fig. 16).



Fig. 16. Crochet and Barry hybrid *Amaryllis*—upper left, red and white; lower left, rose and white; right, huge, heavy-textured, full form white (from white Dutch x 'White Giant').

No seedling is considered as a subject for propagation unless it conforms to well defined standards. This group includes the color range from white through the picotee types, striped red and white, orange and white, salmon, rose, pink, scarlet, and darkest red.

What follows are some of the principles we used in producing bulbs from seed: (1) Work toward some well planned objective; (2) Use only the best seedlings or named varieties in making crosses; (3) A cross from two inferior flowers will invariably produce inferior progeny; (4) With but few exceptions, selfs are not desirable in upgrading the quality of *Amaryllis*; (5) Never produce seeds on first year blooms (the drain of energy may keep the bulb from flowering the following year); (6) No bulb should be forced to make seed for any two consecutive years; (7) Carefully label all crosses as to pod and pollen parent. As a result, those which produce superior progeny can be duplicated in the future.

FLOWERING OF AMARYLLIS CALYPTRATA HYBRIDS

W. QUINN BUCK, *Los Angeles State & County Arboretum,*
Arcadia, California

On October 22, 1962, the first flower on one of our *Amaryllis calyptрата* hybrids began to open. It had been felt that the seedlings, sown on June 15, 1961, must be far from blooming, even though growth had been vigorous; so it was a great surprise to discover an unnoticed spike.

This hybrid of 'Nivalis' (Ludwig) x *Amaryllis calyptрата* was an interesting blending of the parents. Our photograph (Fig. 17) shows the dominance of the *A. calyptрата* in general shape; as the flowers matured the lower petals and sepals curved inwardly even more, and the other segments undulated as in *A. calyptрата*. The green color was not evenly distributed, going especially to deepen and extend the green throat area of the white parents. The flower was dull white, with large green throat, and with some reddish color on the reverse. The texture took on some of the *calyptрата* smoothness. The pink stamens and pistil of *A. calyptрата* carried through, to give a spot of color.

Of the fourteen seedlings from this cross a second flowered soon after the first, with an interval before additional spikes appeared. The 1963 crop of spikes has been quite good, and up to this time (August 15, 1963) most of the fourteen have flowered at least once, and some have had as many as three and four spikes scattered over the months. Many of the later flowers have been surprisingly wide-seged, with a flatter form like that of the Dutch hybrid parent. Some spikes have shown three buds, while others have had only two. Most of the seedlings began producing offsets very early, and they now have their pots crowded.

Of a second cross, 'Ludwig's Dazzler' x *A. calyptрата*, about half of the 204 seedlings show many offsets. This producing of offsets

cannot yet be correlated with other characteristics. This second cross was also planted June 15, 1961, but up to now most of the progeny is unflowered. One spike was a surprising picotee; a narrow pink line edged all of the tepalsegs. Two spikes have shown interesting brown lines in the petal midribs. The foliage of this second cross seems a darker green, while the small group shows a tendency to be yellow-green.

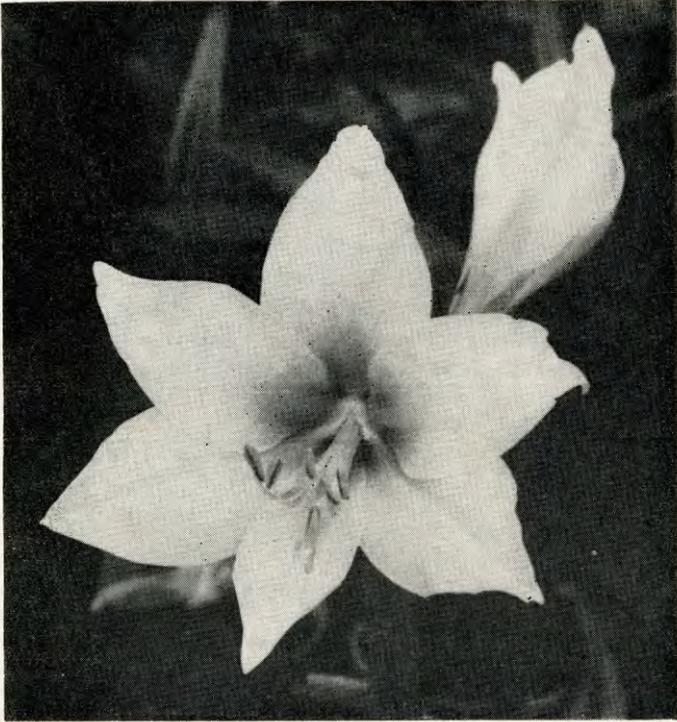


Fig. 17. Hybrid between *Amaryllis* clone 'Nivalis' (Ludwig) and *A. calyptрата*, an interesting blending of attributes of the parents, made by W. Quinn Buck of the Los Angeles State and County Arboretum, Arcadia, Calif. Photo by Jack V. McCaskill.

Earlier observations of a dominance of *A. calyptрата* in leaf width and shape do not seem to be holding true as the bulbs mature.

So far no individuals have been fertile when selfed, cross-pollinated or back-crossed, suggesting consistent triploidy as a strong possibility that should be investigated.

THE OUTSTANDING ANGELL HYBRID AMARYLLIS

W. QUINN BUCK, *L. A. State and County Arboretum, Arcadia, California*

The *Amaryllis* hybrids developed at Loma Linda University by E. A. Angell have both horticultural and historical interest because of the source of the original bulbs from which they have been developed.

In 1934 Mr. Angell bought three bulbs from the Henderson Experimental Farm near Fresno, Calif. One of these, a red and white hybrid of the Luther Burbank strain, flowered and set seed. Three



Fig. 18. View of the Angell hybrid *Amaryllis* field near the tennis court at Loma Linda University, showing many of the Angell near-white hybrids.

years later a solid red amaryllis of the Burbank material was added to the Angell breeding stock. It was these two Burbank bulbs which were the sole foundation of the Angell strain developed during his years at Loma Linda University, Loma Linda, Calif.

When Mr. Angell arrived at the University, where he was superintendent of grounds for twenty-three and a half years, until his retirement in 1961, he brought with him seed pods from the two original bulbs. These seed were planted and became the first generation of many successive years of breeding. Mr. Angell's sixteenth generation is now ready to be planted in the open field. (see Fig. 18).

Color, form, hardiness, free-flowering quality, and vigor have been prime considerations when Mr. Angell has chosen parents for his many

crosses. A tremendous range of color from pure self-colored reds and oranges, through pinks and occasional lavenders and greens, to clear near-whites of exceptional quality, has resulted. The color patterns and variations in form are indicative of Mr. Angell's working to get them. (See Fig. 19.) He has sought "red" foliage in many of his hybrids, and the result is great numbers of clones with handsome bronze foliage. Many spikes produced six buds, and the most floriferous have had as many as eleven or twelve buds.



Fig. 19. Closer view of some of the Angell *Amaryllis* hybrids, grown at Loma Linda University, Loma Linda, Calif.

An example of Mr. Angell's keen interest in hardiness is his selection last winter of some eighty clones that remained green and only slightly damaged after unusually heavy frosts, and temperatures as low as 20° F. From crosses involving this group he is hopeful of getting even greater hardiness than his strain has shown up to now. Among the selections with exceptional hardiness, Mr. Angell found some of his bronze-leaved "pets"; so this character can be included in much of this line of breeding.

In evaluating Mr. Angell's hybrids in the field, it seems that his near-whites are the most outstanding for quality, although this may come from his having dug more of the reds for sale. It is quite fair to say, though, that the Angell strain is unquestionably the best commercial strain being grown in California, and its origin in the Burbank strain gives an added interest.

INTERRELATIONSHIPS OF SOME GARDEN CRINUMS

L. S. HANNIBAL, *Fair Oaks, California*.

We owe Miss I. C. Verdoorn of Pretoria a sincere vote of recognition for her clarification of the status of *Crinum macowanii* Baker because J. G. Baker's original description of 1878 was unfortunately confused with *C. moorei* from Natal. And of equal importance we can report that *C. macowanii* was used some fifty years ago by Luther Burbank for breeding purposes. The hybrid *C.* clone 'Luther Burbank' which he developed has now been confirmed to be a cross of *C. macowanii* with *C. yemense*.

In the April 1956 issue of the South African Journal of Botany Miss Verdoorn reviewed and properly described *C. macowanii*. She found that Baker's description of this plant which was published in the Gardeners Chronicle of 1876 was confused with *C. moorei*, but that the Kew Herbarium lectotype: Mac Owan 2122(K) was typical of the *C. macowanii* species native to the Transvaal. Her study is quite comprehensive in that it covers a number of the geographical variants found in South Africa and provides a proper description of the species.

C. macowanii resembles *C. bulbispermum* in a number of general respects, but the plant is of lower stature and the glaucous recurved foliage is slightly broader and seldom more than twenty inches long. The scape is quite sturdy and rarely taller than 14 inches. The eight or ten blossoms have very heavy tepaltubes and short pedicels. Their shape is like that of a slender white "Cottage Tulip" with the keels of the tepalsegs colored a distinct rose red. The anthers are black and the ripe fruit are beaked.

The species is scattered over an area ranging from Port Alfred on the Indian Ocean up through Natal and the Transvaal to Johannesburg and north to the mountains of south Rhodesia. The high Transvaal forms are quite winter hardy as they experience some frost. The plants are normally found in dry stream beds. In habitat it can be considered a desert species.

Experience here in the Sacramento valley suggests that the high Transvaal forms are quite winter hardy if given good drainage. The plants desire full sun and only an occasional watering. The bulbs flower in early July or August, normally producing two scapes. Those received from the highest elevations are the earliest to flower. Seed sets without difficulty if pollen is employed from clones derived from different localities. Seedling plants offer no difficulty in culture except that they are quite slow growing and require some protection in winter until the bulbs reach appreciable size. The plants probably take ten years to reach maturity. Offsets have never been observed.

Crinum macowanii overlaps in a number of areas where *C. moorei*, *C. bulbispermum*, *C. graminicolum* and other species are normally found. We would expect some crossing in the wild with transitional forms being reported if the species were compatible. Apparently such do not occur in sufficient quantity to attract attention. Breeding

experience by the writer tends to bear this out—*C. macowanii* takes on *C. bulbispermum* with considerable difficulty and the hybrids are very slow growing and difficult to flower; *C. macowanii* on *C. Moorei* produces a slow growing plant which resembles *C.* clone 'Louis Bosanquet,' but with much broader foliage. In view of the fact that *C.* clone 'Louis Bosanquet' has dark grey pollen and other features which tend to point to *C. macowanii* genes being present we had wondered for some time if *C. macowanii* was involved. It appears that *C.* clone 'Louis Bosanquet' may be a cross of *C. bulbispermum* and *C. macowanii*.

However, the major surprise came with the crossing of *C. macowanii* and *C. yemense*. The seedling vigor is particularly noticeable in those hybrids involving *C. yemense* (Burbank's selection) possibly because the Burbank plant may be a tetraploid as it is larger than the van Tubergen form (Plant Life 18, p.30, 1962). The foliage of the latter *C. yemense* x *C. macowanii* is uniquely strap shaped, being about three inches wide over the full forty inch length; it is borne semierect on a 18-inch high pseudo neck and is slightly recurving. The final realization that this plant and the old *C.* clone 'Luther Burbank' were identical was quite unexpected, but it appears likely that Luther Burbank did cross *C. yemense* with a *C. macowanii*; however, if he did, he apparently used a low veldt form as his clone requires warm weather to flower properly. Both Burbank's and the writer's plants have waxy white, tulip shaped blossoms on long curved tepaltubes. The anthers are dark, the hybrids fertile and the fruit beaked. Since the writer has grown F-2 and F-3 seedlings from the Burbank clone and has noted quite a range of segregates it should be of no surprise to find that some of the segregates are quite like *C. macowanii*. In fact it was such F-2 stock backcrossed onto *C. bulbispermum* which gave rise to the writer's *C.* clone 'Cape Dawn' which was described in the 1961 Plant Life. This apparent discovery concerning the parentage of *C.* clone 'Luther Burbank' now completely supercedes the statements made by the writer concerning it in *Herbertia* 9, p. 150. It is however, an interesting fact that *C. macowanii* and *C. yemense*, which seemingly do not resemble each other, appear to have a relatively close relationship or origin. This view is supported by the fact that the *C.* clone 'Luther Burbank' hybrid is the only one thus far encountered by the writer which produces random F-2 generation seedlings typical of a close or intra-specific hybrid. A restudy of the plants shows some common features. It is uncommon, though, to find cases where breeding discloses relationships that morphology neatly disguises. Since these plants appear to be of a common source it would be of interest to look for related species in Rhodesia, Kenya, Tanganyika or Ethiopia. There is a plant around Lake Victoria which resembles *C. yemense*, and *C. abyssinicum*, *C. Kirkii*, *C. scarbrum* and others need reinvestigation.

Further crossings by the writer has disclosed that *C. crispum* (now considered a form of *C. Polyphyllum* according to Cythna Letty in her text) will not cross with *C. macowanii*, despite the fact that there are many similarities including beaked fruit. Attempts to cross *C.*

macowanii with *C. moorei*, as mentioned above, have not been overly successful. Growth is slow and the seedlings are spindly. However, *C.* clone 'Luther Burbank' F-2 seedlings take on *C. moorei* with more ease. The foliage is long and uncurved, but at best it will take the bulbs ten years to reach flowering size. This latter behavior is quite surprising as the presumed cross of *C. moorei* and *C. yemensis* (Burbanks 'White Queen') is quite vigorous. We can only conclude that *C. moorei* and *C. macowanii* have little attraction for each other.

Most crosses of *C. macowanii* on *C. bulbispermum album*, which is probably the *C.* clone 'Louis Bosanquet' cross, have not been found

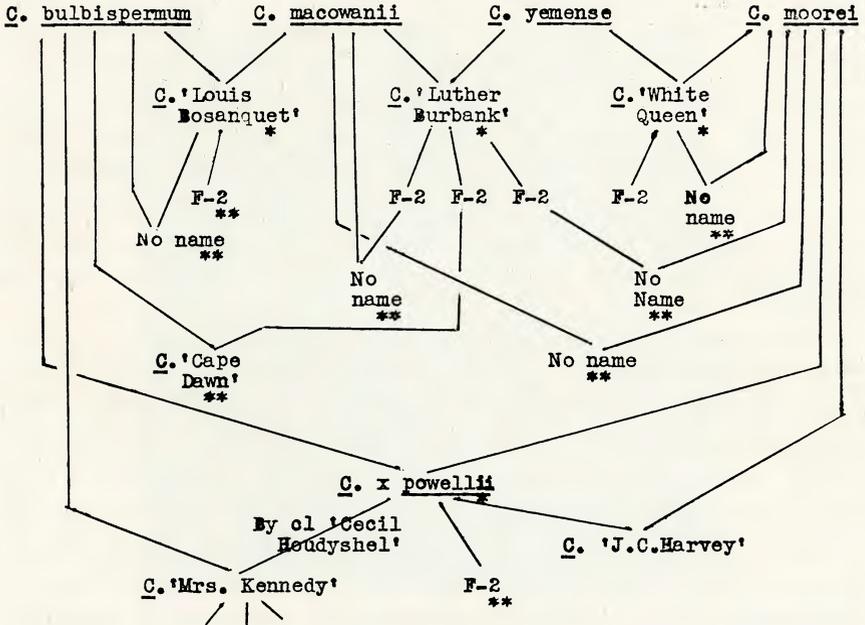


Fig. 20. Experimental confirmation of interrelationships of some *Crinum hybrids*. * Existing hybrids duplicated by writer by recrossing presumed parental species. ** New hybrids developed by writer.

of sufficient value to keep, but crossings involving the Orange River and Kimberley red-flowered form of *C. bulbispermum* are quite dark in color, and are considerably hardier. It is possible that the bulbs which the writer once saw growing in Berkeley were of this hybrid composition in lieu of being red *powellii*. The plants multiply rapidly and the foliage is half the width of the *C. x powellii* crosses.

The writer's 'Cape Dawn' hybrids, which are *C.* clone 'Luther Burbank' crossed on *C. bulbispermum* differs from the Bosanquet type of cross mostly in vigor and size. The latter has foliage some 8 feet long and a single bulb often makes four or five scapes with 18 or 20

blossoms in a single season. The pollen is sterile. In contrast the smaller 'Louis Bosanquet' cross has viable pollen and occasionally produces seeds. The umbels are not what one could call outstanding.

In the 1962 issue of Plant Life the writer pointed out the value of determining the interrelationships of *Crinum* species and hybrids if breeding progress was to continue. The use and relationship of *C. macowanii* to the other Cape species is a distinct revealing. Similarly, *C. yemense* may have had far more use than generally conceded in the breeding field. It is now possible to pinpoint the parentages to a number of our *Crinum* hybrids. The chart shown in Fig. 20 outlines the interrelationships discussed above, and we can gain some indication from this as to future breeding breakthroughs. Apparently most hybrids have viable pollen and one can cross back onto a number of the species to obtain additional hybrids. If one backcrosses onto a parental species there is a good probability of the backcross being very hardy and capable of producing some seed. *C.* clone 'Mrs. Kennedy' represents a *C.* x *powelli* 'Cecil Houdyshel' backcrossed onto *C. bulbispermum album* and as such is quite a potent breeder with considerable promise of future use. Backcrosses of *C.* clone 'White Queen,' *C.* clone 'Luther Burbank' and others are also on the way and if viable as expected then additional breeders can be contemplated.

One item of interest which requires further study is Dr. Edgar Anderson's hypothesis that an F-1 hybrid is the geometrical average of all dominant genes. When one examines the bulbs, foliage, and flowers and habits of *Crinum* hybrids one eventually discovers the dominant combination of features which are inherited from the parental plants; and in all instances so far examined *Crinum* hybrids are in accord with Dr. Anderson's views. The long, recurved, channeled characteristics of *C. bulbispermum* foliage may dominate over the *Moorei* foliage in most *powelli* hybrids, but when closely examined the *powelli* foliage is broader, less recurved and less channeled. One can cite a great number of other instances, and the only factor which seemingly confuses the issue is hybrid vigor, or lack of vigor. This attribute increases or decreases a plant's physical proportions sufficiently to mislead the evaluator unless he is aware of such behaviorism and is on the alert to take it into consideration.

SECOND HYBRID GENERATION SEEDLINGS OF **ALSTROEMERIA X ORPETIAE**

[Selfed seeds of *Alstroemeria* x *orpetiae* with lilac colored flowers, have been distributed to various correspondents. Results obtained by two growers with these seeds are reported here. It is hoped that others who have received them will report in the Amaryllis Year Book.—*Hamilton P. Traub*]

1. Report from Grant V. Wallace, **Berkeley, California**

In July, 1961, Dr. Hamilton Traub kindly mailed me some seeds of an Orpet *Alstroemeria* hybrid: *A. violacea* x *A. pelegrina alba*, collected from F-1 selfs. As usual, not many germinated, but one sturdy plant produced by these seeds bloomed in the spring of 1963. The flowers were very fine: large, and creamy-white, with very few spots—one might truthfully say, with *no* spots. This plant had a rugged career: snails ate it to the ground the first year. However, the tubers produced a perfectly good cluster of stems in 1963, with the result noted above.

2. Report from Burr Clouette, **San Diego, California**

In 1961, seeds of the Orpet *Alstroemeria* hybrid from self-pollination were received from Dr. Traub. These were planted and in due course fifteen seedlings appeared. Up to 1963, three seedlings have bloomed. Two are much like the parent, that is flowers lilac with darker blotch and streaking. The third has white flowers with small yellowish or chartreuse blotch on the two upper tepals, and a few greenish markings in and around the blotch.

The leaves of all of the seedlings are dark glaucous green, but the stems of the two seedlings with colored flowers are reddish whereas those of the seedling with the white flowers are light green.

A NEW BI-GENERIC HYBRID— X SYDNEYA MORRISII

KATHERINE L. CLINT, *Brownsville, Texas*

We must thank a sudden lucky impulse for this beautiful new hybrid, for neither my husband Morris nor I are given to promiscuous crossing in the Rain Lily group. Someone had requested seed of *Habranthus immaculatus*, which is not always easy to supply since the species does not bloom heavily and usually requires hand pollination. Even this is tricky because the interval between the opening of the anthers and drying of the pollen beyond use is very short. On this particular day, I had checked my lone blossom of *H. immaculatus* frequently but misjudged the time and found that I had lost my opportunity. Thoroughly disgusted and disappointed, I suddenly remembered the flower of *Zephyranthes bifolia* in the greenhouse. This had been open for several days and when I discovered that the pollen was neither fresh nor plentiful I almost failed to use it. Actually, I think my action was inspired more by pique at the loss of *H. immaculatus* seed than optimism over the possibility of a bi-generic cross. I remember being quite surprised when signs of fertilization were soon evident. Had the flower been pollinated by insects before I applied *Z. bifolia* pollen or did we have prospects of a fine hybrid cross?

The capsule matured rapidly and produced an unusual number of seed—about 90, which were carefully planted and watched closely. This was on May 26, 1960. Germination was above average and the exceedingly rapid growth of the seedlings seemed to foretell their

hybridity. In August of the same year, about 65 bulbs were transferred to a long, deep flat filled with a rather rich, humusy soil mix. In this they grew apace and it was soon evident that we no longer need have any doubts of obtaining a true cross. The deep, shining green leaves (those of *H. immaculatus* are quite glaucous) were very similar to those of the pollen parent but already much longer and broader.

In the late summer of 1961, six of the larger bulbs (now about the size of a paper shell pecan) were potted in a standard 7" clay pot, using the same rich soil with limestone chips added to the mix and a layer several inches deep of the same stone in the bottom for drainage. It was decided to keep these growing continuously in the greenhouse through the winter if at all possible, even though both parents need a dormant period. The remainder of the bulbs were planted in a raised bed in the shade house, where they received care until late fall when they were allowed to go dormant. We were to regret planting them here, for the severe freeze of January, 1962 and subsequent drought caused heavy damage. Some bulbs were lost completely and all were badly set back.

On January 6, right in the middle of the cold weather, a husky bud was discovered on one of the bulbs in the greenhouse. One can imagine the excitement in the Clint household. What would the flower be like? Surely, with two such beautiful parents, one couldn't lose. Due to the extreme cold, the scape developed very slowly. For almost a month, the bud sulked just above ground level and we were in constant fear of losing it. At last the weather warmed, the scape shot up unharmed and on February 7, the flower opened and we were delighted. It was indeed a lovely thing, resembling *H. immaculatus* in size and shape but the color was sensational. Though often seen in *Amaryllis* hybrids, it is completely new to the Rain Lily group—carmine rose RHS 621 to 623, with a white center and a small green throat. Spathe, scape and flower form were typical of *Habranthus* while the leaves now looked more like a small *Amaryllis* than either *Zephyranthes* or *Habranthus*. In April, one of the bulbs in the shade house bloomed. It was a larger, more open flower, with similar coloring except that the carmine rose was a much deeper shade. The early maturing of these two and about 8 other seedlings was not reflected in the group as a whole, since only a little over half of them have bloomed to date. Had all been kept in a healthy, growing state perhaps the story would have been different. The flowers have been very similar in appearance, although there is, of course, some variation in depth of color and form. The size of the blossoms has increased with the age and size of the bulbs, the average being 3" and the largest more than 4½" in diameter. An extra dividend is the year round growing and blooming habit.

As in most bi-generic hybrids, the seedlings appear to be sterile. Repeated attempts to self-pollinate, cross-pollinate with sister seedlings

(CONTINUED on page 34.)

4. AMARYLLID CULTURE

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

EXPERIENCES WITH AMARYLLIS SPECIES

WILLIAM MORRIS, 89 Mills Street, Warners Bay,
New South Wales, Australia

After reading Dr. J. C. Smith's "Amaryllis Species Notes" in the 1962 Amaryllis Year Book, and his request for reports from other growers, I decided to write this article.

Since first becoming interested in *Amaryllis* about five years ago, I very rapidly acquired a major interest in the species and old or new interspecific hybrids. I grow the wonderful Dutch hybrids and enjoy them, but I always look for something different and that is what the species reveal.

There were very few *Amaryllis* species in this country—at least that I could locate in N. S. W.—so to begin with I had to try to obtain seeds of as many as possible from overseas, mainly from Brasil, Bolivia and the U. S. A. I received seeds of *A. aulica* from Mrs. Clint about four years ago and at present scapes are appearing for the first time on four bulbs. The half dozen or so seedlings have multiplied very rapidly by offsets and I now have clumps of dozens of bulbs. The bulbs were evergreen until last summer (it is now autumn here July 5, 1963) when they went completely dormant for about 8 weeks. This seems often to be the way with many seedlings. Going dormant announces that they are large enough to flower after going through the earlier "grand period of growth".

Amaryllis pardina flowered here last spring for the first time from a bulb I located in cultivation in Sydney. How long it has been in this country is not known, but it is not widespread. I was in Northern Queensland when it flowered. I was told that it was highly spotted.

I received *Amaryllis reginae* from Bolivia, and *A. calyptрата* from Brasil. The first is very vigorous and is now reaching flowering size. The larger bulbs have produced quite a crop of offsets. All offsets—*aulica*, *pardina*, and *reginae* have done well when planted in the ground.

With me, *A. calyptрата* has been much slower contrary to Mr. Buck's findings (Amaryllis Year Book, 1962, p. 131). My plants have not grown rapidly even under glass with feeding. When planted out in the ground they almost ceased to grow, and they have now all been put back into pots in the glasshouse (unheated) where they still grow slowly. One seedling seems different in a number of ways and has grown much better than the rest. As the seeds came from garden grown plants in Brasil, I am wondering if this one is a chance hybrid with another *Amaryllis* species in the garden. *A. calyptрата* seedlings have always gone dormant in summer whereas this one has not, and it also has pigmented leaves in contrast with the rest with plain light green leaves. Only inspection of the flowers later will solve this riddle.

Amaryllis evansiae from U. S. A. grown seeds has grown quite well. Now about 30 months old, two of them appear to be mature, and I am hoping for flowers in the spring. Dr. Smith reported his bulbs tended to rot or decline. Mine have not done this either in pots or in the ground. The two largest bulbs have been in pots all the time while most of the rest were planted out. As these did not respond by rapid growth after a season, they have been repotted and put back in the glasshouse. In potting these and other *Amaryllis*, I always use plenty of crocks—from 1/3 to 1/2 the pot height.

Amaryllis belladonna L., the American Belladonna, seeds were received from the U. S. A. and Bolivia at about the same time as *A. evansiae*. They have not been as rapid growing as the latter. At this time, only one bulb may be large enough to flower. However, they have not been difficult in any way, simply slow. They have been pot grown from the beginning—except for a few in the ground as an experiment. I feared that our winter rain, when they were dormant, might rot them. So far I can not comment on those in the ground as they have not been through a winter yet.

Amaryllis psittacina var. *decorata*, from Dr. Traub, has grown very well and is near flowering size I believe. I am waiting on this one with impatience as the description of its flower color intrigues me. *A. psittacina* var. *psittacina*, received only last year from Mr. Davis, has grown very well and looks half grown already.

A. vanleesteenii (?), from Bolivia, has been the slowest of all from seeds. At the end of its second growing season its largest leaves are only 2 1/2" x 3/8".

Amaryllis striata in one of its forms bloomed here last year—3 years from seeds. I was very pleased with it. Some pollen saved from *A. pardina* gave a good pod of seeds and about a dozen seedlings are growing well now.

Amaryllis aglaiae from Dr. Traub had a short growing season this year, and has been dormant for the last month. As the weather is getting quite cool now, I do not expect it to put up more leaves. With a long rest, it may flower in the spring.

Amaryllis sp. (unidentified) from Dr. Traub in 1961, originally collected in Minas Gerais, Brasil, is very intriguing. It has beautiful blue-green foliage and is quite winter dormant. It has grown quite satisfactorily here and winters well in the ground.

Two other unidentified species are from Brasil. One labeled "aulica" is quite different from my first species of this name. It has grown rapidly and should flower by 1964. The second was collected in the Campos do Jordao (Serre da Mantiqueira, alt. 1000 m.) is said to be deep red. The plant somewhat resembles *A. calyptrata* but is a much better grower and does not go dormant. It seems to have many more leaves at a time than most *Amaryllis*. I am hoping for flowers next season as it is quite large. Perhaps I will have to wait until 1964.

Amaryllis reticulata var. *striatifolia* has been grown in Australia for many years. I have only flowered it once (autumn 1960) and a plant of *A. x johnsonii* was in flower at the same time. Now seedlings of this

cross with a reduced white stripe in their leaves are large enough to flower but have not as yet done so. From the same flowering I also got a few seedlings from selfing var. *striatifolia*.

Amaryllis moreliana, seeds from the U. S. A. recently received, has germinated well. The seedlings are growing vigorously.

I have a couple of other unidentified species from Brasil, but until they flower I cannot report on them.

Amaryllis immaculata was imported as a mature bulb and has made good foliage this year and has now gone dormant.

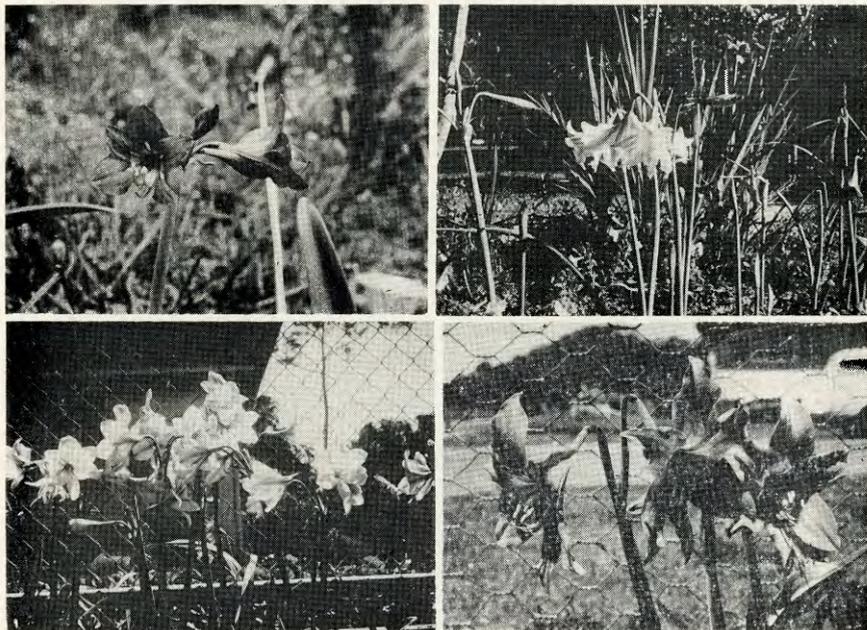


Fig. 21. *Amaryllis* collected by William Morris in northern Queensland gardens. Upper left, beautiful small red form, umbels 5-fld, greenish-white star in throat, and regular, wide-open perigone. Upper right, *Amaryllis vittata* (?), see text. Lower left, small, almost white form, resembles the form shown in upper left in shape. Lower right, apparently *Amaryllis belladonna* var. *major*, a beautiful scarlet (orange red), speckled with gold dust, and with a yellowish throat.

Amaryllis ambigua, also imported as a mature bulb, has grown well and is now dormant.

Amaryllis elegans (syn. *A. solandriiflora*) from Caracas, Venezuela. Seeds germinated well and seedlings are growing vigorously, and so far has not gone dormant in winter.

It now remains to mention some of the bulbs which I collected in northern Queensland in October 1962.

The first appears to be *Amaryllis belladonna* L. var. *major* (see Fig. 21). It is a beautiful scarlet (orange red), speckled with gold dust, and with a yellowish throat. This was not uncommon in the gardens

from Townsville to Cairns. However, the most common *Amaryllis* was a beautiful small red form ($3\frac{1}{2}$ " across) with about 5 flowers per umbel (see Fig. 21). It has a clear greenish-white star in the throat, and a regular, wide open perigone. It is unlike any other *Amaryllis* I have seen.

The one that thrilled me most may be a small form of *Amaryllis vittata* (see Fig. 21). It has a very long tepaltube, about 6" long, flaring at the apex to about 3" across. It has semi-pendulous flowers about 4 to each umbel. From a distance, the effect is a pale pink trumpet but from close up it is white with a few reddish lines on the tepalsegs.

In Innisfail, I saw a garden full of a beautiful, small, almost white *Amaryllis*. In shape it resembles the red one mentioned earlier, but is white with only a few fine reddish lines on it. Again it is only about $3\frac{1}{2}$ " across the face. (See Fig. 21).

The last of these old and established bulbs was found in Gympie. To me it looked like an almost white variety of *A. x johnsonii*. It had somewhat more marked red lines on it than the others, but still gave the appearance of an almost white flower—about 4" across the face. I obtained bulbs of all of these except the one at Innisfail, but I hope to get bulbs of it also this year.

Early hybrid? I sent Dr. Traub a bulb of this unidentified hybrid (?) which is very widespread in Australia. He has flowered it and believes that it is an early hybrid with *Amaryllis striata* in its parentage. The other parentage is of course unknown. In occasional gardens it is to be seen in profusion. It rather resembles *A. striata* but has a pale orange-pink flower on a scape up to 3 ft. tall, and has up to 8 flowers to the umbel. It has been consistently sterile here and no results have been obtained with its pollen on other *Amaryllis*.

Within the last month or two some interesting bulbs have been released from quarantine to me. These include 3 clones of *A. Senorita Hybrids*, *A. forgetii*, *A. x mostertii*, and a small bulb of *A. evansiae* x *A. aglaiae*. I will be awaiting results with these with great interest.

On top of these species, I have about twenty primary hybrids involving 8 different species. I will not bother listing and discussing these as not much can be predicted about them and I must wait their flowering. Most of them are very vigorous and I hope it will not be too many years until they flower. I have high hopes that from this genetic pool a nice selection of types of hybrids can be obtained. Perhaps in a few years I can give you some progress reports.

Our climate here seems very favorable for growing *Amaryllis*—species and hybrids—in the open ground. Rainfall is adequate although sometimes erratic and our water supply seems to be close enough to neutral and soft enough so that they grow well. Absence of extreme heat or cold means that most bulbs have a long growing season and as I mentioned earlier seedlings often grow the whole year round, winter only slowing their growth but not defoliating them.

As there are still quite a few species I would like to have, I would be pleased to hear from any other growers who would like to exchange bulbs or seeds.

[Editorial note.—With further reference to the unidentified hybrid *Amaryllis* with an umbel of 7 flowers, Fig. 16, *Plant Life* 1950 (pp. 99—100) should be noted. Here a similar hybrid is illustrated. It was grown by a friend of the late Major Pam in England in 1941. Major Pam also wrote to the writer about this hybrid and indicated that it was an old one dating back to the first half of the 19th century. Such a hybrid could have been carried from England to Australia by immigrants in the 19th century.—*Hamilton P. Traub*]

FLOWERING AMARYLLIS EVANSIAE

BURR CLOUETTE, *California*

Last October (1962), I received three small seedling bulbs of *Amaryllis evansiae* from Claude Davis in exchange for *Amaryllis calyptrata* seedlings. The largest of these flowered on Sept. 10, 1963 (see Fig. 22).

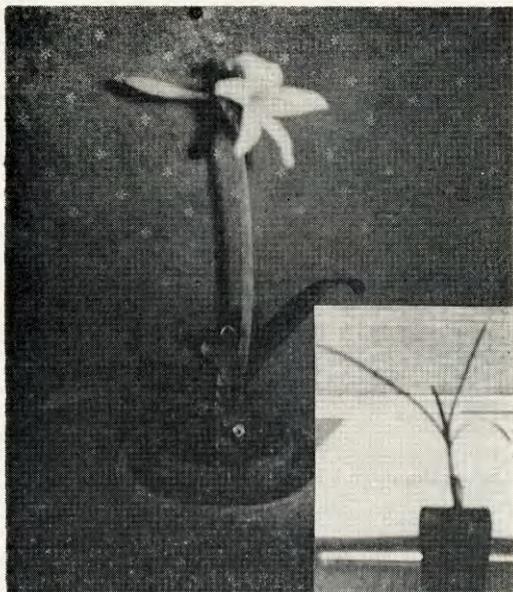


Fig. 22. Left, *Amaryllis evansiae* forma *flavescens* as flowered by Burr Clouette at San Diego, Calif. Right, seedling of *Worsleya rayneri*.

At the time of flowering, this bulb was about $1\frac{3}{8}$ inches in diameter, growing in a 4" clay pot, and planted in Black Magic planter mix. The three bulbs had spent the winter under Gro-Lux lights in the house in small pots. About the first of May, I repotted all three, the largest about 1" in diameter, was planted in a shallow 4" pot, with bulb about $\frac{1}{3}$ above the soil. The other two smaller ones were both planted in one 4" pot.

The largest bulb was put outside in full sun in front of the south-facing wall. The other two were returned to the south window in the house.

The bud was first noted on August 25th, and developed rapidly to open its first flower on Sept. 10. Just prior to opening, the two flower buds were 2 inches long, a brilliant yellowish-green Munsell hue 2.5G Y9/8. On opening, the flower was brilliant greenish yellow (7.5 Y9/8) with darker throat (2.5G Y8/9). The tips of the tepalsegs soon became flushed with a light pinkish orange. As the flower aged, this color spread towards the center of the flower, but only about two-thirds of the way, and the mid-stripe of the tepalsegs remained clear greenish-yellow. A very lovely and dainty flower!

The scape was 10 inches tall and carried two florets both open at the same time, and nearly at right angles to each other. The flowers were two inches deep and three inches across. The tepalsegs were somewhat wavy along the edges and reflexed at the tips.

I used some pollen saved from *Amaryllis* "Gracilis Hybrids" and another miniature on one bloom and pollen of 'Winter Carnival', 'Picotee' and a white Peruvian species on the other. The only *Amaryllis* I had in bloom was a white-striped red and *evansiae* was crossed on it.

One of the Senorita Hybrids is about to bloom so I will try some of the *evansiae* pollen on it. This is a back cross and should produce miniature pastels; maybe even yellowish ones.

GROWING AMARYLLIS IN POTS

C. J. CROCHET AND MRS. J. S. BARRY, Rt. 1, Prairieville, Louisiana

Perhaps one of the most challenging aspects of *Amaryllis* growing is successful pot culture. For a number of years these writers have made an endeavor to successfully bloom *Amaryllis* year after year by keeping the bulbs potted.

First, the proper kind of potting soil must be considered. Various kinds of potting soils must be tried before it can be determined that only one is superior to all others for any particular area. In a score of years we have found through trial and error that: (1) the potting medium must be basically organic in nature (2) that the proper pot size must be considered for each bulb (3) that fertilization must take place regularly during the growing season and (4) that the moisture content must be kept constant.

Potting soil formulae vary. We have concluded that for south Louisiana the mixture components best suited for potted bulbs are 2 parts leaf mold, 2 parts rotted cow dung, and 1½ parts coarse (builder's grade) sand to which a heaping tablespoonful bone meal has been added. This mixture is thoroughly blended at potting time and the bulb is planted so that half will protrude from the surface of the potting mixture. The mixture level is kept one inch from the top of the pot by tapping the pot downward. This leaves space for watering.

Pot size is determined by the size of the bulb which it will hold. One inch from bulb to pot side is considered best. Red clay pots are used. Using too large a pot is not advisable because many named *Amaryllis* clones by nature have weak, small root systems which never penetrate to the bottom of the pot and therefore leave the bulb loose in the pot. Cases in point are several white flowered sorts which have thin and short root systems. Some are 'White Giant', 'Maria Goretti', and 'Albino.' Generally, white flowered amaryllis require shallow pots.

Fertilizer requirements are more than that needed for bed grown *Amaryllis*. Frequent fertilization is a prime consideration. A long lasting fertilizer is applied each month during the growing season. One-half teaspoonful "Fertiloam" is sprinkled dry around the inside rim of each pot and watered in. In addition, a diluted application of "Ra-Pid-Gro" is sprinkled on the leaf surfaces at two week intervals by using a watering can. We in the south are fortunate in that we can take our potted *Amaryllis* out of the greenhouse during the season of rapid leaf growth. We have had very favorable results with growing *Amaryllis* in part shade under trees. Pots are placed close together and sugar cane waste is packed around the pots up to the rim.

The sugar cane waste serves two purposes. One is that the potting mixture surface is kept cool during the hot summer months and more important is that the moisture content is kept constant so that periods of over watering and others of drying out are kept at a minimum.

At the end of the growing season, potted bulbs are returned to the greenhouse for the cold months.

The ultimate in pot growing has not been reached, but it is only through ceaseless experimentation that better procedures are learned, and it is only with these improvements that proximity toward perfection in flowering potted *Amaryllis* can be achieved.

GROWING AMARYLLIDS IN NORTH GEORGIA

BECKWITH D. SMITH, 3479 Rockhaven Circle, N. E. Atlanta 24, Georgia

My best *Amaryllis* are kept growing in the greenhouse all year. By handling them so, it is my belief they suffer less from wind and weather damage, traffic and from insects. Foliage growth is much better and leaves sometimes exceed thirty-six inches. Humidity is better balanced for growing, and proper watering and feeding can be almost perfectly controlled. A light shading of cloth over the greenhouse roof gives proper diffusion of the sun's rays and prevents sunspot, scald and burning of the leaves.

In the fall of 1962 I received a shipment of A. C. Buller hybrid *Amaryllis* from Cape Town, South Africa, which had been shipped by ocean vessel under refrigeration, and on receipt they were again placed under refrigeration at between forty and forty-five degrees until I could arrange to pot and place them in the greenhouse. After refrigeration for a week, the bulbs were potted, labeled as to color grouping and

placed in the greenhouse under an average temperature of 70 degrees. Most of these bulbs were very anxious to bloom. In fact, many of them were showing bud tips on receipt, and they continued to grow, slowly,



Fig. 23. Clones from the late A. C. Buller's Hybrid *Amaryllis*; bloomed April, 1963 by Beckwith D. Smith of Atlanta, Georgia. Upper left, color—orange red; upper right, color—watermelon red, suffused white, lower left, color—fuchsia pink, with white star; and lower right, color—wine red. Photos by Beckwith D. Smith.

even under the cold conditions of storage. Some of the bulbs began to flower in four weeks, but some of them took a little longer, and flowered in six weeks. This period of bloom was in October, and I was

informed that the bulbs had been dug at the Cape, South Africa, in July, just prior to their normal blooming season, approximately August and September. The blooming season for *Amaryllis* in South Africa is the reverse of our blooming season in the southern United States.

The bulbs produced flowers of entirely different colors and combinations of color than are available from the Holland growers. Some are self (solid colors) in shades of very dark red, scarlet, wine, salmon, rose pink, white, striped, and a new combination of color that can only be described as "suffused"; that is, the basic color is rose, let us say, and throughout the bloom there is a suffusion of a lighter color, and with numerous ones showing a white blush. These flowers equally match and in my opinion, exceed the standards of European *Amaryllis*. My observation is, also, that the Buller *Amaryllis* have many other advantages, one of which is the heavy substance of the tepalsegs, making for a longer bloom period, certainly most desirable. Mr. Buller concentrated on this one feature, and he succeeded in developing superior hybrids without sacrificing any part of the beauty of his hybrid flowers. As each flower opened I tried to get good color pictures, and I have submitted these to Dr. Traub. (See Fig. 23.) Pollination was expected through several crosses of these October blooms, and seedlings are now in vigorous growth.

Similarly, in February of 1963, I potted up an additional selection of A. C. Buller bulbs for bloom and exhibition in the Atlanta Flower Show, held in conjunction with the Annual Convention of Federated Garden Clubs of the United States at Lenox Square, Atlanta, Georgia, on April 17-18, 1963, and at which time twenty-three potted Buller bulbs in bloom were exhibited for the first time in the United States. Delegates to the show numbered more than two thousand, from all parts of the United States, and all who saw the blooms were extravagant in their praise. Many of the ladies said that the *Amaryllis* exhibit was the focal part of the show.

After the close of the educational exhibit of Buller bulbs, the potted plants were brought back to my greenhouse and have continued to grow without let-up, and at the time this report is written (September 8, 1963), show no indication of losing their leaves or in any respect becoming deciduous. Apparently, this means that the Buller bulbs can be made to rapidly change their bloom habit, and become acclimatized for spring blooming normal in our southern states. On the other hand, if they are dug here (after being planted in outside ground space), possibly they could be brought into bloom during our fall season by digging and drying them in July, refrigerating for a short period to induce dormancy, and then potting up for indoor fall blooming. I believe it is worth a try, and I will follow this line of experimentation during the coming months. I would be very glad to have correspondence with any members of our Society as to their successes in growing the beautiful A. C. Buller hybrid *Amaryllis*.

WINTERING AMARYLLIS IN THE NEW ORLEANS
AREA

W. J. PERRIN, 4753 Press Drive, New Orleans 26, Louisiana

This is a follow-up article on "Wintering Amaryllis in the New Orleans Area", appearing in 1963 Amaryllis Year Book, page 110. Our 1962-63 winter did not have the low temperature experienced in January

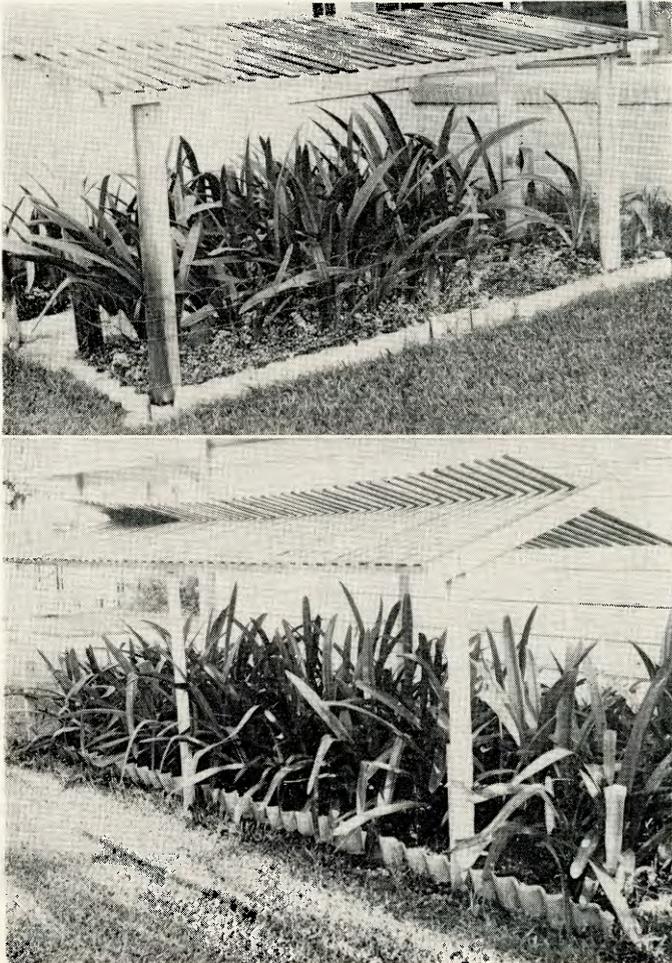


Fig. 24. Perrin hybrid Amaryllis (upper and lower) during summer of 1963 outdoors, New Orleans, La. These bulbs had been stored indoors during the previous winter. Photos by W. J. Perrin.

of 1962; however it did have a record number of freezes. In other words, the severity was lower and the frequency was higher. All during these some 12 to 15 freezes the writer had no worries about the effects of the weather on his bulbs. As mentioned in the '63 article, all of my bulbs were dug on November 1st, disinfected and placed in boxes well packed with Perlite. During the winter months the beds were dug and given a 1-inch layer of 5-10-5 commercial fertilizer and covered with an approximate 3 inch layer of the same soil. During the latter part of February the beds were again dug (spaded) and on March 1st the bulbs were planted. The four months rest given the bulbs seemed to do them much good, in that they took off and grew vigorously



Fig. 25. Amaryllis 'Grand Mist' and 'Grand Bay' during summer of 1963 outdoors, New Orleans, La. These bulbs had been stored indoors during the previous winter. Photo by W. J. Perrin.

immediately. Bloom as expected, was a bit late and normal. This procedure is highly recommended as the rest does the bulbs good and above all, it eliminates worry of loss of bulbs by freeze. Two important facts must be remembered:

1. After packing and storing the bulbs, don't forget to place the boxes in a location free from freezing temperatures; 35 to 50 degree temperature range is satisfactory.

2. Amaryllis bulbs, when purchased or dug, should be soaked in a fungicide solution for 20 minutes and let drain before storing or planting. ORTHOCIDE FUNGICIDE containing 50% captan, works very well.

Please note Fig. 24. Here we see bulbs as of August 20th, 1963 during summer growth. These bulbs were all stored during winter months and are progressing normally as of this date. Of interest is Fig. 25. Here we see the two named and registered bulbs, 'Grand Mist' and 'Grand Bay' during the growing season. In all there are about 47 plants. This is especially interesting to the hobbyist for here we experience multiplication of one's own product.

COMMENTS ON HYBRID AMARYLLIS

BURR CLOUETTE, *California*

The clone 'La Forest Morton' bloomed well and was very beautiful—two scapes, each with four flowers. A white, unnamed clone, from Cecil Houdyshel blooms every now and then—four times last year; three times so far in 1963. It has three nice slightly greenish white flowers per scape. The flowers are about 7-inches across the face, and fairly flat. This bulb is grown outdoors in a pot, and bloomed at Christmas time last year. At that Season of the year in 1962, I had this white, a prepared 'Camellia' and 'Giant Goliath' in bloom, and three Hadece bulbs in bud and showing color. They were all in bloom by New Years.

'Winter Carnival' and 'Marion', two new whites, performed well—the latter has some fine reddish pencilings in the throat.

'Red Master' produced three scapes, each with two huge dark red flowers. 'Royal Velvet', with flowers not quite as large, produced three and four flowers on two separate scapes. The bulb was much smaller, only about two inches in diameter, whereas the bulb of 'Red Master' was over three inches in diameter.

Late in the season, a clone I have been growing under the name, 'Orange Queen' produced two four-flowered scapes, with florets 8-inches across the face, flat, orange with darker throat.

'Clown' is a good red and white striped clone, and was the last to bloom in the regular spring season.

One of Mrs. Barry's *A. x johnsonii* x 'Ludwigs Goliath' is a very nice medium red—four flowers, about 7-inches diameter, on each of two scapes.

One of my own seedlings (Mead Reginae Division x Dutch) is now producing its third scape. It is slightly brownish-medium red; 3 or 4 six-inch flowers per scape, and quite trumpet-shaped.

As I write this report (August 15, 1963), 'Camellia' which bloomed at Christmas time is producing a second scape; as is also 'Tangerine', a fine Hadece clone which produced two scapes last New Years. The Hadece clone 'Rosaline' has just produced its third scape.

I was disappointed in the clone 'Pallas' which was substituted for 'Volendan'. It bloomed well, 4-upturned, medium sized flowers on each of two scapes, but was just an orange red with white throat. I do not like the upturned flowers.

THE FASCINATING ZEPHYRANTHEAE

ALEK KORSAKOFF, 2975 Shipping Avenue, Miami, Florida 33133

All my life I have loved plants and their flowers. My happiest hours were spent in parks, botanical gardens (plantariums), woods, fields and forests. Recently my interest has shifted to the really miniature things that can be grown in small pots.

Since 1957, when Mrs. Clint sent me a goodly collection of *Zephyrantheae*, I have been enamored with the Rain Lilies—or Zephyr Lilies, or Fairy Lilies. I am captivated by the diversity of flower form, from tubular to rather flattish when fully open. Colors range from purest white, shading through pinks and rose into dark red; all shades of yellow, ranging into shades of orange, and to cardinal red; pastels in various shades; some bicolors, and even tricolors; some with white, green or burgundy red throats. Sizes of the flowers range from one-inch to five inches across the face when fully open, and with tepalsegs $\frac{1}{8}$ -inch to more than one inch in width.

What a difference there is in foliage! Starting from almost hair-line strings (filiform), the leaves range to 1-inch or slightly more in width; in length they range from a few inches to 18 or 20 inches or more in length; with coloring ranging from the dulllest grayish to the brightest varnished yellowish or dark greens.

In hybridizing one is fascinated by the great uncertainty of the results. One finds that some are self-sterile and unresponsive to the pollen from other species. Others cross and ripen seeds that never germinate. Many, far too many, cross and produce seeds so profusely, but the seedlings are replicas of the mother plant. Thus apomixis is so prevalent that one never knows what one should get from a particular crossing.

When one gets a real hybrid, one is cheered with the thought that he has proven compatibility of two species, or genera, knowledge useful to science in general. During the six years that I have been working with the *Zephyrantheae*, only one cross yielded a hybrid that merited naming in my opinion.

Discouraging? Oh no! When one sees dozens of bright faces smiling at him, swaying and dancing in the breeze—almost after every good shower—one smiles too. Give them up? Oh no! There is so much to do; so much to hope for; and such a good chance of producing something that will surely bring joy to many others. There is no chance whatever of giving up such a fascinating interest in life.

During the next few weeks every day I will be expecting the promised bulbs from the Dominican Republic—*Zephyranthes bifolia* Aublet—right from its home where it was first found in the year 1775. I am staying put!

EVOLUTION OF AN AMARYLLIS ENTHUSIAST

MRS. JOHN A. ETHERIDGE, *Florida*

Whoever thought twenty years ago when we bought our Florida home that the large bed of *Amaryllis* on the grounds would spark a hobby that has finally grown into a full-time occupation for two people! At the time, we were mostly impressed by the size of the property (two city lots 100 by 105 feet) and by the lovely oaks, citrus, hibiscus and other semi-tropical shrubs and vines. We arrived in the spring, however, the best blooming time for *Amaryllis*, and, after seeing these beautiful plants in bloom, we could hardly wait until the next spring to see them again.

As the years went by, I joined one of the garden circles and became interested in the flower shows. Some time later, the Federation Flower Show was held at a time when *Amaryllis* were at their best. I took First, Second, and Third in that show and, from then on, I was an enthusiastic grower of *Amaryllis*.

A kindly neighbor showed me how to plant the seed with the point down, making little grooves with a ruler or yardstick, depending on the size of container used. By 1957, with the help of a yard man, I had extended my collection to blooming-size 3,500 Mead hybrid bulbs. In those early days, no record was kept of the crosses; just waited for the surprises, which were very rewarding. Among the most outstanding color shades in the crosses were fuschia shades, some with light throats—others solid, and one plum shade, the most perfect *Amaryllis* I have ever seen! Out came the pollination booth and I waited for the second scape to appear. Heartbreak followed as it barely came through and then withered. I began soil testing and found the soil very acid. I had been advised over the years to use neutral copper and had used it so long that the ground had become toxic. Many of my special bulbs disappeared.

Space had run out in our garden but the desire for some Dutch *Amaryllis* plagued me. I thought I would get just a few, though where I would put them was a big problem. About this time, my husband joined me in my hobby as he was greatly impressed with them. Soon there were several hundred Dutch hybrids on hand so we farmed out most of the Mead hybrids to a daughter and a friend. Now we have on hand at all times about 3,500 of the Dutch hybrids and crosses. Where could we put all of these? It was then that my husband had a brain storm. Stooping, kneeling, and bending to keep weeds and wild grass out of the *Amaryllis* caused my husband to wonder if there wasn't a better way to care for the plants. We had not yet learned about mulching. It seemed that if some way could be found to *raise* the beds to a no-stooping level, care would be much easier. Why not tables? Acting on this impulse, my husband built two tables as an experiment. The tables were 28 inches high with 1" by 6" treated lumber for the frames and hardware cloth for the bottoms. The tables were very successful, easing the strain on back and knees. The next

year we built ten more tables. The tables were placed in a single row and a shade shelter was constructed of 6 foot poultry wire covered with Spanish Moss. The moss gives filtered shade.

We now have about forty tables, 2' by 4' in size. About the only change we have made is to use 1" by 8" boards instead of the 1" by 6", thus giving greater depth to the bed. With full-sized, mature bulbs we plant 18 to each table, with three rows, six bulbs to the row. Smaller size bulbs can be planted more closely. Fertilizing, spraying and mulching are easier. We have also, most of the time, 100 or more potted plants. These are also placed in the tables and spaces between the pots are packed with mulch to conserve moisture.

The table method gives us the opportunity to use a uniform soil mix and to watch closely the pH. We have found that *Amaryllis* do their best when the pH is about 6¾. Less than 6½ may cause acid decline. For our soil mix, we use ¼ garden soil, ¼ compost, ¼ well-rotted manure and ¼ sand or Perlite for aeration, plus bonemeal. This mixture has worked very successfully.

Some of our Texas friends claim that our table method is a lazy man's way to grow *Amaryllis*, but my! what a relief not to have to do all that stooping. There is still plenty of work to do. Besides keeping a check on the soil and spraying regularly, we have to watch for insects. About the only insects that bother *Amaryllis* are the lubbar grasshopper, which is controlled by spraying or by using a pair of clippers to snip the villain in two; slugs and snails, which are controlled by bait.

In spite of our table method, we still keep four ground beds in which we have McCann doubles, whites doubles, whites with a faint line of pink, some old Mead favorites and Seminole Reds. We use commercial fertilizers which are high in phosphorus and potash, low in nitrogen, with minor elements. Seedlings are given liquid fertilizer and all sizes are given some as during the rainy summer season so much is leached out.

Each year we import bulbs from the best growers in Holland and advertise them nationally in three magazines. From the small beginning with one bed of Meads, we have come to the place where we live and breath *Amaryllis* all year long.—6908 Narin Ave., Tampa, Florida, 33604.

EFFECT OF DECEMBER 1962 FREEZE ON FLORIDA AMARYLLIS

MRS. FRED TEBBEN, P. O. Box 281, Lake Hamilton, Florida

In the 1963 *Amaryllis* Year Book, I reported on my *Amaryllis* moved from Illinois to Florida in 1961. This article was to be a report on the progress made in growth of all bulbs here in my Florida garden, but the worst freeze of the century came to Florida in December, 1962, so my report will really be on its effect on all *amaryllis* here. For three days and nights we had such extremely low temperatures it was

feared little would be left growing. Here the thermometer registered 18 degrees for long periods of time, and even much lower in the low sections outside town. We are on one of the highest spots in Central Florida and so were fortunate. Then, too, the cold came from the northwest and had to pass over much warm land area to reach us so we did not suffer as much damage as had been feared at first. Almost all signs of that severe freeze are now gone, altho much tropical planting has had to be replaced with hardier material.

I have two large *Amaryllis* beds, each partially shaded and each partially protected from the north winds. In one bed are all my Dutch bulbs and African ones, while in the other are my seedling bulbs and those from India and Japan. I watched these most anxiously for I had nothing with which to cover or mulch either bed, and I was much surprised to find that very little of the *Amaryllis* foliage suffered much damage. Some of the Dutch bulb foliage immediately showed red spots as a result of the cold damage, but very little showed up on the seedling bed. The "native" *A. rutila fulgida* bulbs, however, lost all their leaves and as a result began to put up buds early in January. More cold came and as a result these buds either blighted or bloomed in very deformed and crooked shapes. The Dutch bulbs also sent up bud stalks early and many of these blighted, but some came later and were really lovely and much appreciated since I had feared I would lose all of them. Those that did best were protected from the extremely cold northwest wind, so I shall try to give more protection from such winds in the future. In the seedling bed which is more exposed no foliage was frozen and almost none showed red spots from the cold, but not a single bud appeared, and I now find that the bulbs are all showing offsets. In many cases there are now four bulbs where I planted only one, so I am afraid I shall again have little bloom from these bulbs.

The *Crinum* foliage was all frozen down entirely, and many people dug and discarded their bulbs because of this. I salvaged a few so now I shall have more to identify later. All have sent up fine foliage and *Crinum* 'Cecil Houdyshel' and the "Milk and Wine" lilies have bloomed very well; so has *Crinodonna corsii* clone 'Fred Howard.' It bloomed in April and is again showing bud stalks, so even tho all foliage was frozen, these have all come back beautifully and all will bloom eventually. *Habranthus* and *Zephyranthes* were beautiful as always, and the paper white narcissi and the daylilies have outdone themselves with bloom this year. So, all in all, little damage was done to the amaryllids grown here, and I hope we shall never again experience such a freeze in this section.

I have acquired a few more *Amaryllis* bulbs, of course. I have been much pleased with the beds of the Mead hybrids that bloom so beautifully over a long period here, and the variety of colors one finds among them. Then, too, I purchased some small 22/24 centimeter bulbs of the clones of the Dutch hybrids that seem to do best in the borders here in the south. Among these were 'Apple Blossom,' 'Love's Desire,' 'Ludwig Dazzler,' 'Marie Goretta,' 'Margaret Truman,' and others.

Even tho these were small bulbs all of them bloomed and all have grown enormously in the border. I was very pleased with these small sized bulbs and believe I shall add more of this size as time goes on.

We are told here that the *Amaryllis* need little but water to make them grow and bloom very well. Chemical fertilizers leach away quickly and do little good so I am adding humus in the form of compost etc., to hold the moisture and add food value. This year I seem not to have many of the huge lubber grasshoppers and only a few cutworms to fight, so I am making progress.

Before my last *Amaryllis* bud had opened, my husband and I took off on a two weeks' trip through the Smokies and on up to Washington, D. C. to visit our son. All the way up I enjoyed the Mead hybrids and native amaryllids blooming in Florida; and through Georgia and the Carolinas, the iris, daylilies and peonies were gorgeous. In the Smokies the dogwood was at its very best, and in Washington the azaleas and rhododendron were lovely. On our return trip we stopped in Charleston, South Carolina, for a few days and there I saw lovely beds of *Amaryllis* in bloom in mid-May. Many of these were the species bulbs, but most were the hardy Mead hybrids. I inquired about them, and was told that the temperature reached nine degrees there in Charleston, but the *Amaryllis* suffered no damage as they are planted deeply enough so that they do not come up until all danger of cold weather has passed.

All in all, I cannot complain of the season, and can only hope for more bloom another year. The blooming season seems to be somewhat more extended than one at first realized, as only last week I saw a lovely red *Amaryllis* in bloom on the north side of a house not far away. This may be unusual, but the crinum come when the *Amaryllis* are done, and the *Habranthus* are indeed "surprise lilies" and are still blooming now and then along the edge of the *Amaryllis* bed. I have many more seedlings to plant out this fall, so will have to extend my *Amaryllis* beds to take them in. To me a bulb is a "surprise package," and I can never seem to have enough of them. They have bloomed this year from mid-February till mid-July and may go on longer but since I shall soon go back to Illinois for a visit I suppose I shall miss seeing them. Thus far I have made no crosses or tried any hybridization of my own. The seedlings I have to set out next fall are pure Dutch, or Dutch x Mead crosses made by other people.

LANDSCAPING WITH AMARYLLIS

MRS. BOB E. HEROLD, 203 Cromwell Dr., San Antonio, Texas 78228

As most Texas gardeners begin *Amaryllis* growing with *A. x johnsonii*; I, too, began my interest with ramets of this clone. My garden was begun in earnest in June, 1949, with the building of a new home; however, I've gardened all over Texas for over thirty years. As my garden progressed, transplanting occurred in various beds for more pleasing harmony.

My next *Amaryllis* was a very prolific variety, and to date, I have not been able to identify it. It seems to be a reverse of *A. x johnsonii*—small, trumpet-shaped, white with rose-red stripes, fragrant, two to three scapes with four to six florets to the scape and a good multiplier. I have grown this for about twenty years, the “start” coming originally from California. I have exchanged and given it to many people trying to find out about it. Also, I have sent bulbs to Mrs. Cecil Houdyshel, California; Mr. Claude W. Davis, Louisiana and more recently to Mrs. A. C. Pichard of Houston. These are interplanted along a winding sidewalk bed which presents a profusion of color in early spring from bulbs, early perennials and bearded Iris.

Along a driveway, a bed of pink roses is planted each year with pink *Ranunculus*, shades of double pink St. Brigid anemones and pink tulips, interspersed with pink Rain Lilies and one hundred and eighty-five pink and white “Califlora hybrid” American unnamed *Amaryllis*. These were gained from an original purchase of one dozen mixed “Califlora hybrids” bought in 1952. This one *Amaryllis* has increased in such prolific numbers that I now have two hundred and twenty-five of this one color variety, besides what I have given away. In front of these *Amaryllis*, a border of the common pink oxalis add their beauty nine months of the year.

Across the front of the house, a brick planter has thirty of the pink and white striped “Califlora hybrids” and in the springtime has a row of “White Magic” petunias bordering these.

In front of the shrubbery planting are more *Amaryllis*. Heretofore, they have been mixed reds of the “Califlora hybrids”, but these have been moved to a back garden bed and this spring will see a continuation of the small pink and white trumpets, already mentioned.

We have a corner lot and the street side has an attractive, old and ornate antique white-painted ornamental iron fence set in concrete, the concrete covered with various small leaved varieties of ivies. Inside this fence, is a choice new bed of Ludwig seedlings. From the one hundred seeds, I have sixty bulbs. I had the best luck with the dark reds, twenty-one out of twenty-five seeds; fifteen out of twenty-five in the crimson; fifteen out of twenty-five in the pinks, and only nine out of twenty-five in the whites. In this bed, are a number of choice “sels” from unnamed Ludwig seedlings, before I knew anything about hybridizing. I also have three “Picotee” seedlings. This bed will be bordered with white “Little Gem” Sweet Alyssum. This bed will be watched to see what I have.

In back of a new garage are two new beds, one with one hundred and eleven “Self” seedlings of ‘Nivalis’ and ‘Maria Goretti’. It has been bordered with the green and yellow *Alternanthera*. The other bed includes my choice named clones and other unnamed Ludwig and Warmerhoven bulbs. In this bed are ‘Sweet Seventeen’ and five offsets in three years; ‘Bouquet’ (my favorite), ‘Halley’, ‘Maria Goretti’, ‘Nivalis’, ‘Ludwig’s Scarlet’, ‘Doris Lilian’, ‘Pink Favorite’, *Amaryllis striata*, var. *fulgida*, and *rutila*, as well as many unnamed American

hybrids. This bed has been bordered with the red and yellow *Alternanthera*.

Across the lawn, the side and back cyclone fences are entirely covered with nine varieties of ivies, and here are many more American and Dutch seedlings and offsets, including one hundred and four of 'Bouquet' "self" seedlings. All of the back garden beds are in graceful curves edged with red bricks (at ground level) and "monkey grass". Although monkey grass can be a nuisance, with attention, it makes a neat appearing border in the cold of winter when gardening comes to a "slow walk".

Even my alley is landscaped with *Amaryllis*, about fifty; with a restful background of the ivy. In all, I have seven hundred and ten *Amaryllis* in blooming size with three hundred and fifty one-to-two year old seedlings to look forward to in enthusiastic anticipation. I grow many other amaryllids. This fall, I will purchase four named *Amaryllis* clones and several species.

Since I go for bulbs, people say they never pass without seeing color and beauty as well as a good general appearance; all of which is cared for by my husband and myself.

THE 1962-63 AMARYLLIS SEASON

ROBERT D. GOEDERT, P. O. Box 6534, Jacksonville 5, Florida

The 1962-63 season like the two previous seasons was very cold. Many *Amaryllis* planted in the border in the south, possibly weakened by the past two seasons, rotted during the winter and were lost. A number of people complained that they lost their entire collection of Dutch *Amaryllis*. This was particularly evident in the Valdosta, Georgia area where few Dutch *Amaryllis* were entered at the show. The Mead hybrids in the Valdosta area appeared to have fared better. Whether this indicates that the Dutch hybrids are less hardy than the Mead hybrids is not fully evident. First there are many Mead hybrids planted in the yards that gets little or no care and if a bulb or so is lost no one particularly notices it. When a person has a few Dutch *Amaryllis* he gives them a great deal more attention. This includes additional fertilizer and it is the writer's opinion that the Dutch *Amaryllis* being given special care are more fleshy and not hardened off as they should be at the end of the season. This tends to cause many people to think the Dutch *Amaryllis* can not stand as much cold as the Mead hybrids. It has been my experience that the Dutch *Amaryllis*, if treated like the Mead hybrids, are possibly just as hardy. I do feel that those who grow their Dutch *Amaryllis* in the border need to give them a little more potash in the fall to harden them off before winter sets in. Planting in a well drained area will also help and some sort of mulch over them in winter would also be helpful.

Not only did those who planted in the border lose bulbs but many who planted in pots reported great losses. In most cases they attributed this to carelessness. Some said they had heard the weather forecast but just did not take it too seriously. You might say they figured lightning does not strike the same place three times. Many said they went out the

next morning too late and found their bulbs completely frozen. Some placed their potted plants in their garages or other area only to find this did not provide adequate protection.

This all indicates that, in the future, bulbs in the border should be planted deeper, should be hardened off in the fall and given a little special protection. Those with potted plants will have to learn that they should provide a little heat in their storage areas during extremely cold weather.

The *Amaryllis* bulb crop from Holland and other areas was not as good in quality as normal this past season. Some of the white clones as well as picotee types showed that due possibly to a sudden dip in temperature the bulbs had made spikes in the greenhouse during late summer or fall. Some bulbs showed advance buds which decayed during shipment. This reduced the number of spikes some clones produced. The Hadeco South African clones, on the other hand, produced an exceptional number with three spikes. The South African *Amaryllis* are becoming more popular and with the introduction of named clones should be more evident at shows. The *Amaryllis* bulbs from India this past season also were not up to quality and many did not flower; however the quality of the flowers appears to improve each year. It is expected that the percentage of spikes from the Indian bulbs will be better in the future as they are beginning to rotate their crops to new ground each year. They also are trying to market the bulbs as soon as they reach maturity. They find that once a field reaches maturity the bulbs will decline if not lifted and planted in new soil.

This past season more people purchased the smaller size Dutch bulbs. Besides the fact that two of these can be purchased for the price of one large bulb many find they are much more successful with them. The young bulbs are usually more vigorous. They make a fair spike the first year and if fertilized properly will grow into a top size bulb for the second season. Many find the second year with a good root system established in a pot they can get an exhibition bloom much easier than with a newly imported large bulb. Of course there are still a number of experienced exhibitors who prefer to buy the large bulbs for exhibition. A really experienced grower can flower a large bulb very successfully the first year and keep the bulb in a flowering condition for many years. The inexperienced grower however finds the older bulbs harder to handle as they tend to remain dormant over longer periods whereas the young bulbs tend to start easier and establish themselves better. The small bulbs once established are easier to maintain. The small size bulbs are also becoming very popular in Italy and southern France as well as in the southern United States. Many northern hobbyists prefer the smaller bulbs. They are not as successful with the larger bulbs as they decline after flowering the first year. The small bulb will establish itself at the proper size for pot culture and can be maintained in a healthy condition that will make a reasonable flower spike or two each year without forcing. They feel that bulbs that are overgrown can not be maintained under pot culture conditions and have to decline. Those who grow for exhibition should understand that when a bulb is forced

to get a maximum flower, most clones can not recover in one year's growth and they should not depend on exhibition spikes from the same bulbs year after year. They should have a program whereby they have new or young bulbs coming along each year.

While the large exhibition varieties in solid colors are still most popular there is some indication that other types will be seen more in the future. First in the large exhibition types there are trends away from the solid colors and the classic flat round leopoldi types. Ludwig's Picotee types have an airy form. They are a departure from the solid whites. Although for years there have been many white seedlings with a touch of red or pink in them. Few or none had been introduced. The past few seasons we have seen such clones as 'Marion', 'Peppermint', and 'Siren of Paradise' introduced. These are all beautiful white clones with just a fleck or pencil stripe of red. This gives them some individuality not associated with the pure whites. Ludwig's new introduction, 'Streaking Stripes', indicates a new departure in hybridizing. Here-to-fore a clone with any green in its makeup was considered inferior. 'Streaking Stripes' has a great deal of green in it. It is however an exceptionally nice clone. The blending of red and white with green is very pleasing. It also has a very elegant and beautiful loose form. It probably will become a leading clone although a striped variety seldom ever is as popular as a solid color. The new blush or blended clones such as 'Golden Triumphator', 'Floriade' and 'Pink Beauty' are becoming very popular. All this in the large flowering hybrids is a welcome change from the Dutch breeding of the past where some 8 or 10 solid color tones were all that were available and each new one was another in this limited color range.

In addition to the new bitones and blends being developed new colors are appearing. Ludwig's 'Home Decorator' is a new bronzy salmon that has wonderful color value. The Hadeco African *Amaryllis* also have many improved colors among them.

The small *Amaryllis* are each year becoming more popular with the housewife; however they are not widely accepted by the exhibitor. The gracilis forms can be grown several to a pot and give a show of flowers over a relatively long period of time. As these bulbs can be purchased more reasonably they will become popular and it is hoped their color range will be expanded. New types of free flowering medium size hybrids are needed in the trade. The large flowering hybrids do not flower reliably enough to get and keep the interest of the normal housewife. A free flowering small or medium flower variety is believed to be practical in breeding and once developed can become very popular with the housewife. In this respect it is hoped that some of the free flowering habits of *A. striata* and other species can be developed in new small or medium size hybrids.

The quality of flowers at the shows has declined the past several years. Part of this is a result of the extremely cold weather but part is due to the lack of interest by the exhibitors in purchasing new stock each year and retiring some older bulbs previously purchased that are declining.

Possibly the top show variety of the past season was 'Marion'. It grows large very easily and can compete successfully for the Best Flower in the show. In commenting on the clones I observed this past season I would like to again, as last season, comment by color groups.

WHITE CLONES

This past season saw several new white clones introduced. 'Overture' and 'Winter Carnival' are both tall new whites with airy form. Both seem to be excellent additions to the whites. Of the older clones 'Flying Cloud', 'White Giant', 'Christmas Gift', 'Nivalis', 'White Crane' and 'Dazzler' all gave a good account of themselves. Many still claim first place for 'Oasis'. Others have their own white favorite. 'Mt. Blanc' possibly was the most outstanding in my collection. Most of these made three (3) large spikes.

WHITE WITH COLOR

Picotee clones remain popular and the two new named clones, 'Square Dance' and 'Dutch Doll', were well received. The clone, 'Sensation', is just what the name implies. It is a real flat white with a $\frac{3}{4}$ " bright red border. It is without a doubt one of the most beautiful clones. 'Marion' is a huge white with some red penciling. It is a good show variety and will become very popular as it flowers easily.

WHITE FLUSHED

'Apple Blossom' still is the most popular *Amaryllis* and a most vigorous clone. 'Love's Desire' with still more pink in it is very good. 'Rose Marie', a new Van Meeuwen clone is very similar to 'Love's Desire'. 'Pink Beauty', white flushed pink, is gaining in popularity. 'Little Diamond' is still the undisputed leader of the pinks. Any one who sees it wants it. It appears solid pink at a distance and is round and very flat. The flower is rather large. 'Floriade' and 'Golden Triumphator' make very large flowers. One is white blush pink and the other white blushed golden orange.

WHITE STRIPED

'Streaking Stripes', Ludwig's new striped clone is very outstanding. It has a great deal of green in its makeup which adds handsomely to its beauty. It also has an exceptionally beautiful form. This is a striped clone I predict will become very popular. 'Zenith' still is popular with the exhibitors especially in Texas. 'Silver Lining' is popular in the Mobile area. Van Meeuwen's new variety, 'Pallas', is a white veined red clone rather than a stripe and is very interesting.

BICOLOR

'Beacon' is still popular. 'Candy Cane' flowered well this past season. 'Fantasy' and 'Royal Dutch' are popular rose and white varieties. 'Five Star General' appears to have propagation troubles. Van Meeuwen's new clone, 'Aphrodite', is somewhat similar to 'Five Star

General' and a welcome new addition to the bright red and white clones. 'Piquant' is a fine new clone similar to 'Candy Cane' but of a medium dark red coloring rather than orange red, it is a fine new addition.

BLENDS

Two new ones in this group were well received. 'Day Dream' is a fine new clone that might be classified as an improved 'Margaret Rose' or 'Sweet Seventeen'. Only time will tell. It is a fine clone with very large overlapping tepalsegs. 'Fair Lady', vermilion and white, with the make up as 'Margaret Rose' is a real beauty and really different. It is an excellent new one. 'Pinksterflower' is still popular in orange and white. 'Rosaline', a Hadeco clone, is brick rose and white. This is a new color and a most beautiful free flowering addition.

ROSE PINK

'Dutch Belle', a soft light rose pink is probably the most outstanding introduction in this color in a number of years. The backs of the tepal-segs are white which makes the flower appear lighter. 'Flora Queen', although very scarce, is a real beauty in a light rose with lavender caste. 'Queen of Sheba' still remains one of the leading rose pinks with lavender caste. It grows easily. 'Bellini' is a new medium rose pink that was well received. 'Shakespeare' (not Ludwig's and to be renamed) is a particular old rose color that is very outstanding. 'Fritz Kreisler', a new one similar to 'Daintiness', drew a great deal of comment and will be popular this coming season.

ROSE RED

'Bella Vista' is still possibly the best medium rose red. It is a real beauty and a very robust grower. 'Trixie', Ludwig's new rose red, is a good addition to this color. Warmenhoven's 'Mysterie', 'Moreno', and 'Bordeau' are all good dark rose reds.

WINE RED

'Red Master' still leads this list. 'Blazing Star', 'Tristan', 'Alcyone' and 'Purple Queen' all have their admirers.

DARK RED

'Mars', Van Meeuwen's new dark red was well received. This is a large flowering clone that should become very popular. 'Queen Superiora' and 'Franklin Roosevelt' remain popular.

MEDIUM RED

Warmenhoven's 'Flamboyant' was well received and is a beautiful red. It, with 'Red Champion', 'Topscore' and 'Apollo' make up a quartet that is hard to beat. All are beautiful large reds of different form and are most outstanding. 'Red Champion' is huge and can win easily at the shows. 'Scarlet Triumph', 'Ludwig's Scarlet' and 'Wyndham Hayward' remain popular.



Fig. 26. *Amaryllis* *aulica* var. *platypetala* as grown by Sam Caldwell, Nashville, Tenn., from a bulb imported by Robert D. Goedert, Jacksonville, Fla., from Hawaii where it is naturalized. The species came originally from Brasil. Photo by Sam Caldwell.

LIGHT RED

'Personality' is a rosy vermilion that has some yellow on the mid rib deep in the throat. It was well received last season and will increase in popularity this coming season. It is a very beautiful addition.

ORANGE RED

The Hadeco African 'Orangedale', 'Terro Cotta' and 'Tangerine' are all nice orange red clones. 'Tangerine' flowers well from 22 cm size bulbs. It will often make 3 spikes. The flowers are up to 6". It is an excellent pot plant. 'Traffic Stop', 'Lucifer', 'Don Camillo' and 'Cherokee' are all good orange reds.

ORANGE

'Delilah' is still one of the best orange clones. It has a clear self soft orange color. 'Orange Wonder' becomes more popular each year and is possibly the leader in this group. 'Camellia' flowers darker each year and can be classified in this group or as orange red. Propagation difficulties may cause this clone to be discontinued. 'Salmonette' still remains popular.

SALMON

'Home Decorator' is an outstanding new bronzy salmon that should become very popular as it is a new color that is most outstanding. 'Rilona', a buff or very light salmon is still sensational and a most beautiful clone. 'Bouquet' is still very popular. 'Queen's Page' and 'Salmonea' still perform well.

SPECIES

The species continue to be hard to obtain and usually result in a financial loss to the importer. I was able to get 14 different ones from the wilds this past year; twelve from Brazil and four from Peru along with several lots of *Zephyranthes* and *Habranthus*.

The most promising of these species is SA63-12 from Santa Catarina Island, Brazil. It is said to be yellow. The growth appears to be that of *A. striata* and is very robust. If this one turns out to be truly yellow it will be a worthy addition.

The species SA63-11, said to be a white *Amaryllis* apparently is a *Hymenocallis* or *Crinum*. The growth is similar to *Hymenocallis speciosa* but less lance leaved than the species obtained from Van Tubergen of Holland. It is also distinctly different from the *Hymenocallis* LM63-3 received from Iquitos, Peru this season which is an exceptionally broad leaf form of *Hymenocallis*.

Three wild species received this past season have flowered. Species SA62-7 which is the true *A. blumenavia* from Santa Catarina, Brazil made spikes with up to 7 flowers. This is a beautiful little species and is growing very vigorously. Mixed in with the bulbs received as Species SA62-7 were some other bulbs that also had the typical pear shape of *A. blumenavia*. These bulbs were of a black color rather than the reddish

color of *A. blumenavia* and were segregated out. Those that have flowered have turned out to be a form of *Habranthes robustus* and are possibly a little smaller than those in the trade and a more even pink tone. One bulb segregated with those considered to be *A. blumenavia* has a wider leaf than those found to be *Habranthus*. This may be a different form of *Habranthus robustus* or possibly an *Amaryllis* species. This single bulb is growing very rapidly and I feel it will produce flowers this summer if a *Habranthus* and next spring if an *Amaryllis*.



Fig. 27. *Amaryllis aurica* var. *stenopetala* as grown by Sam Caldwell, Nashville, Tenn., from a bulb imported from Santa Caterina (State), Brasil in 1959 by Dr. Robert D. Goedert, Box 6534, Jacksonville, Fla. Photo by Sam Caldwell.

The species PV63-2 from Kosnipata Valley, Cuzco, Peru, has flowered. The flower was small with two to the spike. It was very similar to the *Amaryllis* grown in India under the name of *Amaryllis belladonna* (syn. *A. equestris*). The foliage also resembled this species or hybrid. The only difference I could detect was that all petals except

the lower petals had yellow near the center; however, the lower petal in PV63-2 was solid red. The form of the flower was very similar.

Species LM63-1 has just flowered. This species from San Martin, Peru, is mid-way between *A. belladonna major* (Type: *A. belladonna* Iquitos, My No. 8-61) and *A. belladonna* (syn. *A. equestris*.) (Type grown in India under this name). Species LM63-1 made 2 flowers to the spike of a very bright scarlet with white green center. The coloring is more like *A. belladonna* (syn. *A. equestris*) and the shape more funnel shaped. The tepalsegs are just as long as in *A. belladonna major* but the flower does not open up as flat. It is a beautiful clear color. The bulb has a much longer neck than *A. belladonna* Iquitos that grows at Iquitos, Peru, not too distant away. This is no doubt a form of *A. belladonna* which appears to grow wide spread and in many forms in this general area of South America.

I have recently received a 15th species from Santa Catarina, Brazil. This species grows along rivers in this area. It is a small variety which is whitish with a pink overtone. The adult bulbs are about $\frac{1}{2}$ " in diameter. The basal plate of the adult bulb is larger than the bulb. They are white in color and appear much like a miniature *Haemanthus multiflora* bulb.

[Editorial Note.—This is *Nothoscordum inodorum* which is a noxious weed when grown outdoors in California as reported in an earlier number of *Herbertia*; when grown in the humid East it apparently is not such a nuisance. It is recommended that it be grown in pots and not allowed to go to seed. The bulb forms numerous bulblets which are the chief danger when grown outdoors in California.—Hamilton P. Traub]

Although my venture in collecting species *Amaryllis* has been a considerable financial loss to me, I do hope in some manner to continue these efforts in the future. I believe with the use of these species some one can develop more free flowering hybrids, new colors and shapes.

At present one collector is on a very extensive collecting trip through Bahia, Goias and Minas Gerais, Brazil.

It is hoped that this trip will produce some new and interesting *Amaryllis* species.

GOLDEN RULES FOR GROWING HYBRID AMARYLLIS

MRS. A. C. PICKARD, *Houston, Texas*

Individual hybrid *Amaryllis* plants vary greatly in their behavior under cultivation. Some are almost evergreen; others lose all their leaves in late fall. Some delay their flowering for several months; others have a short dormant season.

These differences can be attributed chiefly to inherited factors, but also to a lesser extent to environment, and to the kind of culture given during the preceding season. Because of these variations it is advisable not to force into growth.

It is with these thoughts in mind that the following suggestions are made for handling hybrid *Amaryllis*.

(1) *Quality Bulbs*—"Plant a good bulb and you will have a good flower" is an almost invariable rule. Purchase large healthy bulbs, for wise investment is not usually based on bargain offers.

(2) *Proper Handling of New Bulbs*—Keep bulbs in a cool dry place until time for planting. The bulbs may be stored in the home refrigerator. Place bulb in a plastic bag, fasten tightly and store at a temperature that keeps vegetables. This method is especially beneficial to hold bulbs dormant for a longer period.

(3) *Potting Procedures*—Select a clay pot to accommodate the size bulb. Avoid an overly large pot. An inch all around between bulb and pot is adequate. Prepare the clay pot by soaking twenty-four hours before using. Provide proper drainage and fill with the potting mixture to the level at which bulbs are to rest. This will vary according to the size of bulb being planted. Set the bulb firmly at a depth to permit exposure of the top third. Newly purchased bulbs may or may not have roots attached. If you want to be extra kind to your bulbs, coat the basal plate lightly with Rootone, a hormone preparation, just before planting. This deters bacteria and fungi which causes rot and has a beneficial effect on root growth.

(4) *Soil Mixture*—A proper soil for bulb growing remains important. Good soil may be prepared at home by combining 1 part sharp sand, 1 part well sifted garden soil, 1 part rotted dairy fertilizer (or $\frac{1}{2}$ part dried sheep manure), 1 part leaf mold (or humus). Add 2 cups of bone meal, 1 cup super phosphate 20% to each bushel of mixture. Mix well until all material crumbles in your hands even when moist.

(5) *Rest and Resurrection*—Keep the newly potted bulb in a semi-dark place with temperature around 50-60 degrees F. for about six weeks for root making. Water sparingly. Too much moisture induces bulb rot. Also it stimulates foliage growth and retards the budded stem before it emerges from the bulb, sometimes even causing failure of blooms. When the bud is well protruded, move the plant gradually to light. Water more as growth advances.

With bulbs grown last year in pots or directly in the garden bed, to encourage early bloom, bring the pots indoors or lift plant from garden. Give them a complete rest from food and moisture until foliage has dried off—then retire them for rooting just as you would a new bulb with the same potting procedure. The bulbs are then ready to repeat their growing cycle.

(6) *Suitability to Environment*—The plants must be adapted to the condition which will exist when they are placed in a lightly shaded garden spot. Select a possible site for planting and prepare a rich soil in a raised bed, at least 6-8 inches above ground level, to insure perfect drainage. The bulbs appreciate moisture but not wet feet. The bulbs may work their way deeply into the ground, especially when planted in a friable soil. It would be rash to plant them too deeply in the first place as the bulb cannot make healthy foliage when the bulb is too deep beneath the soil. *Amaryllis* develop a great mass of fibrous roots but these will deteriorate rapidly in soggy soil.

(7) *Mulch the Garden Bulb*—After bulbs are planted it is beneficial to cover the soil with two to three inches of mulch to conserve moisture. Keep the soil cool, discourage weeds, and eliminate the need for cultivation. Mulching with organic matter plays an important role because it is rich in beneficial soil bacteria. Use the most convenient mulch obtainable in your area and it is advisable to provide extra nitrogen to counteract the “tying up” of nitrogen by the decaying cellulose. A very heavy mulch will reduce danger of damage by a freeze and it is a must to be prepared for the unexpected.

(8) *Fertilizing*—*Amaryllis* are heavy feeders and enjoy a well balanced meal of nitrogen, potash and phosphates plus all the minor elements about which we hear so much these days. Natural, well rotted dairy fertilizer (sometimes hard to obtain) but most rewarding, reinforced with a nice top layer of decaying leaf mold benefit the plant directly. Whenever this material is not obtainable, any method of soil management that emphasizes a program of regular fertilizing and maintenance of good soil structure is a must for *Amaryllis*. Selection of a suitable fertilizer is a problem to be solved.

(9) *Moisture or Water Supply*—Water, the universal solvent, is the only way plants can obtain mineral nutrients. Plants absorb water through the roots and transpire it through the leaves and green stems. Adequate water keeps plants in good condition and greatly increases quality and number of blooms. Water loss is influenced by light, relative humidity, air temperature, and air movement. Purely local experience is of greater value than the broad advice that I must give to suit all conditions. The depth and density of the water absorbing surface is dependent on the type of soil.

(10) *Effect of Cutting Flowers*—One of the frequent questions asked concerns the cutting of blooms. It may even strengthen the plant if the blooming scape is cut when the flower is partially opened. The flowers will develop just as well if the scape is placed in about 2 inches of water. Wrapping a small rubber band around the base of the scape will prevent splitting and folding up of basal sections. All *Amaryllis* are splendid for indoor display and may be cut with as long a scape as needed with caution not to cut too close to the bulb. Remove faded flowers and scapes as the hollow scape of the *Amaryllis* contributes very little to the bulb but is a great strain on the bulb if allowed to remain and form seed. Therefore, it is best to select only the parents needed for hybridizing. Occasionally the mother bulb will skip a year or so of blooming after pollination and seed setting. But, ripening of foliage is essential. The period of yellowing leaves is vital to the development of the new bulbs. It is at this time that it stores food which will carry it over to the next season.

Growing *Amaryllis* is a never ending source of enjoyment.

GROWING AMARYLLIDS AND OTHER SEEDLINGS
ON WATERDAROLD DECKER, *Chula Vista, California*

Sometimes I wish that I hadn't thought of it. For over 3 months the various angles of it have completely "plagued" me.

It all began while reading Dr. Traub's AMARYLLIS MANUAL, page 123, in which he recommends floating *Amaryllis* seeds on top of tap water for 24-48 hours prior to planting. The thought kept recurring to me, "floating seeds on top of tap water," until I did just that. I filled a small open-mouth jar about $\frac{3}{4}$ full of water from the faucet, and sprinkled in about 25 *Amaryllis* seeds. They floated like little boats. Well, I didn't leave them float for a mere 24-48 hours, but just left them float. Within about a week, I held the jar up and could see clean white roots emerging from the seed. "This is interesting," I thought; "why not just leave them float some more and see what happens?" They continued to grow. After a month here is what happened: they had developed the radicle-root about an inch in length, the cotyledon-leaf nearly the same length, and a miniature bulb. All of this in nothing but water. At that stage I transplanted them to a flat of well-decomposed oak leaf mold, which I haul in from the mountain areas, about 40 miles east of San Diego, and which I find very satisfactory for starting things, as it is entirely free of damp-off and clean and friable. I soaked the flat prior in water, left drain, made good size holes with my finger, and inserted the roots of the tiny plants. Then I placed the flat in the cold frame and covered about ten days with a cloth sash. This, then, is essentially all there is to it.

But it still intrigued me. Another test June 13th is still in water at this writing (September 23rd). The water remains almost crystal clear, some of the cotyledons are about 6" in length. About 3 weeks ago they seemed to be getting a little pale, so I added a small amount of fertilizer solution. I believe this helped as they are of a healthy green color now. They continue to float as aquatic plants, mostly entirely submerged in the water.

More recently I thought, "If *Amaryllis* can be started this way, there must be many more kinds of plants that could be similarly started." I have since experimented with such things as Zinnias, Marigolds, Gerbera, Salvia, Petunia, Snapdragon. Germination has been excellent with all. However, the Zinnia, Marigold, and Gerbera became clouded and murky, apparently with fungus development. The Petunia and Snapdragon jars, however, have remained perfectly clear. It is curious to note that these tiny Petunia and Snapdragon seeds soon sink to the bottom of the jar, though in this way completely submerged, their germination appears to be in no way impaired. After germination, the young plants become detached from the seed hull and usually float at or near the surface. The plants are now 3 weeks from sowing, perfectly healthy and seem completely at home in water. It is curious to note that with time, the plants seem to toughen, and even though small can be quite readily handled. I have transplanted to flats of

leafmold tests of these Snapdragon and Petunia seedlings without difficulty. I believe the limits of most plants in water is the development of the cotyledon stage. However, *Salvia* has developed a rather extensive little fibrous root system, and fairly large true leaves already.

This novel method of growing seedling may, therefore, be divided into two parts: (1) Sowing seeds on water, for which I am indebted to Dr. Traub's suggestion, and (2) leaving them float. I believe with *Amaryllis* that they should float from 4 to 6 weeks. That is, they might as well float for that length, as they suffer in no way in the water, and as they develop to a larger size, are easier to handle.

Another more recent thought with me, which I believe is of importance with this system, is the use of boiled water to eliminate any possibility of fungus development from the water itself. Also, I purchased some heavy plastic dishes (made by Tri-State Plastic Molding Co., Chicago, and I believe available at most dime stores.) These are rather inexpensive and come in several sizes. They are clear like glass, and have a lid. For example, size 5" x 6½" x 2½" deep will conveniently hold about 100 seeds, and on the label is the description: "New high heat material, can be scalded to insure germ free protection." After the water came to the boiling point, I poured it into these plastic containers, and immediately replaced the lids and left cool. After complete cooling, I sowed to more *Amaryllis*, Marigolds, Zinnia, and *Salvia*, immediately replaced the lids, labeled, and stored on a shelf. My theory here, besides positive elimination of all possibility of fungus from the water, is that the floating seed is protected by the lids from contamination from mold fungus in the air. Many seeds are like bread under humid conditions, they attract mold, which is pretty much everywhere, and this is particularly serious when directly exposed to air, either atop water or soil. So far this phase of the experiment looks very promising with roots on the germinating Marigolds and Zinnias very clean, and comfortable looking, floating on the water. Boiling the water and using a container with a lid, and never removing the lid during the experiment is, I believe, a very worthwhile idea, and offers positive protection of growing the seedlings in a completely sterile media.

Still thinking on the problem, just yesterday I happened upon the thought of adding a bit of fungicide to the water. Something that would completely control all fungus development either from the water, container or seed, without affecting the development of the seedling. I believe this is a very practical approach, and might solve things completely. I have tried weak solutions of Manzate, a manganese compound widely used as a spray to control various fungus developments on plants, and also "Lavoris" brand mouth wash, which is largely zinc chloride. Both seem very effective against plant fungus, and only further time will tell of the effect on plants. It seems likely that something could be used to give positive control, without interfering with the normal development of the young seedlings. It is essential for the normal development, that all mold should be kept from developing.

All of this is, of course, very simple. One doesn't need expensive equipment. It doesn't take up much space or any considerable time—in fact, one of its purposes is to save time. I believe I have some of the essentials figured out, but it is likely that others may think of variations of the idea, refinements or better ways of doing it. It's at the beginning. I am sure it will appeal to the hobby gardener, and may even have practical application for the grower of larger amounts. I believe it will be found that many if not most seeds actually germinate better and at higher percentage in sterile water than in soil or other media. For this reason, it is possible that this method will have further practical application for seed firms who regularly run germination tests of seed.

I mentioned this idea of floating *Amaryllis* seed on water to one of the retail catalog firms, to whom I sell (I am in the wholesale flower-seed growing business), and they recently wrote, "You will be interested to know that we had the best germination with the *Amaryllis* by sowing it on water as you suggested. We had no success using Vermiculite and fair germination with soil." Actually, I have had pretty good luck planting *Amaryllis* in Vermiculite in plastic containers, as has been described in the *Amaryllis* Year Book. However, I am sure floating on water is better. I believe one can be assured of the *maximum* germination. Later, I showed my results to a visiting customer-seedsman, and he was amazed to see these plants growing in the jar of water. I believe this would be the reaction of most people. It amazes me, yet, every time I look at the jar, and fills me with wonder.

Of course, no seed will germinate unless it contains life. *Amaryllis* and many other types of seed will attract fungus, especially during the warm humid months of late Summer and Fall, especially in the Southern and Eastern States. The seed pods should be left on the flowering stalk until they have matured. At this stage they will split apart, and may be removed, and should be thoroughly dried on a tray in the sun a week or so before either planting or storing for future planting. The pods should not be lumped together in a bag, while still containing moisture. Most seed firms have especially made air-tight rooms, in which the moisture is mechanically removed, and the humidity constantly kept very low, at a relative humidity of 30 or less. Many seeds that normally rapidly deteriorate may be kept in high germination for long periods—often many years, by this method. This, of course, is out-of-the-question for anyone not in the seed business. However, it is likely that sometime someone will find a simple and inexpensive way of maintaining the germination of small amounts of seed. I have been thinking, and plan to try a little experiment of storing packages of small amounts of seed in a south window, so that they will receive a good "drying-out" for several hours daily. This may be sufficient to prevent development of fungus on the seed, which I believe is the main reason for rapid deterioration of *Amaryllis* seed. If stored in a closed room, I believe an open can is better than bags of either cloth or paper, as it is likely that these in themselves attract moisture. This spring I planted 144 seeds in leafmold of an *Amaryllis* strain.

This seed had been stored in an open can, without humidity control. It was something that I wanted to get the most of. This seed was 11 months old, and I got 96 to germinate. Another word of caution about storing seeds. Never store seeds in a tightly closed container, unless the moisture level of both seed and container air has first been lowered very considerably. Since this is difficult or impossible without a rather expensive set-up, it should not be considered. Some might get the idea, too, of storing seeds in packages or bags in a closed jar or other container, with calcium chloride or other desiccant at the bottom to withdraw the moisture. This sounds reasonable. Many of the mechanical dehumidifiers operate under the theory of blowing air through a desiccant. However, under stable air conditions, a check with a hygrometer shows that calcium chloride doesn't lower the humidity to a safe level. The humidity remains too high to prolong the life of the seed. The germination is down. I have tried it.

Perhaps the best and certainly the most convenient way of maintaining seed germination of small seed lots is to place in a refrigerator. Here, one has the advantage of a cool temperature and a dehumidifying action, both of which are designed to promote the long life of seed. The life of certain seeds respond differently to different temperatures. Certain seeds will be killed by too low a temperature. However, I have kept, and at this time continue to have samples of certain seeds in the freezing compartment of my refrigerator, imbedded in ice, and at around 0°F. Some of these samples have been in such a state now for 3 to 4 years. I tested the *Gerbera* a year or so ago, and it showed no appreciable loss of germination. Normally, it is very short-lived. *Salvia*, on the other hand, is completely killed by this low temperature, though continues to germinate very well when stored at about 40°F. I have never tested *Amaryllis* seed under these conditions. Though this would be a very interesting experiment for someone.

Without question, the very best way for the person with small lots of *Amaryllis* seed and other types of relatively short-lived seeds, whether you save it yourself or buy it through a seedsman, is to plant it as soon as possible. Sowing on water is made to order for this. *Amaryllis* clones bloom and the seed matures over a period of several months. Sowing on water is certainly a most convenient way to handle crosses and seed from selections as it is mature and ready.

The real "beauty" of this water culture is that when once the seed has been sown, there is absolutely no further work until the seedlings are ready for transplanting. One could just as well go on vacation. The only precaution is that the temperature should be maintained above 60°F, and that the containers should not be placed in direct sunlight.

Under this method, too, you are growing in a perfectly sterile medium. About the only possible contamination is through the seed itself. This method is certainly less trouble and more fool-proof than sterilizing or fumigating soil to guard against soil-borne damp-off and other fungus diseases, which can attack the seed itself in the process of germination. These problems are normally ever present for all

growers, either the hobby gardener or one commercially engaged.

This method seems to fit the giant hybrid *Amaryllis*, perhaps many of the other amaryllis equally well. However, there are likely many other types of plants that can be just as well started in this way. I have always remembered the experience of Mr. Orpet, as told in the 1956 Yearbook, page 11, regarding *Alstroemeria violacea*, to quote: "Mr. Orpet procured 300 seeds, along with instructions for planting all of which indicated that no matter what the treatment of seeds "vernalization," cold or hot treatments, chipping, sulphuric acid, soaking in water, etc.," there must be a full year from planting to germination, and flowering might take place five months after that. Mr. Orpet put his seeds in a pan of water, was called away for nearly two weeks and remembered in panic that his seeds were still soaking on his return. He found each seed showing a little white germinal point, sowed them at once (in April) and was rewarded not only with a quick germination but 350 little plants (owing to a double embryo in some) a few of which flowered in June of the same year." So it is entirely likely that use of this method with *Amaryllis* is only a beginning. I am personally making tests of sowings in water of such tough germinating items as Canna and Rose, though won't hazard yet just what my luck will be.

I won't go all-out and say this *is* the way to start all seed. There are undoubtedly many variations of the method. Certain seeds may be better started this way, and transplanted to ground immediately upon signs of germination. Others are so easily started directly in soil that prior germination in water may prove just extra work. Too, there will be other types that can be germinated in water, though upon germination should not be left in that state perhaps more than a week, as they may not develop chlorophyll normally in water. And there will, certainly, be others that may advantageously be left in the water much longer than a month, and, with the addition of small amounts of nutrient, will develop quite normally under these conditions, prior to later transplanting to soil. I would think that certain easily grown kinds like Zinnia and Marigold could be transplanted directly to a prepared spot in the garden about 10 days after germination, with some immediate protection from sun and wind.

I wish to stress, too, that this, even to me, is still very much in the experimental stage. With this in mind, I believe it is very desirable to proceed modestly. At first test your methods in a small way. Don't start with your rarest seed, your most important crossed seeds, or your most valuable lots.

Above all practical values that this method might unfold for you, I believe as with all people who like to grow things and to whom germination and plant growth and development have something mystical and magic about them, you will enjoy peering daily through the glass or plastic container (for this reason glass or plastic is preferable to a metal container) and watch the seed germinate and develop into miniature real life plants. Grown in soil one actually observes only the upper half of the plant.

WINTER HARDINESS OF SOME AMARYLLIDS
IN CENTRAL NORTH CAROLINA

WILLIAM LANIER HUNT

Recent severe winters have tested out the winter hardiness of many amaryllids. Since the writer's arboretum is right on the margin of hardiness for a number of these plants, the following report may be of some value.

Lycoris, *sternbergias*, *rhodophialas*, *crinum*s, *hymenocallis*, *zephyranthes*, *Nerine bowdeni* and other amaryllids are grown in quantity here toward the northern end of Zone 8 in the South Atlantic States. The arboretum is located on the eastern edge of piedmont North Carolina. Before the recent extreme winters, the average of low temperatures for Zone 8 was 10 degrees above zero. The lowest temperature was usually 4 degrees below zero for several hours between 2:00 A. M. and dawn. With the coming of day, plants were subjected to bright sunlight (usually with no snow or ice cover) and sometimes to a rise to above freezing: the worst situation an evergreen plant can undergo.

Before the recent severe winters came along, the common old sterile form of *Lycoris radiata* bloomed profusely in most seasons. In 1959, however, a northeaster brought below freezing temperatures in November which damaged the foliage of this plant so badly that almost none of them bloomed in September, 1960. In protected places, they flowered normally.

Unusually deep snows in 1960-61 resulted in only 10 per cent of normal bloom in September, 1961. Then severe drops in temperature in 1961-62 down to 10 below zero with no snow cover had the same effect: about 10 per cent of normal bloom in September, 1963. The winter of 1962-63 was much like the previous one, and the effect this September was about 2 per cent of bloom in these same beds of several thousand bulbs.

Weeds and honeysuckle, however, had overgrown a very large new planting of these "red spider-lilies" as *L. radiata* is called in the South Atlantic States. To the writer's utter amazement, this new planting bloomed normally! So winter protection is very practical for *L. radiata* in Zone 8. We are relieved to know that, with a little trouble, we can be assured of blossoms in spite of 10 below zero for several days together in the December till Valentine's Day period.

It is good to be able to report, also, that *Lycoris elsiae*, which had flowered profusely every year before the past four winters, produced this year about 10 per cent of its normal crop of blooms in spite of the same deep freezes. Last winter, some beds of this species were protected by laying a light covering of "pine tops" (boughs) over them after the cold set in. In one large bed, there were no flowers this year, but in another, protected the same way, there was a 10 per cent flowering.

The new Dresden yellow *Lycoris* which fades to cream, and the new porcelain rose *Lycoris* (both described elsewhere in this issue) seem to be a bit hardier to cold than *L. elsiae*. This is possibly owing to the

slightly thicker foliage of these two new plants. In beds of *L. elsiae* where they were growing, they flowered when *L. elsiae* did not.

Here in the upper end of Zone 8, *Lycoris aurea* is not a practical outdoor flower. A bed of 100 bulbs planted back in the forties just wasted away until there were only a few feeble ones left in ten years. It is good to know from Mr. Caldwell that this species takes kindly to cool house treatment in deep boxes.

Lycoris traubii is hardier than the above because of its thicker, tougher foliage, but it also succumbs to the same difficulty as that of *L. aurea*: the foliage is too tardy in the autumn, and the first hard freezes damage it or destroy it outright. In some seasons, both of these lycoris will get ahead of the frosts, develop to the safe point and 'tough-it-out' with the winter. *L. traubii* then gives about 2 per cent of bloom, but *L. aurea* does not get up enough strength to bloom. Watering from September on will hasten the coming of the leaves of these two lycoris and might make them practical if a frame were then put over them. It will be a godsend if Mr. Caldwell's new yellow lycoris with spring foliage can fill the gap left by these two tender yellow species.

Before the past severe winters, *Lycoris squamigera* has nearly always supplied us here with great crops of flowers. In perhaps one season out of ten, it would be off and only an odd flower or so would appear. Recently, however, the late freezes in March and even in April have so damaged the foliage that this species has flowered only at about 25 per cent of normal.

Lycoris incarnata has never, during some twenty years flowered very profusely here, and it has bloomed even less during the past severe winters. In the experience of this writer, this species is chary of bloom until it has developed clumps of six or more bulbs. Does it bloom better in a drier clime or in limestone country? It seems to be grown as a cut flower in Italy.

Lycoris sanguinea, L. "cinnabarina" and their forms have been moderate bloomers here. Even in the past severe seasons, they have given 50 per cent of their normal bloom.

We have saved the best for the last and are happy to report that *L. sprengeri* has bloomed lustily every single year during the past few seasons. There has been a small colony of it here for some ten years—now increased to fifty to one hundred bulbs. This species looks rough and ready. The spring foliage has a little tiny red edge that may indicate its experience with extreme cold in its native habitat. Mr. Caldwell's "Sprenrad", then, combines the two most winter hardy lycorises and ought to be extremely valuable as far north as any lycorises will go. My own seedlings of this same cross certainly stand up to the worst the winter can produce.

The best form of *Sternbergia lutea* which I have grown for some thirty years has always come through the winters unharmed. Thick foliage, again, seems to be the deciding factor, for two batches of imported bulbs have thin leaves and often get damaged by freezes. Perhaps gardeners who report no success with sternbergias are trying to grow the thin-leaved types.

The past two winters have had some effect on even the best type of *Sternbergia*. Where a bed of several thousand bulbs extends out from under large sweet gums and oaks, the bloom was sparse this year (though foliage showed no injury), but the bulbs back underneath the trees bloomed as lustily as ever. This good type of *Sternbergia* is apparently one of the hardiest of all amaryllids. The same may be said of *S. fischeriana*, the fall-winter-spring blooming species which the writer has described and praised before in HERBERTIA. The twisted foliage of this species stands up to the worst that winter can bring on and flowers appear right in the snow as soon as the sunshine returns.

Rhodophiala x huntiana foliage has always been damaged by extremely low temperatures, but these floriferous bulbs can send up a new set of foliage as soon as warm weather comes in spring and bloom normally every August. The writer once performed an experiment with rhodophialas. Winter had destroyed one set of leaves on the bulbs and the new leaves had no more become mature than they had been cut off by the man mowing the lawn. Noticing that more leaves began shortly afterwards to come up, the idea struck us to see how long it would take this foliage to grow. It was then late June, but this third set of foliage developed rapidly until it had its full length. Shortly afterwards, the foliage was cut off some of these bulbs to see whether or not they might possibly come out again. To everyone's amazement, they did so right away.

Since the bulbs in question were in a bed of rich soil where flowers were growing, they received regular waterings through July and August, and their foliage again developed to normal size. At this point, one could not resist the temptation to remove the foliage from a few bulbs again. Still another set of leaves was produced, and many of the bulbs in question flowered at their normal time in late August.

Somewhere, the writer has read that this little *Rhodophiala* comes from an area in the mountains of Argentina where the soil slides off steep mountains, often burying the bulbs very deeply. This must account for the sometimes six- to nine-inch necks on the bulbs. The ability to produce successive sets of leaves when damaged makes this one of the most indestructible of the amaryllids.

AMARYLLIS CULTURE UNDER ARTIFICIAL LIGHT

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The number of years an *Amaryllis* can be grown successfully under artificial light can only be answered by continued experimentation. After growing *Amaryllis* under artificial light and observing all phases of good culture, I am confident that *Amaryllis* species and hybrids can be grown indefinitely with success. (See Plant Life 1963, pages 107-110.)

As described by this writer in an article "Artificial Light for *Amaryllis* Growth" in *Amaryllis Year Book* 1963, the lighting arrangement has remained the same. The cool white fluorescent tubes used in

the past had been replaced during the spring of 1962, with "Gro-Lux" fluorescent tubes. In replacing the cool white fluorescent tubes with "Gro-Lux" tubes, I have placed most *Amaryllis* bulbs in two size groups to utilize the growing area and light source to the greatest advantage.

The first group consisted of all small sized bulbs placed under the light source twelve inches between the fixture and the tops of the pots. Most of the pots were three inches in size and consisted of *Amaryllis blumenavia*, *A. elegans* var. *divifrancisci*, *A. cybister*, *A. evansiae*, *A. striata*, *A. striata* var. *fulgida*, *A. mollevillquensis*, *A. reticulata* var. *striatifolia* hybrid, "Mrs. Garfield" and a number of unidentified species.

The second group consisted of the larger size *Amaryllis* bulbs placed under the light source twenty four inches from the top of the pots. Most of the pot sizes vary from five to seven inches. Included in this group are *Amaryllis belladonna*, and its varieties, *A. aulica*, *A. aulica* var. *platypetala*, *A. immaculata*, *A. x johnsonnii*, *A. pardina*, *A. x acramannii* and the various strains, some of which I find difficult to grow out of doors.

There are many plants, which have wider tolerances and become easily satisfied for continual development. Of course there will also be some bulbs which will need special care because if they are lost, replacements will be hard to find. All phases of culture, containers, growing media, fertilizing and watering, play an important part under conditions of an enclosed environment.

Today many substitutes are being offered for clay pots, but clay pots offer the greatest advantage in my growing area, especially when fresh air circulation is limited during the cold winter and spring months. Clay pots being porous, help promote aeration of the growing media and I find this beneficial to the healthy growth of the *Amaryllis* bulb.

The only disadvantage of clay pots is the accumulation of fertilizer salts from heavy feeding during active growth. If there should be fertilizer salt accumulation, it is best to clean the clay pots as the *Amaryllis* starts its resting stage.

At the start of growing *Amaryllis* under artificial light I used various growing media to see which gave the best results for healthy growth under the environment created. Presently the commercial mixture "Black Magic" has given excellent results for all bulbs. The main reason for its use besides being clean and odorless is that the need for organic fertilizers is eliminated. In some cases I added sand, perlite or leaf mould. When soil mixtures were used, continual watering and fertilizing usually packed the soil, creating poor aeration and eventually rotting the base of the *Amaryllis* bulb.

Since organic materials such as manures, bone meal, etc., are essential for good *Amaryllis* growth, their use indoors in a confined area would be unbearable. In using "Black Magic" mixture, excellent results were obtained with soluble chemical fertilizers. During active growth of the bulb, two soluble fertilizers were used, with good results, Rapid Gro (20-20-20) and Hyponex (7-6-19). A monthly application of muriate of potash was used, with good results.

During active growth all *Amaryllis* respond to heavy fertilizing. In using commercial fertilizers, various factors have to be taken into consideration, to obtain maximum efficiency. Depending upon whether they are *Amaryllis* species or hybrids, pot size, air circulation, heat application, fertilizing and watering will vary. As pot sizes vary, fertilizing and watering will also vary. The best guide I have found, as soon as the surface of the growing medium shows signs of drying, then the bulb is watered or fertilized. I try to alternate watering and fertilizing and when possible use collected rain water.

Many of the *Amaryllis* species which I have, are impossible to grow out of doors. The *Amaryllis* hybrids, a majority of which bloom in the spring, are about the only bulbs placed out of doors for continued growth.

Amaryllis aulica, the species which I have grown longest (4 years) under artificial light in the complete absence of sun, has bloomed faithfully for me for the past four years. Under artificial light *Amaryllis aulica* will remain evergreen, with active growth starting in October. The bulb will bloom during December with the flowers lasting a period of two weeks. After blooming, the bulb sets new leaves with the older leaves yellowing. Watering and fertilizing are continued until June when fertilizing is discontinued, but it is watered to keep the growing media moist.

During the blooming period of December 1962 *Amaryllis aulica* put out two flowering scapes and this caused the bulb to decline considerably. I doubt whether the bulb will bloom the fifth year.

The summer flowering *Amaryllis* x *acramannii* is another excellent bloomer under artificial light. The flowers of the bulb are very erect and do not fully develop. *Amaryllis* x *acramannii* like *Amaryllis aulica* is treated as an evergreen. The blooming period for this hybrid has been between the first and third week of July. The second year under artificial light this bulb produced one offset with the mother bulb increasing in size each year.

Amaryllis striata which blooms in January is another species that remains evergreen. This species shows more vigor than its variety and is easily grown under artificial light.

Amaryllis striata var. *fulgida*, another evergreen species is unpredictable in its blooming period. Some of the bulbs have bloomed in June, others have bloomed in October and January. As soon as this species blooms, it has a tendency to enter a resting stage and watering and fertilizing is withheld. The growing medium is kept moist, but if overwatered, this bulb will rot. The flowers of this species under artificial light, last longer than most of the species.

Amaryllis belladonna var. *major* is another good grower under artificial light. A one third proportion of sand is added to the growing mixture of "Black Magic" for this species, with good results. This species also remains evergreen under artificial light, with active growth starting in the latter part of February. Watering and fertilizing is continued to the end of October and afterwards this species received just enough water to keep the growing mixture moist. Under artificial

light the bulb I have has produced one offset during a two year period.

Amaryllis immaculata, another summer blooming species with its active growth starting in June, has not been successful with outdoor culture. When this species was received and grown out of doors, it was impossible to get it to bloom. Under artificial light this species is a good grower, with active growth lasting until January when it will go into a dormant stage. During the dormant period of this species, watering is withheld completely.

Amaryllis aulica var. *platypetala* is treated as an evergreen species. During August and again in October this species will put forth vigorous leaf growth. The flower form is similar to *Amaryllis aulica*, but the color is a pure crimson with the absence of green in the throat. Until the present time this plant has bloomed during November.

Amaryllis reticulata var. *striatfolia* hybrid "Mrs. Garfield" is a clone, which shows evergreen characteristics under artificial light. The potting procedure has been similar to that of *Amaryllis striata* var. *fulgida* with the bulb resting on top of the growing media. Active growth starts during August and lasts to May when the leaves yellow. Usually this bulb puts out from three to five leaves and has not bloomed for me after two years growth under artificial light.

Recently three bulbs of *Amaryllis evansiae* were received from Mr. Wyndham Hayward. Good results were obtained when two of the bulbs were planted with the neck of the bulb protruding above the soil line. The one bulb planted with the lower half placed in the growing medium, declined and eventually rotted. Since planting, the remaining bulbs have retained their leaves with moderate watering and fertilizing. In watering *Amaryllis evansiae* I find it best to allow partial drying of the growing medium. The bulbs I have are small and because of this I have been handling them as seedlings.

Amaryllis elegans var. *divifrancisci* as well as *Amaryllis cybister* are two bulbs which when planted, remained dormant throughout an entire growing season. Even with bottom heat it was impossible to break their dormancy.

Amaryllis cybister showed good growth when its dormancy was broken the following growing season. During the time when dormancy was prevalent, watering caused decline to that portion of the bulb above the soil. The following season the bulb was planted with just the neck of the bulb above the soil line. Active growth was good, starting in April and by the end of August this species was in its dormant stage.

When dormancy in *Amaryllis elegans* var. *divifrancisci* was broken the following season, this species gave poor growth. The leaves put forth extended about a half inch in length and remained this way throughout the remainder of the season. Whether this species will give better growth the following season remains to be seen.

The past few seasons Mr. Robert Goedert of Jacksonville, Florida has offered many interesting *Amaryllis* species from South America. Practically all the bulbs which I received were good growers under artificial light during the first season. Many put forth offsets and these showed good growth when left attached to the mother bulb. Those

detached from the mother bulb and not having some root system tend to go dormant.

One noteworthy species from Santa Catarina, Brazil, was received from Mr. Goedert and identified by number SA62 7. What makes this species distinctive from the others is the leaf structure and the pattern set by the eight leaves the bulb puts forth. The bulb showed vigorous growth in the late winter when received and continued growth until early August when it went into a semi dormant stage. At this writing the bulb is starting active growth and I am hoping for it to flower at this time.

The leaf at its narrowest point was 1/8-inch (petiole) and two inches at its widest point (blade) with the length of the leaf measuring approximately nine inches. The petiole leaf formed by this species and its miniature form makes this a noteworthy addition to any collection. [Editorial Note:—This is apparently *Amaryllis blumenavia*.]

Practically all *Amaryllis* species I have received were devoid of any root system. Many of the species i.e., *Amaryllis cybister*, *Amaryllis elegans* Var. *divifrancisci* and some of the unidentified species remained dormant throughout an entire season. Care must be taken in watering because over watering will cause decline and eventual rotting. Hormone powders have helped, but patience will still have to be exercised.

I believe it is best to encourage a good root system even at the expense of losing a flower bud of any given species. When allowed to flower the bulb will decline and in some instances start to rot.

Bottom heat has also helped in breaking the dormancy of some of the species, but care must be exercised. When bottom heat was used, placing the potted bulb on top of the fluorescent fixture has been sufficient.

One of the greatest advantages in growing *Amaryllis* under artificial light is in handling them from seeds. We have an uninterrupted season for continued growth, which is necessary in growing *Amaryllis* from seeds. The handling of *Amaryllis* from seeds is a subject which I would like to discuss in a later article.

GROWING AMARYLLIS CALYPTRATA FROM SEEDS

BURR CLOUETTE, *California*

My *Amaryllis calyptрата* seedlings are now almost 18 months old. All of those which I have not traded off are thriving. One bulb is far ahead of the others in size. The bulb is all of two inches in diameter. The two largest bulbs were grown in the house under Gro-Lux lights. This would seem to indicate that this type of lamp is excellent for growing *Amaryllis* as well as other plants.

The *A. calyptрата* bulbs are all planted in Black Magic planter mix, and are fertilized regularly. One of the bulbs is still in its 3½" square plastic pot; three others are now in 5" clay pots, and the largest is in a 6" clay pot.

Amaryllis calyptrata is evergreen and seems to grow the year round. I have not noticed any pronounced periods of inactivity, as in *Amaryllis evansiae*, which is also evergreen but is inactive at times. *A. calyptrata*



Fig. 28. *Amaryllis calyptrata* seedlings as grown by Burr Clouette, San Diego, Calif.

also seems to like lots of water and fertilizer. I keep the potting mixture at least damp at all times.

I hope that my largest bulb will flower next spring (1964).

(CONTINUED from page 53.)

THE ORIGIN OF ADAPTATIONS, by Verne Grant. Columbia Univ. Press, 2960 Broadway, New York, N. Y. 1963. Pp. i-viii + 606. Illus. \$12.50. This important new book by an outstanding authority on the causal theory of bioevolution as applied to diploid sexual organisms will be welcomed by all biologists. In Parts 1 and 2, the author lays the general foundation for Part 3, in which the genetical theory of bioevolution within populations is detailed. In Part 4, he extends the exposition to include the formation of primary evolutionary population units. In Part 5, the bioevolutionary process as previously explained is applied to the subject of the hierarchic lineages. Dr. Grant has given by far the best presentation of the bioevolutionary process up to the present; incorporating not only the previously published information but also original contributions of his own. This stimulating, clearly written text is highly recommended to students of bioevolutionary theory, and also to biologists generally.

(CONTINUED on page 118.)

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(CONTINUED from page 116.)

EXPERIMENTAL BIOLOGY, by R. W. Van Norman. Harcourt, Brace, Englewood Cliffs, N. J. 1963. Pp. 243. Illus. This is an introduction to methods, techniques and instruments used in experimental research in biology, and is particularly useful to the beginning student. The introductory chapters are concerned with science and research in general, and biological science in particular. The main body of the text is devoted to the methods, techniques and instruments commonly used in experimental biology. The concluding chapters are concerned with the design of experiments; the handling of experimental data; and the preparation of manuscripts. Highly recommended.

SELECTED BOTANICAL PAPERS, edited by I. W. Knobloch. Prentice-Hall, Englewood Cliffs, N. J. 1963. Pp. 311. Illus. Realizing that for many the first course in plant science is usually the last, the editor has provided a rich harvest of background material for the course. This is calculated to make it rich in cultural, aesthetic and philosophic values. The background papers, selected from ancient, middle modern and contemporary sources, are arranged under such headings as the importance of plants; development of botany; ecology; phytogeography and exploration, etc. This is a valuable companion for both the plant science teacher and the student, and is highly recommended.

THE DEVELOPMENT OF HOMEOSTASIS, edited by E. F. Adolph. Academic Press, 111 5th Av., New York 3, N. Y. 1962. Pp. 218. Illus. \$7.00. This book makes available the Proceedings of a Symposium on the Development of Homeostasis, with Special Reference to the factors of the Environment. The symposium, in which 39 outstanding authorities participated, was held at Liblice in 1960 under the Chairmanship of Dr. E. F. Adolph. The three concepts discussed ranged from (a) homeostasis (physiological regulations; homeokinesis; maintenance of constancy); (b) the study of ontogeny of regulatory phenomena in organisms; and (b) the study of body fluids, and their maintenance. This stimulating book is required reading for all physiologists. Highly recommended.

GENETIC EFFECTS OF RADIATIONS, by C. E. Purdom. Academic Press, 111 5th Av., New York 3, N. Y. 1963. Pp. 173. Illus. \$7.00. This concise, clearly written book by an outstanding authority is intended for the intelligent layman, and also for students and workers in various fields of science. The Chapters are devoted to basic radiation physics; principles of heredity; genes—the material of heredity; the production of mutations by radiations; quantitative aspects of radiation mutagenesis; factors which modify the genetic effects of radiations; genes in populations; mutation in man; and genetic radiation hazards in man. Highly recommended.

ATOMIC ENERGY ENCYCLOPEDIA IN THE LIFE SCIENCES. Editor and major contributor, C. W. Shilling, and Miriam T. Schilling. W. B. Saunders Co., W. Washington Sq., Phila. 5, Penna. 1964. Pp. 474. Illus. \$10.50. This important new book was prepared under the auspices of the Division of Technical Information, U. S. Atomic Energy Commission. There are more than 1,200 alphabetically arranged entries. Under a table of contents the entries are classified under 15 major headings:— radiation; elements and radioisotopes; radiation biology; genetic effects; somatic effects; prevention and treatment; accidents; radioisotope uses; health protection; environmental contamination; waste disposal; instruments; accelerators, reactors, power; weapons; and administration, laboratories and organizations. It is hoped that in the next edition, where practicable, brief references to further reading may be added at the end of the entry. This valuable reference book is important not only for specialists in atomic energy, but also for biologists, medical researchers, specialists in agriculture, teachers and students, and civil defense and public health officers. Highly recommended.

THE HUNT ARBORETUM

WILLIAM LANIER HUNT, *Chairman, Board of Advisors, North Carolina Botanical Garden*

The expanding population in the United States is rapidly causing the destruction of the natural resources of forests and animals. This situation has been coming on rapidly in this century, and, unless the choicest areas are preserved for posterity, they will be swallowed up and destroyed by the present "population explosion".

In 1926, I arrived at the University of North Carolina with two truck loads of irises, bulbs and rare plants which I had had with me in Preparatory School at Woodberry Forest, Virginia. I had thought that the Coker Arboretum at the University was an active botanical garden. It turned out, however, to be only a beautiful small collection of native and exotic plants. Since there was not much active botanical and no horticultural work going on in the Arboretum, I betook myself to Europe on a summer study trip.

Anyone who knows Kew Gardens can understand why Kew would inspire a young horticulturist born in a plant nursery to try to establish a botanical garden at home in the wonderful Southern States. Inspired by my old friend, the late Mr. Raffill of the Temperate House at Kew, I came home exhilarated.

Botany students, geologists, zoologists, hiking enthusiasts, faculty members—in fact, almost everybody at the University of North Carolina used to walk to Laurel Hill to see the wild rhododendrons or "laurels" when they bloomed in April. On the sides of a deep gorge in a slate valley with Morgan Creek at the bottom, the purple *Rhododendron catawbiense insularis*, trailing arbutus and many, many wild flowers thrive. It has long been known that the fall line slate valleys of the Southeastern States are full of treasures. Mountain species have been noted in them since John Bartram, "the king's botanist" and his son William traversed this country in search of the wonders of the "New World". Laurel Hill is a splendid example of the slate valley. Many of the mountain species overlap here with those of the Coastal Plain. Rhododendrons grow in sight of Yellow Jessamine (*Gelsemium*), and mountain plants like kalmia, *Azalea arborescens* and fothergillas mingle with coastal species like *Vaccinium arborescens*. The bottom of the gorge is about 260 feet above sea level, and the sides ascend quickly to 350 feet.

It was a case of "love at first sight" when I happened upon Laurel Hill on a walk in the woods in 1926. Suddenly, there was a deep valley below me with a musical stream at the bottom almost as big as a river, rushing over rocks and boulders. The site of an old mill, now washed away by a spring freshet, completed the picture of a real mountain valley transported to the eastern edge of the Piedmont.

Surprised that the University did not own this beautiful and dramatic area, I set about the long and tedious task of acquiring it. After I had searched the country for some seven years for the heirs to the property, the newly discovered heirs proceeded to sue each other for several more! Altogether, more than twenty years elapsed—and a world war—before Laurel Hill was bought and paid for.

The proximity of the Laurel Hill gorge to the campus of the “first State University” makes this small area of some 125 acres extremely valuable as a natural teaching laboratory. From the hills above the gorge, one can tell time by “South bell”, and the Departments of Botany, Zoology and Geology have always used this area for field trips.

Long before I had taken title to Laurel Hill, I had begun to explore its steep sides, often hanging onto trees and shrubs. “Nothing like this in Kew, Edinburgh, Cambridge or “Jardin des Plantes,” I thought. “Eventually, there will be an arboretum and botanical garden here. . . .” Shortly after the deed to the property was in hand, I began to open up some trails and roads into the densely overgrown area and to plan its ultimate layout. Then, in 1960, I began to transfer the land to the University as the Hunt Arboretum, to be administered under the new North Carolina Botanical Garden.

Because of its eminent and distinguished faculty, its excellent botanical library and especially because of the presence of the Ashe Herbarium of Southern Plants, the University of North Carolina is a most advantageous place for the establishment of a botanical garden and arboretum. As we have noted, the location near the fall line half way between the mountains and the sea and about half way between New York and Florida allows for the successful cultivation of many plants from colder regions along with those from warmer ones. There is certainly a great opportunity here to create an almost complete living collection of the plants of the Southeastern States.

BOWLING GREEN STATE UNIVERSITY PLANTARIUM

NATHAN WILLIAM EASTERLY, *Botanist and Plant Naturalist*

Three acres of land have been set aside for the establishment of a Plantarium at Bowling Green State University, Bowling Green, Ohio. As the need arises, more land may be added. It is my hope that we can have a great variety of conifers, deciduous trees and shrubs, and other herbaceous plants of special horticultural interest which are hardy in our area.

Bowling Green is located in a productive farming area of Ohio. During the glacial period, northwest Ohio was covered by Lake Warren. The sandy shores are still evident as sand ridges. As the lake receded, the area remained swampy. Black muck associated with the swamp gave this part of the state the name, “The Great Black Swamp.” In 1859, a law providing for public ditches paved the way for drainage of the land. Northwest Ohio today is one of the state’s most productive rural areas.

During the past decade there has been a significant increase in our student population. It is my firm conviction that many of these students will become interested in plant life if the necessary facilities are available. Most of these students will not become professional plant scientists but many will become teachers. If a well planned school garden, including greenhouse space, can be established and maintained here at Bowling Green, this will benefit not only the students, but faculty members, other citizens of Bowling Green, or any interested lay person in northwest Ohio.

Any suggestions, help, or encouragement of our plantarium will be greatly appreciated.

BLANCOA CANESCENS FROM WESTERN AUSTRALIA

W. R. STEVENS, *Bastia Hill, Wanganui, New Zealand*

Blancoa canescens Lindl., a singular member of the *Haemodoraceae* appears to be rare in cultivation, which is rather surprising considering that it is still fairly plentiful in its native habitat. Its home is in Western Australia where it occurs mostly on the sand plains north of Perth, with some isolated colonies quite near Perth.

Lindley named this monotypic genus in honor of a Spanish botanist, Manuel Blanco. In Australia the common name of Red Bugles has been bestowed on it.

Although I have known of this plant for a great many years, I was not able to procure seed of it until three years ago. Only six seeds germinated, and three of them promptly died. The remaining three grew well, and were potted up. At the age of four months, when they were about three inches high, they were planted out in a well-drained sunny position. All of them grew well, and at the age of eighteen months, one plant had a few small flowers, though these were not typical. This year the plants are flowering well.

In growth it resembles some species of *Sisyrinchium*, but the leaves are much coarser and more rigid, growing to a height of about ten inches. Each division or fan is attached to the main root below the soil level, and does not make independent roots. This means that propagation by division is not exactly simple.

The slender furry flower stalks emerge from the fans in March or April (autumn), and buds appear shortly afterwards. These pendent buds are of a rusty red, becoming much brighter as they develop which is very slowly. The number of buds on each stalk varies on each flower stalk from three or four to eight or nine, occasionally up to twelve and are produced in sets of twos and threes. As the flower develops, the six pointed perianth opens out to a horizontal position, showing the pale orange inner colouring. Although not of a spectacular beauty, the slender richly coloured scape is truly charming. The flowering period extends from August (early spring), until the end of October.

It is to be hoped that the Red Bugle flower of Western Australia will gain the wider distribution it deserves, now that seed is becoming avail-

able. Interested gardeners may possibly obtain seed from The Director, Botanical Gardens, King's Park, Perth, Western Australia.

[Editorial note.—Under date of Sept. 10, 1963, Mr. Stevens requested information about the relationship of the genus *Blancoa* Lindl., to other groups. In Kew Index, published in 1895, p. 310, it is indicated as belonging to Family *Haemodoraceae*; and as far as the writer knows no change in its status has been made.—*Hamilton P. Traub*]

EASILY MANAGED ORCHIDS

A report by J. W. Blowers on easily managed orchids, the various species of *Pleione*, closely related to *Coeloglyne*, is to be found in Gardeners Chronicle February 4, 1961, page 94. This beautiful plant may be grown in the cool house, or the coolest position in the intermediate house. *Pleione formosana*, *P. Pricei*, *P. humilis*, *P. hookeriana*, and *P. limprichtii*, are the hardiest. *P. lagenaria*, *P. praecox*, and *P. maculata*, require a little more heat—about 55°F. The beautiful flowers are produced from winter to spring, and last for about 14 days.

A BEAUTIFUL BROMELIAD

GRANT V. WALLACE, *Berkeley, California*

The bromeliad in question, *Puya alpestris*, sometimes known as *Pitcairnia caerulea*, was given to me by the late Mrs. Anson Blake, who had a lovely estate and botanic garden in Berkeley, since taken over by the University of California. The plant is rugged and hardy, a native of the Andean slopes of Chile. It has bloomed but twice in my experience, eight years apart: once in July, 1955; and at the time of writing, August, 1963. It is well worth waiting for. The flower stem resembles that of a yucca; the whole plant has a yucca-like habit, for that matter. The inflorescence is a many-branched spike, with the lovely flowers opening from the bases of the spikelets upward. The perianth consists of three conspicuous, colored segments, with the other three short and obscure, resembling a calyx. The color is a hard-to-describe green, somewhat like verdigris. Each flower has a little pool of clear nectar within its base; I tasted this liquid and found it to have a very pleasant, faintly sweet flavor. I can't recommend the plant for quick results, but it is a sight to behold when it finally decides to unfurl its inflorescence!

ANTHOLYZA BREEDING PROGRAM

HAMILTON P. TRAUB

When the writer moved to La Jolla on the Pacific Ocean, he found on the grounds a naturalized South African irid which appears to be *Antholyza intermedia*. He also noted that it was naturalized or cultivated in gardens elsewhere in the vicinity. At first he tolerated it

but also eradicated some of it, but as he observed it over an eight year period he finally began to appreciate its value. It flowers profusely in January—March, has a very informal character that makes it valuable in flower arrangements, and thrives under utter neglect. It dies down in June at the beginning of the 3—4 months dry period, and emerges with the rains in October, and then blooms from January to March. The flowers are bright red. It seeds profusely so that it can be easily propagated either by seeds or by offset-cormlets. In 1962, the writer decided to begin a breeding project to improve this subject still further, but there are no other species available here at present. There are about 18 species—4 in tropical and the rest in South Africa.

For the breeding program, the following are wanted particularly, although any of the other species would be acceptable—*namaquensis* (red), *nervosa* (scarlet), *pulchra* (violet-purple), *cunonia* (red), *aethiopica* (red and yellow), *aethiopica* var. *bicolor* (red and primrose), *aethiopica* var. *vittigera* (orange-red), *paniculata* (red and yellow), *quadrangularis* (red and yellow), *steingroveri* (red), *schweinfurthii* (red and yellow) and *bucherveldii* (greenish-yellow). Seeds and corms of *A. intermedia* are available at present for exchange. It is known that it is particularly useful for southern California, and it may be that it will thrive also in southern Arizona, Texas, Louisiana, Mississippi, Alabama and Florida.

ROOT MEALYBUGS ON PHOENIX AND CORDYLINE

HAMILTON P. TRAUB, *California*

When the writer took possession of his home at La Jolla, Calif., in 1954, the grounds were literally overrun with giant *Eucalyptus* and in addition there were two large *Phoenix dactylifera*. All of these, as reported by neighbors had been planted by a nurseryman friend of Lew Ayres on the premises at the time his parents built the house. The *Eucalyptus* were removed at an expense of \$800 and one of the *Phoenix dactylifera* was allowed to stand. It was soon found however that the roots of the palm had literally penetrated the ground for a radius of over 30 or more feet, and to a considerable depth. It was also found that *hardly anything could compete* with the roots of the palm. Also he was shocked to note that the roots were infested with mealybugs which appeared not to harm the development of the palm. Thus the palm had to be removed. In southern California such palms, and also *Washingtonia* palms, and others, serve as homes for rodents. When the *Phoenix* was removed, it was difficult to drive off the huge rats that it housed; one very large rat simply moved to the other side when workmen were busy on one side.

In this connection the writer remembered that when he resided at Orlando, Fla., in the 1930's and 1940's, it was proposed to organize a palm society. The writer noted that palms were hardly subjects for the intimate gardener, mainly due to the great size of many palms, and that their culture was best reserved for large parks and plantariums

(arboreta). Someone suggested instead that the American Amaryllis Society be organized, and this proposal luckily prevailed.

The writer ordered stock of what is locally known as the Ti plant in Hawaii, which is *Cordyline terminalis* from tropical Asia. This thrived here and soon became so luxuriant as to become a nuisance. Ti also harbors the root mealybugs which do not seem to harm it. Thus it too had to be eradicated.

It would be of interest to hear from other members who have had similar troubles.

FILMSTRIP SERIES: PLANT CLASSIFICATION

[The following excerpts are from a letter received July 6, 1962 from Dr. Winslow Kelley, Associate in Filmstrip Production, Encyclopedia Britannica Films, Inc., Wilmette, Illinois. Those interested in this cooperation should write directly to Dr. Kelley.]

It occurred to us here at Encyclopaedia Britannica Films that members of the American Plant Life Society may have in their files some excellent 35 mm color slides which could be of value for teaching young people more about botany in numerous high school classes throughout the country.

For your information, we plan to release a series of nine science filmstrips on PLANT CLASSIFICATION to the nation's high schools, this autumn. For this program we will be able to utilize 35 mm color slides for the illustrations. The subject areas for these filmstrips are:

How Plants Are Classified	Ferns and Fern Allies
Algae	Gymnosperms
Bryophytes	Monocotyledons
Fungi and Slime Molds	Dicotyledons
Bacteria	

Professors Howard Arnott and Robert Doyle, botanists at Northwestern University, are the educational collaborators for this series.

Since the filmstrips will be distributed to high school biology teachers, we plan to present an over-view of the typical plants in the primary groupings. Professors Arnott and Doyle have prepared the attached list of some of the visuals still needed. Even so, if you or a member have a slide that is not identical to one requested but is closely related, substitutions will be given careful consideration.

If you or members in the Plant Life Society would be interested, we would appreciate it if 35 mm color slides on any of the subjects listed could be forwarded to us; we will purchase those accepted at \$10 per slide. In addition to the \$10, we will supply a duplicate of each slide purchased. Of course, those slides not used will be returned. Each slide submitted should be well identified either on the slide or on a separate identification sheet.

[For those members interested in the amaryllids, it should be noted that these are included under the heading "Monocotyledons."]

—Editor]

PLANT LIFE LIBRARY

STUDIES IN GENETICS, by H. J. Muller. Indiana University Press, Bloomington, Indiana. 1962. Pp. 618. \$4.95. Geneticists in particular and indeed all biologists are fortunate that two of the pioneer contributors, and distinguished elder statesmen in these disciplines have consented to republish their more important papers in single volumes. Prof. E. B. Lewis has assembled and edited the works of Prof. A. H. Sturtevant. Likewise, at the instigation of his students and colleagues, and on the occasion of his seventieth birthday, Prof. H. J. Muller has selected and edited the papers in the volume under review. He has also clarified certain obscurities by inserting a number of explanatory notes at appropriate spots in the text.

The papers are segregated into 9 parts; each part represents work that is roughly homogeneous in subject matter. They are: (1) Chromosome basis of heredity and linkage; (2) Genotype-phenotype relations; (3) Gene theory; (4) "Spontaneous" gene mutations; (5) Gene mutations induced by radiation; (6) Chromosome properties and changes; (7) Heterochromatin; (8) Evolution; (9) Human and general genetics.

There is a FOREWORD by Joshua Lederberg; a page devoted to "H. J. MULLER AS A TEACHER" by G. Pontecorvo; and a chronological list of "WORKS BY H. J. MULLER" which runs to 336 titles, truly a prodigious output by any set of standards. There is also an INDEX of about 8 pages. A random sample of several entries in the INDEX suggests it is accurate and usable.

Browsing thru the pages of this book, one cannot help but be impressed, or even overwhelmed, by Prof. Muller's fertile imagination, and capacity to design critical experiments. These are his most outstanding characteristics as pointed out by Pontecorvo in his essay on Muller as a teacher. It is also true as Lederberg states in the FOREWORD that Prof. Muller has had the foresight and skill to anticipate nearly all of the major advances in genetics over the past 30 years. This is truly an amazing feat in a dynamic science such as genetics has proved to be in the 60 years of the twentieth century.

Prof. Muller takes a dim view of the idea currently fashionable in some circles that all biological problems can be solved by biochemical and biophysical methods and techniques. In his opinion the methodologies and materials of classical genetics are clearly not passé. In a bold statement quoted below, Prof. Muller makes his position clear.

"We do not wish to imply by the above remarks any agreement on our part with the adolescent notion that genetic work utilizing the older methods and materials is no longer worthwhile. There are enormous areas of great importance still to be explored that cannot at present be inquired into as well in any other way, and that promise rewarding results. Included here are work on mechanisms of segregation, crossing over, mutation, position effect, gene expression, selection, and speciation, and analyses of differentiations within chromosomes and within 'loci'."

His fellow geneticists and future generations of geneticists and biologists have reason to be grateful to Prof. Muller for making available in one volume the fruits of a lifetime of research. Lastly, the Indiana University Press deserves congratulations for publishing a book of slightly over 600 pages that can be purchased for the price of \$4.95.—*Thomas W. Whitaker.*

KURZE GESCHICHTE DER GENETIK BIS ZUR WIEDERENTDECKUNG DER VERERBUNGSREGELN GREGOR MENDEL'S [A short history of genetics up to the rediscovery of Gregor Mendel's laws] by Hans Stubbe, Gatersleben, Veb Gustav Fischer, Verlag, Jena. 1963. pp. 232. DM 18.10. Illus. Contrary to expectation there is no really good early history of genetics in the German language. This state of affairs no longer exists. Prof. Dr. Hans Stubbe, the able and respected Director of the Institutes für Kulturpflanzenforschung at Gatersleben, East Germany, has effectively closed this gap. His short history of genetics is an excellent chronicle of the early history and development of the science of heredity. Prof. Stubbe's book covers approximately the same material and time span as Conway Zirkle's "The beginnings of plant hybridization", combined with his later paper. "The knowledge of heredity before 1900". The book by Prof. Stubbe is more comprehensive than Zirkle's work because it traces developments in both plant and animal fields.

Prof. Stubbe commences his story with the domestication of animals and plants, and terminates it with a detailed, documented study of the personalities and events leading to the rediscovery of Mendel's laws in 1900. In the intervening pages he evaluates the contributions of the Greeks, the Romans and the outstanding natural history investigators of the Middle Ages. In the eighteenth century he explores the ideas and personalities responsible for the preformation theory, the theory of epigenesis and the great botanical discoveries made at the end of the seventeenth and beginning of the eighteenth centuries. The remainder of the book is devoted to the work of individuals whose investigations indirectly led to establishing a firm foundation for the recognition of the significance of Mendel's work when it came to light in 1900.

It is a scholarly book with much detailed historical information to offer the serious student of heredity. Among its most pleasant features are the excellent portraits of many of the individuals involved in the slow but steady climb of genetics from an art to a full-fledged scientific discipline. The portraits range from that of the Greek physician, Hippocrates, to the Austrian geneticist, Erich von Tschermak-Seysenegg. There is a bibliography of about 400 titles, and both a subject and author index.—*Thomas W. Whitaker.*

THE ARCHITECTURE OF THE GERMLASM by Verne Grant, John Wiley & Sons, Inc., New York, 1964. pp. 236. \$9.75. Illus. If we accept the dictionary definition of "architecture" as any ordered arrangement of the parts of a system, the title of this book is technically correct. An even more descriptive title might be, "Gene action and interaction in diploid organisms". The book is predominantly about genes, their linkages, interaction with other genes and with the environment. Within the limits he has set for himself, Prof. Grant has done a magnificent job of analysis to show just how genes are arranged and how they perform to execute their many functions. Admittedly the term "gene" is hard to define satisfactorily in terms of a precise well-marked entity on the chromosome. Grant takes the attitude the term is still a useful one. He states, "It (the gene) can only be used in an indefinite sense to refer to genetically active regions of varying size and limits on a chromosome."

Later in the book Grant suggests that the true theory of the gene will have to be established by future research, and will probably consist of a composite of several different generalizations, each with limited validity. This position is well summarized by the following quotation, "Thus the genetic material of viruses and bacteria may consist to a considerable extent of interchangeable nucleotide pairs, while that of plants and animals may be organized to a much greater extent into large structural units. In short, discrete Mendelian genes may be a characteristic element in the genotype of complex organisms, but may be a relatively uncommon feature of the genotype of simple viruses and bacteria."

Considering that the book is aimed at an audience of advanced biology students and professional biologists, one might question the propriety of including the elementary material of the first two chapters, "The Hereditary Material" and "Gene Action". Similar discussions can be found in many of the modern textbooks of genetics. As Grant points out, however, this basic material is needed for an orderly development of the analysis which follows.

It is difficult to find much to quarrel with in this book. The final 4 chapters are particularly good: "Organization of a Chromosome Region"; "Linkage of Functional Gene Systems, I"; "Linkage of Functional Gene Systems, II"; and "Linkage of Adaptive Gene Combinations". Prof. Grant has made an effort, largely successful, to avoid technical terms, but in the end he is forced to coin a few himself, e.g. serial gene systems, etc. However, one should not be misled into thinking this is a book for a casual evening's entertainment. Close attention and study are required to follow the author's skillful, tightly knit arguments.

Prof. Grant is not one of those people who think that genetics commenced in 1953 when Watson and Crick announced the probable structure of the DNA macromolecule. He has borrowed freely from earlier literature for examples that

are pertinent for his purpose. The work of Goodspeed and Avery with trisomics in *Nicotiana* is used to illustrate genic balance. Likewise, to show the differences between closely related species in the segmental arrangement of chromosomes, Avery's work with *N. glauca*, *N. langsdorffii* and *N. glauca* is cited. These researches were all published in the late 1930's.

In a section on "hereditary determinants in the cytoplasm", Grant devotes about 4 pages to a succinct account of the important research of Michaelis with *Epilobium*. This work has been either ignored or not well-understood by most contemporary writers. It is a welcome surprise to see it integrated with other research on the nature of the hereditary factors in the cytoplasm.

The book is neatly assembled and printed. Moreover, it is practically free of typographical errors. The bibliographical footnotes are an unusual and convenient feature of the book. They do away with annoyance of having to turn to the end of the chapter or the rear of the book to check the author's documentation. There is a Bibliography of about 250 titles, an Author and a Subject Index—*Thomas W. Whitaker*

DIE GENOMMUTATIONEN (PLOIDIEMUTATIONEN), by Dr. Rigomar Rieger. Gustav Fischer Verlag, Jena. 1963. pp. 183. DM, 23.90. **Die Genommutionen (Ploidiemutationen)** is another excellent review in the series, **Gundlagen, Ergebnisse und Probleme der Genetik**, edited by Professor Dr. Hans Stubbe of Gatersleben, East Germany. Rieger has centered this review mostly around a discussion of the origin of polyploids and the mutations that occur in these organisms with extra chromosomes. Naturally, nearly all of the examples chosen for discussion are from the higher plants, because this is where polyploidy commonly occurs, and where it can be readily induced for experimental study. There is, however, some discussion of polyploidy in salamanders, and of aneuploidy in man. **Die Genommutionen** is a very thorough, well-illustrated review of 183 pages. There is a bibliography of nearly 500 titles and an author-subject index.—*Thomas W. Whitaker*.

GENETICS, by I. H. Herskowitz. Little, Brown and Company, 34 Beacon St. Boston 6, Mass. 1962. Pp. 466 plus 76 pp. Supplement, Illus. Professor Herskowitz's text is patently one of the best of the current crop of college textbooks on modern genetics. If the author's directions are followed it can be used for either a one semester course (31-45 hours) or a two semester course (60-90 hours). For the one semester course he suggests omitting about one-half of the material leaving only the chapters on basic concepts to be mastered.

It is an attractive book; the paper, printing, and binding are good, and the illustrations appear to have real merit. Few typographical errors are apparent. There is both a SUBJECT INDEX and an AUTHOR INDEX, along with a SUPPLEMENT. The first paper in the SUPPLEMENT is a portion of Mendel's letter of 1867 to Carl Nägeli reporting the results of his classical experiments with peas. The remainder of the material consists of Nobel Prize lectures by Morgan, Muller, Beadle, Tatum, Kornberg and Lederberg. These inspiring addresses are of lasting value, and the serious student of genetics could well take the time to study and digest them.

The author, evidently an experienced teacher, has introduced some sound pedagogical tools each calculated to stimulate the learning process. For example, each chapter terminates with a short paragraph or two, appropriately labeled SUMMARY AND CONCLUSIONS which epitomizes the essential ideas developed in the preceding pages. Also at the end of each chapter there is a list of thought provoking QUESTIONS FOR DISCUSSION, and 4 to 6 REFERENCES to original papers from which the material in the chapter was drawn. Another lively innovation is a photograph of an individual who has made significant contributions to the field covered by the chapter. It is a pleasant surprise to note that more than one half of these persons are alive today.

In 49 chapters Professor Herskowitz has covered the entire field of genetics from segregation to genetic coding. Inevitably some subjects are given more

thorough treatment than others. The text appears to be well adapted to satisfy the needs of those students majoring in science. Whether it would be suitable for liberal arts students with a limited background in chemistry and biochemistry is questionable. Also, as the author admits, the vast field of applied genetics has been almost entirely neglected.—*Thomas W. Whitaker*

A SOURCE-BOOK OF BIOLOGICAL NAMES AND TERMS, 3rd edition, revised and enlarged, 3rd Ptg., by E. C. Jaeger. Chas. C. Thomas, 301-327 E. Lawrence Av., Springfield, Ill. 1962. Pp. xxxv + 323. Illus. \$5.75. Since the publication of the 3rd edition in 1955, the supplement to this standard work has been considerably enlarged. In the introductory section, the building of names and terms, types of names, application of names, transliteration, Greek prefixes, form of Latin nouns and adjectives, Latin names of anatomical structures, and language abbreviations, are considered. In the main body of the book, and supplement, the Greek, Latin, or other origins of the more than 12,000 elements included are set down alphabetically. Their meanings together with examples of their use in nomenclature and terminology, are concisely given. This is required as a standard reference book by students, teachers, and all other workers in the biological sciences. Highly recommended.

BIOLOGY TEACHER'S HANDBOOK, by J. J. Schwab, supervisor. John Wiley & Sons, 605 3rd Av., New York 16, N. Y. 1963. Pp. 585. Illus. \$7.00. This is one of the series of Biological Sciences Curriculum Studies initiated by the American Institute of Biological Sciences. Thirteen authorities participated in this study and the results are summarized by the supervisor. It is intended as an everyday reference source for those teaching the Biological Sciences Curriculum Study courses, and also for those teaching other biology courses. Section 1 is devoted to the method of approach; Section 2, to the demonstration of the teaching of biology by inquiry; Section 3, to basic knowledge in the physical sciences and statistics, and recent biochemical discoveries, necessary for teaching biology; and Section 4, to information and materials which assist the teacher. This is required reading by all biology teachers, and should be on hand for daily reference. Highly recommended.

FATTY ACID METABOLISM IN MICROORGANISMS, by Klaus Hofmann. John Wiley & Sons, 605 3rd Av., New York 16, N. Y. 1963. Pp. 78. Illus. \$3.25. This is a summary of the work carried on by Dr. Hofmann at the University of Pittsburgh in 1947 which was presented as the 1962 Squibb Lectures on Chemistry of Biological Products. Chapter 1 deals with lactobacillic acid, a novel micro-biological metabolite; Chapter 2 is devoted to biosynthesis of cyclopropane fatty acids, and Chapter 3 is concerned with biosynthesis of monounsaturated fatty acids by microorganisms. Highly recommended.

NAMING THE LIVING WORLD, by Theodore Savory. John Wiley & Sons, 605 3rd Av., New York, 16, N. Y. 1963. Pp. 128. Illus. \$3.95. This well-written, easily readable book is designed for the student in biology who desires to obtain an understanding of the principles and procedures for the naming of lineages (species and higher taxa). Part 1 is devoted to the principles of nomenclature; Part 2, to the various codes of nomenclature; and Part 3, to the practice of nomenclature—the naming of species and higher taxa.

QUANTITATIVE CHEMICAL TECHNIQUES OF HISTO- AND CYTO-CHEMISTRY. Vol. 2. Interscience Publ. (Div. of John Wiley & Sons), 605 3rd Av., New York 16, N. Y. 1963. Pp. 513. Illus. \$15.75. This is the second volume in the series by Dr. Glick. The reader is referred to the review of Vol. 1 in *Plant Life*, vol. 19, 1963. The second volume is devoted primarily to chemical techniques—spectrophotometric and titrimetric techniques—but flame photometric, and micro-biological techniques are also included. This up-to-date text is required as a constant reference companion by all who are interested in histo- and cytochemistry. It is highly recommended.

OUTLINES OF BIOCHEMISTRY, by E. E. Conn and P. K. Stumpf. John Wiley & Sons, 440 Park Av., So., New York 16, N. Y. 1963. Pp. 391. Illus. \$8.75. This outstanding new one semester course in biochemistry for upper-division under-

graduates and first-year graduate students, by two authorities, will be welcomed by both the teacher and the student. It provides an excellent over-all survey of the science of biochemistry in the light of recent advances in our knowledge. Part 1 deals with the chemistry of biological compounds; Part 2, surveys the metabolism of biological compounds; and Part 3, is concerned with integration of metabolism. Appendices are devoted to buffer and pH problems; a review of some modern concepts in organic chemistry; and methods in biochemistry. The authors are to be congratulated on an excellent text. It is highly recommended.

THE CHEMISTRY OF WOOD, edited by B. L. Browning. Interscience Publ. (Div. of John Wiley & Sons), 605 3rd Av., New York 16, N. Y. 1963. Pp. 689. Illus. \$25.00. This important new text by 17 authorities, includes contributions on the outstanding features of the chemistry of wood, and its components. It is intended for the student, the young scientist and technologist. It provides critical surveys of the supply and uses of wood; structure of wood; composition and chemical reactions of wood; cellulose; hemicelluloses; wood lignins; extraneous components of wood; chemistry of developing wood; wood-water relationships; manufacture of wood pulp; wood as a chemical raw material; and chemistry of bark. This contribution is both a text and a reference book and is highly recommended.

ADVANCES IN ENZYMOLOGY, AND RELATED SUBJECTS OF BIO-CHEMISTRY, edited by F. F. Nord. Vol. 25. Interscience Publ. (Div. John Wiley & Sons), 605 3rd Av., New York 16, N. Y. 1963. Pp. 565. Illus. \$15.00. This volume includes contributions from 15 outstanding authorities. The topics covered include elementary steps in enzyme reactions; photosynthesis, energetics and related subjects; the chemistry of light emission, the prevalence and significance of the products; inhibition of enzymes; coenzyme Q; multiple forms of enzymes; biological basis for ethionine effects on tissues; biological methylation; recent developments in the biochemistry of amino sugars; and the mechanism of cacao curing. This important volume is highly recommended to all who are interested in enzymology.

ADVANCES IN PEST CONTROL RESEARCH, edited by R. L. Metcalf. Vol. 5. Interscience Publ. (Div. John Wiley & Sons), 605 3rd Av., New York 16, N. Y. 1962. Pp. 329. Illus. \$13.50. This volume includes contributions from 6 outstanding authorities in the field of pest control. The articles are devoted to the impact of antibiotics upon plant disease control; theory and principles of soil fumigation; fumigation of food commodities for insect control; gas chromatography of pesticides; and instrumentation in pesticide residue determinations. This timely book will be of interest to all who are interested in advances in the basic knowledge of plant and animal pests, and measures for their control. Highly recommended.

PROCEEDINGS OF THE FOURTH CELLULOSE CONFERENCE, edited by R. H. Marchessault. Interscience Publ. (Div. John Wiley & Sons), 605 3rd Av., New York 16, N. Y. 1963. Pp. 548. Illus. \$22.50. This symposium includes contributions from a large number of authorities in the Cellulose Research Institute. It is notable that a half-day session was devoted to the molecular architecture of wood. According to prominent workers in this field, the future of cellulose as a polymeric entity is locked in the molecular complexity of wood. In addition, there are general papers on various topics usually considered at the conference; discussions on future trends in cellulose research; and contributions from friends and colleagues of P. H. Hermans. Highly recommended.

HEREDITY AND DEVELOPMENT, by J. A. Moore. Oxford Univ. Press, 417 5th Av., New York 16, N. Y. 1963. Pp. 245. Illus. (Paperback) \$1.95. In the first part of the book, the history of genetic concepts is traced from Darwin's untenable theory of pangenesis of 1868, to the rediscovery of Mendelism in 1900, and finally to the identification of nucleic acid with the genetic code. In the second part—concerned with embryology—the carrying out of the hereditary instructions contained in the zygote is discussed. The subject is amplified by the consideration of a synopsis of development of the amphibian embryo; gastrulation and organ formation; differentiation; and developmental control of genetic systems. This stimulating book is highly recommended.

CHROMATOGRAPHY, edited by Erich Heftmann. Reinhold Publ. Corp., 430 Park Av., New York 22, N. Y. 1961. Pp. 753. Illus. \$17.50. This first complete reference book on the theory, techniques and applications of chromatography and electrochromatography will be welcomed by all chemists and biologists. The book includes contributions from thirty-four outstanding authorities. The first part is devoted to fundamentals of chromatography including the development of theories and techniques. Part 2 is concerned with the applications of chromatography to important classes of compounds—amino acids, peptides, proteins, lipids, terpenes, carotenoids, fat-soluble vitamins, steroids, carbohydrates and related compounds, alkaloids, nucleic acids and related substances, chlorophylls and porphyrins, water-soluble vitamins, antibiotics, phenols, inorganic ions, nonhydrocarbon gases, and hydrocarbons. This important reference text is highly recommended to teachers and students; and chemists and biologists.

VIEWPOINTS IN BIOLOGY, NO. 1. Edited by J. D. Carthy and C. L. Duddington. Butterworth Inc., 7235 Wisconsin Av., Washington 14, D. C. 1962. Pp. 290. Illus. \$14.95. It is refreshing to note that the series of reviews, of which this is the first, are to be written so as to be "readily understandable to other scientists as well as biologists." In this first volume, comprehensive reviews are presented by H. E. Street, on the physiology of roots; P. R. Lewis, on histochemistry in biology; H. Tristram, on protein synthesis in micro-organisms; C. L. Duddington, on predaceous fungi and the control of eelworms; J. E. Treherne, on the physiology of absorption from the alimentary canal in insects; and, Gabriel Horn, on some neural correlates of perception. This important volume is highly recommended to biologists.

THE BOXWOOD BULLETIN, Vol. 1, Nos. 1—3; Vol. 2, nos. 1—4. (1961-1962). The American Boxwood Society, Blandy Farms, Boyce, Va. Membership \$2.00 per annum; Bulletin to non-members, \$5.00 per volume. This quarterly is devoted to boxwood, the oldest garden ornamental. This publication will appeal to the large number of gardeners who are interested in boxwood.

LIFE: ORIGIN AND DEVELOPMENT, by Goesta Ehrensaerd. Univ. of Chicago Press, 5750 Ellis Av., Chicago 37, Ill. English edition. 1962. Pp. 164. Illus. \$1.50. This book, by an outstanding Swedish biochemist, presents his ideas about the origin of living things through gradual chemical evolution. He apparently discounts the role of chance in the evolutionary process, and holds that there is an inevitable path. However, the truth apparently lies somewhat between these two extremes. This presentation is recommended to the student as the conclusions reached by an eminent biochemist which are worthy of consideration.

THE ECOLOGY OF NORTH AMERICA, by V. E. Shelford. Univ. of Illinois Press, Urbana, Ill. 1963. Pp. 610. Illus. \$10.00. This important book details an ecological reconstruction of early North America (1500 to 1600) on the basis of widely scattered published works dealing with these primeval communities, and also data collected by the author during a lifetime of field observation and research. Its publication is indeed an important event because it provides background information on the habits, biotic communities, and distribution and abundance of animals and plants in primeval North America. This outstanding book will appeal to plant and animal biologists, agriculturists, foresters, wildlife managers, and sportsmen. Highly recommended.

MOLECULAR EQUILIBRIUM, by P. H. Carnell and R. N. Reusch. W. B. Saunders Co., W. Washington Sq., Philadelphia 5, Penna. 1963. Pp. 217. Illus. Paperback, \$2.25. This is a programmed course in general chemistry. The authors point out that such a course is not a substitute for regular class-room instruction, but when properly used in conjunction with the other teaching procedures, it can be of real assistance to the student. The course is in three parts—the law of chemical equilibrium; equilibrium changes; and equilibrium calculations. Highly recommended to chemistry students.

(CONTINUED on page vi, above.)

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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[AMERICAN AMARYLLIS SOCIETY, continued from page 2.]

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**VOLUMES 16-20
1960-1964, incl.**

EDITED BY

HAMILTON P. TRAUB

HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY

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CATALOG OF
HYBRID AMARYLLIS CULTIVARS
1799 TO DEC. 31. 1963

COMPILED BY

Dr. Hamilton P. Traub
Prof. W. R. Ballard
Mrs. La Forest Morton
Mr. W. D. Morton, Jr.
Mr. E. F. Authement

FIRST EDITION

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

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FOREWORD

The registration of Hybrid *Amaryllis* clones began with the organization of the AMERICAN AMARYLLIS SOCIETY in 1934. In the same year the writer published the first catalog of Hybrid *Amaryllis* in THE AMARYLLIS YEAR BOOK. Since 1934, the Society has provided a registration service, international in scope, for *Amaryllis* and the other amaryllids.

During the 1940's the responsibility for the registration of hybrid *Amaryllis* clones was assumed by Prof. W. R. Ballard of Hyattsville, Maryland. When Prof. Ballard died in the 1950's, the post was vacant until the duties were taken over by Mrs. La Forest Morton of New Orleans, Louisiana, who ably handled the project until her death on Oct. 28, 1955. Mr. W. D. Morton, Jr., had assisted his wife in the registration and other work that Mrs. Morton had carried on as an officer of THE AMERICAN AMARYLLIS SOCIETY, and it was natural that he should continue the registration project, and he has headed up the project since that date. In 1962, Mr. Edward F. Authement accepted the position of Assistant Registrar in order to assist Mr. Morton with the project. With this additional assistance, it was decided to prepare the present CATALOG OF HYBRID AMARYLLIS CULTIVARS. Mr. Authement performed the major part of the work in connection with the compilation of the Catalog from the records left by the previous registrars.

The first *Amaryllis* hybrid was made by a Mr. Johnson, who had a small garden at Prescott, Lancastershire, England. The hybrid was reported in 1799. It was a cross between *Amaryllis reginae* and *A. vittata*, and was later named *Amaryllis x johnsonii*. This, or similar hybrids, has come down to us. During the first third of the 19th century, many hybrid *Amaryllis* had been produced, mainly in England.

Hybrids in the contemporary sense were first produced by Garroway & Company, of Bristol, England, who originated *Amaryllis x acramanni* in 1835 by crossing *Amaryllis aulica* var. *platypetala* and *A. psittacina*. This hybrid has come down to us and is still cultivated in the United States.

The second important step in the development of the larger-flowered hybrids was realized when Jan de Graaff (1797—1862) crossed *A. vittata* with *A. striata* vars. *fulgida* and *crocata*, and by selective breeding obtained the colorful hybrid which was named 'Graveana'.

His son, Simon de Graaff (1840—1911) in the 1860's crossed *A. psittacina* and *A. striata* with other available larger-flowered hybrids, and then crossed these with 'Graveana', and thus produced the famous 'Empress of India', with glowing red flowers and broad, rounded, white-banded telapsegs. This represented the third landmark because it was the beginning of the large-flowered Reginae hybrids represented today by Division 4-A and 4-B Reginae flower types.

The fourth step in the direction of the contemporary hybrids was taken when Richard William Pearce was employed by Veitch & Sons to collect plants in South America. He brought back *Amaryllis*

leopoldii and *A. pardina* from Peru (possibly actually from Bolivia). These were crossed with the best Reginae hybrids and by the 1870's gave rise to the large-flowered, open-faced Leopoldii hybrids. These are recognized today as Division 5-A and 5-B Leopoldii Hybrids.

The contemporary hybrids contain genes not only of the species mentioned but also of a number of others—a total of more than a dozen species.

With the organization of THE AMERICAN AMARYLLIS SOCIETY in 1934, steps were taken to extend the variety in cultivated hybrid *Amaryllis*. In addition to Reginae Hybrids (Division 4-A and 4-B), and Leopoldii Hybrids (Division 5-A and 5-B), the following new Divisions were recognized: Division 1 (cultivated wild species); Division 2 (Long Trumpet Hybrids), Division 3 (Belladonna Hybrids), Division 6 (Orchid-flowering Hybrids), Division 7 (Double Hybrids), Division 8 (Miniature Hybrids) and Division 9 (Unclassified Hybrids). Some progress has been made toward popularizing these additional types which add much needed variety.

Since 1799, a very great many *Amaryllis* hybrids have been produced and named. Of these, up to 1934, only a very few had survived. It would thus serve no useful purpose to attempt to catalog all of these names of non-existent clones. It was decided to list only those names which had appeared in major works concerned with *Amaryllis*. Such a catalog was prepared by the present writer and published in the 1934 AMARYLLIS YEAR BOOK. Beginning with this date, an attempt was made to catalog at least the named clones in commerce. These names were listed as registered in the AMARYLLIS YEAR BOOK. The present Catalog includes these names and those registered up to December 31, 1963. This work is to be considered as *the starting point* for the nomenclature of hybrid *Amaryllis* cultivars.

Supplements to the present Catalog will be issued from time to time, listing those named clones in cultivation. Thus, those interested may keep up with developments by consulting the 1964 Catalog, and the most recent supplement.

*Camino de la Costa,
La Jolla, California
December 31, 1963*

*Hamilton P. Traub,
Editor*

CORRIGENDA

Any needed corrections in the CATALOG will be reported in PLANT LIFE 1965.

HOW TO REGISTER AN AMARYLLIS CLONE

The registration service, international in scope, was instituted by The American Amaryllis Society in 1934.

1. Write to the Registrar of *Amaryllis* cultivar names, Mr. W. D. Morton, Jr., 3114 State Street Drive, New Orleans 25, La.; or Mr. Edward F. Authement, Assistant Registrar, 2214 Gallier Street, New Orleans, La. 70117, for registration blanks, enclosing check or money order for the registration fee made payable to THE AMERICAN AMARYLLIS SOCIETY, which is affiliated with THE AMERICAN PLANT LIFE SOCIETY.

2. The registration fee is \$2.00 for each clone registered. The brief description of the registered clone will be published in the next following AMARYLLIS YEAR BOOK.

3. A name not previously used should be selected, and this together with an alternate name that may be substituted in case the first has already been pre-empted. The present Catalog contains all of the names pre-empted through 1963. If it does not appear there, or in any Supplement published later, the chances are that it is available unless some one has recently sent in an application with a request for it. The registration is not completed until the blanks are filed and approved by the Registrar. A signed registration form will then be returned to you.

4. The registration procedure is in essential accordance with the International Code for Cultivated Plants, 1961 or later editions. Names should consist preferably of one or two words, and never of more than three words. The following types of names are inadmissible:

(a) Scientific or common names of a genus, or the common name of a species; such as 'Hibiscus', 'Camellia', 'May Apple', etc.

(b) Numerals or symbols such as seedling numbers, etc.

(c) Names beginning with articles, such as "The" and "A".

(d) Names of living persons without the written consent of that person, or of the parents, in case of a minor.

(e) Abbreviations such as "Dr." for "Doctor", "Mt." for "Mount", etc.

(f) Use of trademark or copyrighted names unless previously in common use. Or a slight variation of a name already registered

5. The application blank should be filled in as completely as possible. It is particularly important to include (a) the flower type Division, (b) the height of the plant; (c) number of flowers per umbel; (d) depth of flower; (e) diameter of the flower; (f) brief color description of flower; (g) flowering time; (h) deciduous or evergreen habit of plant.

6. The classification of the Amaryllis flower types are those which appear in Traub, "The Amaryllis Manual". Macmillan Co., New York & London, 1958:

- | | |
|---|---|
| Division 1. Cultivated Wild
Amaryllis (D-1) | Division 6. Orchid-Flowering
Amaryllis Hybrids (D-6) |
| Division 2. Long-Trumpet Amaryllis
Hybrids (D-2) | Division 7. Double Amaryllis
Hybrids (D-7) |
| Division 3. Belladonna-Type
Amaryllis Hybrids (D-3) | Division 8. Miniature Amaryllis
Hybrids (D-8) |
| Division 4. Reginae-Type
Amaryllis Hybrids (D-4)
(sub-types D-4A, and D-4B) | Division 9. Unclassified Amaryllis
Hybrids |
| Division 5. Leopoldii-Type
Amaryllis Hybrids (D-5)
(sub-types D-5A, and D-5B) | |

7. Introduction of hybrid Amaryllis clones: Introduction is defined as the "offering for sale to the public" in catalogs, printed lists, and advertisements. Send copies of these, if they contain new introductions, to the Registrar, if possible.

8. Only registered named clones, and authentic unnamed breeder's seedling, are eligible for the regular awards at Official Amaryllis Shows.

ALPHABETICAL LIST OF ABBREVIATIONS— DESCRIPTIVE TERMS AND LITERATURE CITATIONS

A.—The genus *Amaryllis* L., first published in Linnaeus, "Species Plantarum", 1753; used as a prefix to registration numbers: A280, etc.

AAS.—The American Amaryllis Society; organized in 1933; affiliated with the American Plant Life Society since 1945.

APLS.—The American Plant Life Society.

autm.—autumn-flowering.

Bak. Amaryll. 1888.—Baker, J. G.; Handbook of the Amaryllideae. Geo. Bell & Sons, London, 1888.

c.—trade catalog or price list.

Chitt. 1933.—Chittenden, F. J.; Royal Horticultural Society, London. Communication dated Oct. 20, 1933.

cl.—clone; a plant reproduced by asexual (vegetative) means. For example: All plants of the clone 'Floriade' are genetically uniform with the original "mother plant", having been derived from it by vegetative division. A clone is a particular kind of **cultivar** (cultivated plant).

Cult.—plants that are maintained under cultivation.

D—Amaryllis flower division. (see Registration Procedure).

dbl.—flowers double.

DCN.—The ISCC-NBS Method of Designating Colors, and a Dictionary of Color Names. National Bureau of Standards Circular #553, 1955. Order from Supt. of Documents, U. S. Printing Office, Washington 25, D. C.

dec.—deciduous: plant loses its leaves at a certain season each year, and goes dormant.

diam.—diameter: flower size across face.

e.—early: applied to spring, summer, autumn, or winter flowering season.

err.—error: due to spelling rather than a real synonym; such names are enclosed in double quotation marks.

ev.—foliage evergreen (held for a relatively long period). Younger leaves are produced before the older ones die down; such plants do have a dormant period but the leaves are not shed.

- f.—figure.
 fc.—figure, illustrated in color.
 fld.—flowered (as per number of florets per umbel).
 fis.—florets (flowers).
 fr.—mildly to moderately fragrant.
 GC.—Gardeners Chronicle (London).
 GW.—Gartenwelt, Berlin.
 GZ.—Gartenezeitschrift, Berlin.
 h.—height of scape in inches.
 Hb.—Herbertia, Vols. 1-15 (1934-1948), includes Yearbook American Amaryllis Society, Vols. 1 and 2.
 HCC—Wilson, Horticultural Colour Chart, publ. by Royal Horticultural Society, Vincent Square, S. W. 1, London, England.
 Herb. Amaryll. 1837.—Herbert., William, Amaryllidaceae, James Ridgway & Sons, London. 1837.
 Houd., Cat.—Houdyshel, Cecil; catalog, La Verne, Calif.
 I.—Introducer, or introduced formally into commerce.
 Ker, Cat.—Ker, Robert P. & Sons, Liverpool, England; catalog.
 la.—late; applied to spring, summer, autumn, or winter flowering season.
 l. hom.—later homonym; the term used when a name already in use has been applied to a different clone at a later date.
 M & P.—Maerz & Paul, A Dictionary of Color; McGraw-Hill, N. Y.
 NCF.—Nickerson Color Fan.—1957. Order from Arnold Arboretum, Jamaica Plain 30, Mass.
 Nehr. Amaryll. 1909.—Nehrling, Henry, Die Amaryllis oder Rittersterne, Paul Parey. Berlin. 1909.
 NR.—Not registered; recognized as validly published, but unregistered clone which has been published with adequate description. Such clones are not eligible for awards at the Official Amaryllis Shows unless they are registered later.
 petseg., petsegs.—petepalseg, petepalsegs; refers to the inner floral segments.
 PL.—Plant Life, Vols. 1 to date (1945 to date); includes also Year Book American Amaryllis Society from 1949 to date.
 R.—Registered.
 recu.—recurrent blooming; more than once each season.
 RH.—Revue Horticole (Paris).
 RHS.—Royal Horticultural Society, London, Journal.
 seg., segs.—tepalseg, tepalsegs; refers to the floral segments.
 semi-ev.—foliage semi-evergreen; intermediate.
 setseg., setsegs.—Setepalseg, setepalsegs; refers to the outer floral segments.
 spr.—spring flowering.
 SPN. 1942—Standardized Plant Names, 2nd. ed., edited by Harlan P. Kelsey & William A. Dayton. J. Horace McFarland Co., Harrisburg, Pa. 1942.
 su.—summer flowering.
 Sweet—Sweet, British Flower Garden, 1830.
 syn.—synonym; term used to apply to invalid names for the same clone.
 Traub, Amaryll. 1958.—Traub, Hamilton P., The Amaryllis Manual. Macmillan Co., New York. 1958.
 U—Umbel; flower cluster.
 v. fr.—very fragrant.
 Veit. RHS. 1890.—Veitch, Harry; The Hippeastrum (Amaryllis). Journal Royal Horticultural Society, London 12:243-255. 1890.
 Veit. Cat.—Veitch, James & Sons; Chelsea, England. catalogs, 18—to date (1934).
 win.—winter flowering.
 x—hybrid.

ROSTER OF AMARYLLIS HYBRIDIZERS AND/OR INTRODUCERS WITH ABBREVIATIONS

—A—

Angell—Mr. E. A. Angell, Loma Linda Univ., Calif.
Arms.—Armstrong, England.

—B—

Back.—Mr. James Backhouse, York, England.
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Bevan—Mr. Len Bevan, Australia.
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—J—

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 V. Hou.—Mr. Louis Van Houtte, Belgium.
 VM.—Messrs. G. C. Van Meeuwen & Sons, Heemstede, Holland.
 VT.—C. G. Van Turbergen, Haarlem, Holland.
 VW.—M. Van Waveren & Sons, Hillegom, Holland.
 VZ.—Van Zyverden Bros., Inc. U. S. A.

—W—

W-C.—C. Warmenhoven, Hillegom, Holland.
 W-WS.—W. S. Warmenhoven, "Zonnewende", Hillegom, Holland.
 W-WZ.—W. Warmenhoven & Zonen, Hillegom, Holland.
 Whe.—Mr. R. W. Wheeler, Winter Park, Fla.
 Will.—Mr. B. S. Williams, England.
 Wolfe—Mr. Russell S. Wolfe, Orangeburg, South Carolina.
 Wors.—Mr. A. Worsley, Middlesex, England.

—Z—

Zand.—Zandbergen Bros., Inc., Valkenburg, Holland.
 Zeiner—Mr. G. D. Zeiner, Florida.

CATALOG OF HYBRID AMARYLLIS CULTIVARS, 1799 TO DEC. 31, 1963

The names of hybrid *Amaryllis* clones, both valid and invalid, and also a few of the cultivated wild species, are listed alphabetically. For descriptions of the wild *Amaryllis* species see Traub—The *Amaryllis* Manual. Macmillan Co., New York. 1958; and Plant Life for species published since 1958.

The reader should consult the list of abbreviations for the meaning of any that appear in this Catalog.

All completed registrations up through December 31, 1963 are included in the Catalog.

—A—

- 'Acadia', R; A-2; sulphur-colored, high-lighted and veined light red. Nehr. *Amaryll.* 1909. Hb. 1:46. 1934.
- 'Achilles', NR; Hb. 1:63. 1934.
- 'Acquisition' (Veit. 1889), R; A-3; Chitt. 1933. Hb. 1:46. 1934.
- 'Acramanii' (Garr. 1835), R; A-4; err: "acramanni", "ackermannii"; *A. aulica* var. *Platypetala* x *A. psittacina*. Nehr. *Amaryll.* 1909. Hb. 1:46. 1934.
- 'Adonis', NR; Hb. 1:63. 1934.
- 'Africana' (HDL. 1963), R; A-760, D-5A; U-4fld; 15" h; fls. 6½" diam; scarlet (HCC-19), darker throat; spr.; I.—VZ. 1963.
- 'African Glow' (Buller), NR; brilliantly flame colored. PL. 19:22. 1963.
- 'Agamemnon' (Holf. 1906), R; A-5; Chitt. 1933. Hb. 1:46. 1934.
- 'Agatha' R; A-773. I.—Goed. 1962 for a Dutch Breeder.
- 'Agneta', R; A-6; orange-red, bordered white. Nehr. *Amaryll.* 1909. Hb. 1:46. 1934.
- 'Aileen Ingle' (BM. 1962), NR; claret rose on white.
- 'Albaron' (VM. 1962), R; A-741, D-5A; U-4fld; 16" h; fls. 6½"-7½" diam; currant red (HCC-821), cardinal red throat. PL. 19:67. 1963.
- 'Alabaster' (Traub, 1960), R; A-553, D-5A; U-4fld; 22" h; large pure white; spr.; dec.; PL. 16:76. 1960.
- 'Alba Rosea Marginata' (Ker), R; A-6, D-5; white, segs veined rose red. Nehr. *Amaryll.* 1909. Hb. 1:46. 1934.
- 'Alcyone' (VM. 1952), R; A-518, D-4A; 22" h; fls. 7" diam; dark red. PL. 15:46. 1959.
- 'Albino' (VM. 1948), R; A-517, D-4; U-4fld; 22" h; fls. 7" diam; pure white. PL. 15:46. 1959.
- 'Alec' (BM. 1954), R; A-562, D-5B; U-2fld; 16" h; fls. 7½" diam; capicum red (HCC-715), currant red flush, white towards throat. PL. 17:51. 1961.
- 'Alexandria' (VM.), NR; blood red.
- 'Alfred' (Arms. 1949), R; A-7, D-5A; fls. 8½" diam; pure white. PL. 5:88. 1949.
- 'Alipur Beauty' (Lanc. 1940), R; A-8, D-8; U-4fld; 15" h; fls. 4" diam; carmine pink, tube pale green, white bands on petals; *A. stylosa* x *A. reticulata striatifolia*, 'Mrs. Garfield'. Hb. 6:238. 1939.
- 'Allmanni' (Col.), R; A-9; *A. calyptrata* x *A. vittata*. Herb. *Amaryll.* 1837. Hb. 1:46. 1934.
- 'Alpha' (BM. 1954), R; A-563, D-5B; U-2-3fld; 20" h; fls. 7½" diam; vermilion red (HCC-18). PL. 17:51. 1961.
- 'Alta Clarae' (Herb.), R; A-10; *A. psittacina* x 'Griffini'. Hb. 1:46. 1934.
- 'Amazon' (BM. 1954), R; A-564, D-5B; U-4fld; 20" h; fls. 7½" diam; currant red (HCC-821), flushed white. PL. 17:51. 1961.

- 'Ambiguum' R; A-11. *A. elegans* x *A. vittata*. Bak. Amaryll. 1888. Hb. 1:46. 1934.
- 'America' (Heat. 1938), R; A-15, D-5; golden pink, cream base, whitish keel shaded pink, speckled. Hb. 5:146. 1938.
- 'American Beauty' (Zeiner), NR; Hb. 11:256. 1944.
- 'American Express' (Lud. 1951), R; A-421, D-5A; U-4fd; 26" h; fs. 8" diam; oriental red (HCC-819), violet red reflection. PL. 14:55. 1958.
- 'American Fashion' (Lud. 1954), NR; U-4fd; 26" h; fs. 8" diam; rose madder (HCC-23). c. Lud. 1954.
- 'American Idol' (Lud. 1956), NR; U-4fd; 30" h; fs. 11" diam; salmon (HCC-412), salmon-red throat, upper petals bearded. c. Lud. 1956.
- 'American Pride' (Gasp. 1964), R; A-748, D-5A; U-4fd; 16" h; fs. 7" diam; currant red (HCC-821), darker throat.
- 'Amor' (VM. 1963), R; A-742, D-5A; U-4fd; 15" h; fs. 7" diam; geranium lake (HCC-20/1), greenish-white midribs, stripes, PL. 19:67. 1963.
- 'Anagram' (BM. 1954), R; A-555, D-5B; U-2-3fd; 16" h; fs. 7½" diam; geranium lake (HCC-20), flushed white. PL. 17:51. 1961.
- 'Andersoni' (Herb.), R; A-12; *A. striata* x *A. vittata*. Hb. 1:46. 1934.
- 'Andromache' (Ker), R; A-13, D-5; violet red. Nehr. Amaryll. 1909. Hb. 1:46. 1934.
- 'Andromeda' (Ker), R; A-14, D-5; light ground with red veins. Nehr. Amaryll. 1909. Hb. 1:46. 1934.
- 'Anita' (Gasp. 1958), R; A-399, D-5B; U-4fd; 30" h; fs. 7½" diam; rose bengal (HCC-25), mid-stripe on segs; fr.; spr. PL. 14:54. 1958.
- 'Anna Paulowna' (W-WS. 1951), R; A-492; U-4fd; 26" h; fs. 8" diam; salmon-red, red throat. PL. 15:44. 1959.
- 'Anne Lindberg' (Dom. 1934), NR. Hb. 2:92. 1935.
- 'Aphrodite' (Ker), R; A-16, D-5A; white, striped and feathered red. Hb. 1:46. 1934.
- 'Aphrodite' (VM. 1962), R; A-743, D-5A; U-4-6fd; 16" h; fs. 6" diam; signal red (HCC-719), green throat, white midribs. PL. 19:67. 1963.
- 'Apollo' (Ker), R; A-18, D-5; carmine red, edged white. Hb. 1:46. 1934.
- 'Apollo' (W-C. 1962), R; A-725, D-5A; U-3-4fd; 21" h; fs. 8" diam; vermilion red (HCC-18); spr.; I.—Goed, 1962. PL. 19:67. 1963.
- 'Apple Blossom' (Holf. 1899), R; A-17; Chitt. 1933. Hb. 1:46. 1934.
- 'Apple Blossom' (Lud. 1954), R; A-422, D-5B; U-4-5fd; 22" h; fs. 8" diam; white, with dawn pink (HCC-523), lower segs lighter shade, red ring in throat; spr; dec. PL. 14:55. 1958.
- 'Arona', R; A-19; yellow (like *Clivia* yellow). Nehr. Amaryll. 1909. Hb. 1:46. 1934.
- 'Artemise' (Sou.), R; A-20; *A. vittata* hybrid. Nehr. Amaryll. 1909. Hb. 1:46. 1934.
- 'At Dawning' (BM 1954), R; A-566, D-5A; U-2fd; 14" h; fs. 7" diam; scarlet (HCC-19), white star in throat. PL. 17:51. 1961.
- 'Attraction' (Lud. 1958), R; A-457, D-5B; U-4fd; 30" h; fs. 7½" diam; syn: "Red Radiance", capsicum red (HCC-715), darker throat; spr; dec; PL. 15:42. 1959.
- 'Audrey' (Font. 1958), R; A-405, D-5B; U-4fd; 24" h; fs. 6" diam; rose opal (HCC-o22) greenish throat, segs reflexed; spr; ev. Mead hybrid crimson x cl. Pink Perfection. PL. 14:55. 1958.
- 'August Koch' (GPC 1937), R; A-21; U-4fd; orange red, pale yellowish star; syn: "Hippecoris garfieldii, no. 13". I.—AAS. 1937. Hb. 4:142. 1937.
- 'Aurora' (Ker), R; A-22, D5; light red, strongly veined red. Nehr. Amaryll. 1909. Hb. 1:46. 1936.
- 'Autumn Beauty' (Veit.), R; A-23; *A. reticulata striatifolia* x *A. leopoldii*; autm. Nehr. Amaryll. 1909. Hb. 1:46. 1934.

'Autumn Charm' (Veit.), R; A-24; *A. reticulata striatifolia* x *A. leopoldii*; autm. Nehr. Amaryll. 1909. Hb. 1:46. 1934.

'Averunicus' (Veit. 1901), R; A-25; orange red, bordered white. Nehr. Amaryll. 1909. Hb. 1:46. 1934.

'Azalea' (BM. 1954), R; A-567, D-5B; U-2fld; 24" h; fls. 7" diam; azalea pink (HCC-618), flushed white. PL. 17:51. 1961.

—B—

'Baby Pink' (Gasp. 1958), R; A-400, D-5B; U-4fld; 26" h; fls. 6½" diam; solferino purple (HCC-26/3), greenish throat; spr; fr. PL. 14.54. 1958.

'Bacchus' NR; Hb. 1:63. 1934.

'Baffin' (Sou.), R; A-26; *A. vittata* hybrid Nehr. Amaryll. 1909. Hb. 1:46. 1934.

'Baroness Schroder' (Schr. 1928), R; A-27; Hb. 1:46. 1934.

'Baron Palles' (Will.), R; A-28; cl. 'Defiance' x *A. reticulata*; autm. Nehr. Amaryll. 1909. Hb. 1:46. 1934.

'Batemanni' (Col.), R; A-29; *A. reginae* x *A. striata*. Herb. Amaryll. 1837. Hb. 1:46. 1934.

'Baton Rouge' (Lud. 1954), NR; U-4fld; 30" h; fls. 8½" diam; signal red (HCC-719); la. spr; c. Ludwig & Co. 1954.

'Beacon' (Whe. 1940), R; A-30, D-5A; fls. 8" diam; red with violet tones, darker center, lighter towards edges. Hb. 7:130. 1940.

'Beacon' (W-WS. 1954), R; A-493; U-4fld; 26" h; fls. 10" diam; salmon. white midrib. PL. 15:44. 1959.

'Beau Joliat' (W-WS), R; A-494; 22" h; fls. 3½" diam; rosy red. PL. 15:44. 1959.

'Beautiful Lady' (Lud. 1963), R; A-756, D-5A; U-4fld; 26" h; fls. 10" diam; mandarin red (HCC-17/1/2), azalea pink influence, darker throat; spr.

'Belinda' (VM. 1963), NR; dark velvety red, darker throat. R; A-750.

'Bella Vista' (Lud. 1960), R; A-555, D-5A; U-4fld; 22" h; fls. 8" diam; cherry red (HCC-722/1), dark red throat. PL. 17:53. 1961.

'Bellini' (VM. 1963), R; A-783, D-5A; U-3-4fld; 16" h; fls. 6½" diam.; tyrian rose (HCC-24/2). Registered and I.—Goed. 1963.

'Ben Hur' (Nehr.), R; A-31; orange red; *A. belladonna* x cl. 'Empress of India'. Hb. 1:46. 1934.

'Benthamii' (Herb.), R; A-32; gloomy but variable red. Hb. 1:46. 1934.

'Berengaria' (Heat. 1938), R; A-33, D-5; soft dark pink with white star. Hb. 5:146. 1938.

'Bertha Vasku' (Vas. 1936), R; A-34, D-4B; deep red. Hb. 3:92. 1936.

'Bert Merrill' (Traub 1934), NR; Hb. 2:92. 1935.

'Besson', R; A-35; Chitt. 1933. I.—Holf. 1898. Hb. 1:46. 1934.

'Bethlehem Gem' (BM. 1954), R; A-568, D-5B; U-3fld; 20" h; fls. 9" diam; brick red (HCC-o16), white fusion on center of segs. PL. 17:51. 1961.

'Betty Jean' (Arms. 1945), R; A-36, D-5B; fls. 10" diam; white, pink penciling in throat. Hb. 12:104. 1945.

'Big Chief' (Zeiner 1944), R; A-37; fls. 7" diam; solid red. Hb. 11:266. 1944.

'Black Beauty', R; A-38; Chitt. 1933. I.—Holf. 1925. Hb. 1:46. 1934.

'Black Prince', R; A-39; Chitt. 1933. I.—Holf. 1903. Hb. 1:47. 1934.

'Blazing Star' (Lud. 1958), R; A-463, D-5A; U-4fld; 22" h; fls. 9½" diam; dark vermilion (HCC-717), darker throat. PL. 15:42. 1959.

'Bleeding Heart' (Lud. 1954), NR; U-3-4fld; fls. 8" diam; blood red (HCC-820). c. Ludwig & Co. 1954.

'Blushing Beauty' (W-WS. 1962), R; A-683, D-5A; U-3-4fld; 20" h; fls. 7" diam; rose pink (HCC-427), white on 3 upper segs, lower segs white

- with orient pink (HCC-416/3). PL. 19:65. 1963.
 'Bondi Beach' (BM 1958), R; A-633, D-5B; U-2ffd; 19" h; fs. 7½" diam; shrimp red (HCC-616). PL. 17:52. 1961.
 'Bon Ton' (VW 1959), R; A-653; U-4ffd; 20" h; fs. 8" diam; carmine pink (HCC-21). PL. 17:53. 1961.
 'Bordeaux' (W-WS. 1951), R; A-495; U-4ffd; 28" h; fs. 10" diam; orange-scarlet (HCC-19), deep scarlet in throat. PL. 15:45. 1959.
 'Bouquet' (Lud. 1953), R; A-424, D-5A; U-4ffd; 28" h; fs. 9" diam; begonia rose (HCC-619-619/2), throat and stamens empire rose (o621); spr; dec. PL. 15:42. 1959.
 'Boy Rolf' (Bur. 1905), NR. Hb. 9:152. 1942.
 'Brenda', R; A-40. Chitt. 1933. I.—Veit. 1897. Hb. 1:47. 1934.
 'Brian Boru', R; A-41. Chitt. 1933. I.—Holf. 1906. Hb. 1:47. 1934.
 'Bridal Bouquet' (BM 1958), R; A-634, D-5A; U-1-3ffd; 18" h; fs. 9" diam; light cream, pin-pointed delft rose, picotee edges. PL. 17:52. 1961.
 'Bridesmaid' (Lud. 1953), R; A-423, D-5B; U-3-4ffd; 24" h; fs. 7½" diam; pure white, greenish tinge in throat; spr; dec. PL. 15:43. 1959.
 'Brilliant' (VE), NR; **A. pardina** hybrid. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Brilliant' (Lud. 1953), R; A-425, D-5A; U-4ffd; 24" h; fs. 8½" diam; signal red (HCC-719), dark red throat; spr; dec. c. Ludwig & Co. 1954. PL. 15:43. 1959.
 'Brilliant Star' (W-WS. 1962), R; A-708, D-5A; U-4ffd; 20" h; fs. 6" diam; currant red (HCC-821) with cardinal red (822) in throat. PL. 19:65. 1963.
 'Britannia' (Heat. 1938), R; A-43; light salmon, upper petals veined along keel, lower petals shaded white to pink at tips. Hb. 5:146. 1938.
 'Brocade' (BM 1957), R; A-569, D-5B; U-2-3ffd; 18" h; fs. 8½" diam; porcelain rose (HCC-620), flushed white, tips azalea pink. PL. 17:51. 1961.
 'Broginart' (Sou.), R; A-1; **A. vittata** hybrid. Nehr. Amaryll. 1909. Hb. 1:46. 1934.
 'Brookesi' (Bro.), R; A-44; **A. elegans** x **A. johnsonii**. Hb. 1:47. 1934.

—C—

- 'Calliope' (Ker), R; A-45, D-5; scarlet red, rose red sheen. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Calphurnia', R; A-46; rose, white star. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Calypso' R; A-47. Chitt. 1933. I.—Holf. 1910. Hb. 1:47. 1934.
 'Camellia' (VM 1935), R; A-519, D-7; 24" h; fs. 8" diam; salmon rose, partially double. PL. 15:46. 1959.
 'Cammack's Star' (Camm.), NR; PL. 10:79. 1954.
 'Candy Cane' (Lud. 1954), R; A-426, D-5A; 28" h; fs. 9" diam; segs white-edged, white band in center and bright capsicum red (HCC-715/3) bands between white; spr; dec. c. Ludwig & Co. 1954. PL. 15:42. 1959.
 'Cannae Butterfly' (McCul. E), NR; D-6; U-4ffd; red on white ground, greenish white midribs, thickly striped and dotted red. PL. 10:27, f. 1. 1954.
 'Capsicum' (BM. 1956), R; A-570, D-5B; U-2ffd; 20" h; fs. 7½" diam; capsicum red (HCC-715), flushed white. PL. 17:51. 1961.
 'Captain McCann' (McCann), NR; D-7; dark red. PL. 6:108. 1950.
 'Cardinal' (Chandler), NR; SPN. 13. 1942.
 'Cardinal' (Lud. 1958), R; A-464, D-5A; U-4ffd; 24" h; fs. 8" diam; oxblood red (HCC-820), currant red throat; spr; dec. PL. 15:42. 1959.
 'Cardinal's Choice' (BM. 1954), R; A-572, D-5B; U-2-3ffd; 17" h; fs. 7½" diam; cardinal red (HCC-822). PL. 17:51. 1961.
 'Cardinal Wolsey', R; A-48. Chitt. 1933. I.—Holf. 1910. Hb. 1:47. 1934.

- 'Cardinal Wolsey' (BM. 1954), R; A-571, D-5B; U-2fid; 14" h; fs. 7" diam; cardinal red (HCC-822). PL. 17:51. 1961.
- 'Carmen' (Whe. 1941), R; A-49, D-5A; fs. 8½" diam; crimson, violet tones. Hb. 8:92. 1941.
- 'Carminata' (Ker), R; A-50, D-5; light rose red. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
- 'Carnarvoni' (Herb.), R; A-51; *A. elegans* x *a. johnsonii*. Hb. 1:47. 1934.
- 'Carnavonia' (de Cand.), NR; *A. reginae* x *A. vittata*. Herb. Amaryll. 1837. Hb. 1:47. 1934.
- 'Carolina' (BM 1957), R; A-573, D-5B; U-4fid; 18" h; fs. 7" diam; creamy white, flushed and nettled scarlet. PL. 17:51. 1961.
- 'Carolyn' (Burns 1936), R; A-52; large blood-red. Hb. 3:92. 1936.
- 'Carousel' (Lud. 1963), R; A-754, D-5A; U-4fid; 30" h; fs. 9" diam; capsicum red (HCC-715), and white.
- 'Cartoni' (Herb.), R; A-53; *A. aulica* x cl. 'Sweetii'. Hb. 1:47. 1934.
- 'Caruso' (Lud. 1950), NR; U-4fid; 24" h; fs. 8" diam; orange-scarlet, darker in throat. PL. 7:72. 1951.
- 'Casper Ludwig' (Lud. 1948), R; A-196; 24" h; fs. 7½" diam; pure white with slight greenish throat. Hb. 15:69. 1948.
- 'Cassandra' (Ker), R; A-54, D-5; red, white veins. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
- 'Cathedral Peak' (BM. 1958), R; A-574, D-5B; U-2-3fid; 20" h; fs. 8½" diam; blood red (HCC-820). PL. 17:51. 1961.
- 'Cathedral Windows' (Ram. 1959), R; A-543, D-5A; 23" h; fs. 6½" diam; brick red (HCC-016) with white, light orange effect; spr; dec. PL. 16:76. 1960.
- 'Catherine Valente' (W-WS. 1962), R; A-688, D-5B; U-3-4fid; 23" h; fs. 7" diam; delft rose (HCC-020/1), geranium lake (20) in upper segs towards throat. PL. 19:65. 1963.
- 'Cavalier', R; A-774. I.—Goed. 1962 for a Dutch breeder.
- 'Cecelia', R; A-55 white over a rose scarlet ground. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
- 'Celestine' (Hay. 1938), R; A-56, D-5; U-4fid; fs. 8" diam; salmon coppery-pink, white keels to 1" of tip of segs. Hb. 5:146. 1938.
- 'Cerise Magnificum', R; A-57. Chitt. 1933. I.—Schr. 1928. Hb. 1:47. 1934.
- 'Champion's Reward' (Lud. 1954), R; A-427, D-5A; U-4fid; 26" h; fs. 9" diam; oriental red (HCC-819), glossy throat; spr; dec. PL. 14:55. 1958.
- 'Charlemagne' (VM), NR; large purple red.
- 'Charles Penny', R; A-58. Chitt. 1933. I.—Hamb. 1892. Hb. 1:47. 1934.
- 'Charmaine' (Vas. 1940), R; A-59; brilliant red, creamy throat. Hb. 6:155. 1940.
- 'Chartreuse' (BM. 1957), R; A-575, D-5B; U-2fid; 18" h; fs. 7½" diam; chartreuse green, flushed cream and porcelain rose, scarlet lines. PL. 17:51. 1961.
- 'Chelsoni' (VE), R; A-60; *A. pardina* hybrid. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
- 'Cherokee' (W-WS. 1954), R; A-496; U-4fid; 26" h; fs. 8" diam; metallic red with orange cast. PL. 15:45. 1959.
- 'Cherry' (BM. 1955), R; A-576, D-5B; U-3fid; 24" h; fs. 8" diam; cherry red (HCC-722). PL. 17:51. 1961.
- 'Cherry Bing' (BM. 1958), R; A-577, D-5B; U-2fid; 14" h; fs. 8" diam; cherry red (HCC-722), tips lighter shade. PL. 17:51. 1961.
- 'Cherry Flip' (BM. 1958), R; A-578, D-5B; U-3fid; 15" h; fs. 7" diam; cherry red (HCC-722), currant red overlay. PL. 17:51. 1961.
- 'Cherry Liquor' (BM. 1959), R; A-635, D-5B; U-3fid; 18" h; fs. 8" diam; cherry red (HCC-722), lighter shade towards throat. PL. 17:52.

1961.

'Cherry Queen' (Lud.), NR; U-4fld; 30" h; fls. 7" diam; cherry red (HCC-722). c. Ludwig & Co. 1954.

'Cherry Red' (Lud. 1948), R; A-61; cherry red (HCC-722). Hb. 15:69.

1948.

'Chimboraso', R; A-62. Chitt. 1933. I.—Holf. 1897. Hb. 1:47. 1934.

'Chimere', R; A-63. Chitt. 1933. I.—Veit. 1895. Hb. 1:47. 1934.

'Christmas Dream' (VW. 1960), R; A-654, D5A; U-3-4fld; 22" h; fls. 8" diam; orange-scarlet, satin finish in throat. PL. 17:53. 1961.

'Christmas Gift' (Lud. 1959), R; A-539, D-5A; U-4fld; 23" h; fls. 8" diam; white with soft green throat; la.-spr. PL. 16:75. 1960.

'Christmas Joy' (W-WS), R; A-497; 24" h; fls. 3½" diam; red. PL. 15.45. 1959.

'Circus' (Lud. 1959), R; A-538, D-5A; U-4fld; 28" h; fls. 9" diam; signal red (HCC-719-719/2), white stripe and outer edge; spr. PL. 16:75. 1960.

'Clemence' (Sou.), R; A-64; *A. vittata* hybrid. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Cleopatra' (V. Hou.), R; A-65. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Cleopatra' (VM. 1953), R; A-520; 20" h; fls. 7" diam; pure salmon. PL. 15:46. 1959.

'Climax', R; A-66. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Clive Cookson' (Cook. 1936), R; A-67; fls. 7" diam; vermilion, blood-red in throat; reflexed. Hb. 3:92. 1936.

'Clonia', R; A-68; white, veined red. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Clovelly', R; A-69; Chitt. 1933. I.—Holf. 1901. Hb. 1:47. 1934.

'Clown' (VW. 1958, R; A-406, D-5; U-3-4fld; 24" h; fls. 9" diam; white with vivid red veins. PL. 14:55. 1958.

'Colvilli' (Col.), R; A-70; *A. reticulata* x *A. reginae*. Herb. Amaryll. 1837. Hb. 1:47. 1934.

'Comte de Germiny' (Will.), R; A-71; *A. reticulata* x cl. 'Defiance'; autm. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Concerto', R; A-775, D-5A; U-4fld; 15" h; fls. 7" diam.; scarlet red (HCC-19); spr.; dec. I.—Goed. 1962 for Dutch grower.

'Connie Fay' (Sol. 1961), R; A-677, D-7; U-2fld; 15" h; fls. 7½" diam; rosy red, white in center of segs. PL. 18:42. 1962.

'Conquerant' (Sou.), R; A-72; *A. vittata* hybrid. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Coral Island' (BM. 1957), R; A-636, D-5B; U-2fld; 14" h; fls. 7" diam; azalea pink (HCC-619) on uranium green (63) base, rhodonite red (0022) veining, cream border. PL. 17:52. 1961.

'Corinna', R; A-73. Chitt. 1933. I.—Veit. 1893. Hb. 1:47. 1934.

'Cornut' (Ker), R; A-74, D-5; rose red. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Cornado' (Bur. 1913), R; A-75; U-3-4fld; fls. 8" diam; scarlet with oriental crimson; e.-spr. Hb. 9:154. 1942.

'Corpus Christi' (BM. 1954), R; A-579, D-5B; U-4fld; 20" h; fls. 7½" diam; white, speckled scarlet and edge around all petals. PL. 17:51. 1961.

'Count Cavour' (VE.), R; A-76. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Cream Parfait' (BM. 1958), R; A-637, D-5B; U-2fld; 15" h; fls. 8" diam; white with jasper red markings. PL. 17:52. 1961.

'Creon', R; A-77; lower segs lilac red, upper segs veined red. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Crimson Beauty' (Lud. 1954), NR; U-3-4fld; 28" h; fls. 8" diam; crimson (HCC-22), tips shade darker. c. Ludwig & Co. 1954.

'Crimson Comet' (Zeiner, 1946), R; A-78, D-4A; U-4fld; fls. 6½" diam; crimson, yellow midrib. Hb. 13:110. 1946.

'Crimson King', R; A-79; Chitt. 1933. I.—Veit. 1892. Hb. 1:47. 1934.

- 'Croesus' (Chandler), NR; SPN. 13. 1942.
 'Croomii', R; A-80; *A. elegans* hybrid. Bak. Amaryll. 1888. Hb. 1:47. 1934.
 'Crown Jewels' (BM), R; A-666; dark red PL. 17:52. 1961.
 'Crown Prince of Germany', R; A-81. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Cupid' (Ker), R; A-82, D-5; pure white, slightly penciled red. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Cupido' (VM. 1962), NR; salmon pink. I.—Goed. 1962.
 'Cupid's Rival' (Lud. 1955), NR; 28" h; fs. 8" diam; red, darker throat. c. Ludwig & Co. 1955.
 'Currant Wine' (BM. 1960), R; A-638, D-5B; U-3fid; 18" h; fs. 8" diam; currant red (HCC-821). PL. 17:52. 1961.

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- 'Dagbreek' (BM. 1956), R; A-639, D-5A; U-3-4fid; 18" h; fs. 7½" diam; blood red (HCC-820). PL. 17:52. 1961.
 'Daintiness' (Lud. 1954), R; A-428, D-5B; U-4fid; 24" h; fs. 8" diam; porcelain rose (HCC-620), crimson rose towards center of segs. c. Ludwig & Co. 1954. PL. 14:55. 1958.
 'Dallas Bride' (BM. 1954), R; A-640, D-5B; U-4fid; 18" h; fs. 7½" diam; pure white. PL. 17:52. 1961.
 'Danny Kaye' (VW. 1962), R; A-733, D-5A; U-4fid; fs. 8" diam; scarlet (HCC-19), creamy midrib deep in throat; spr. PL. 19:67. 1963.
 'Daones', R; A-83. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Dark Red Bonnet' (Vas. 1940), R; A-86; fs. 7" diam; dark red. Hb. 6:155. 1940.
 'Dark Red Bonnet' (Camm.), NR. PL. 10:79. 1954.
 'Daudenii' (Herb.), R; A-84; cl. 'Griffini' x *a. johnsonii*. Hb. 1:47. 1934.
 'David Hollestelle' (VW. 1962), R; A-734, D-5A; U-4fid; 18" h; fs. 8" diam; scarlet (HCC-19); spr. PL. 19:67. 1963.
 'Dawn' (Heat. 1934), R; A-87, D-5; U-3fid; fs. 10" diam; white, pink veins lower petals; spr; dec. Hb. 1:105. 1934.
 'Dawn' (BM. 1955), R; A-580, D-5B; U-3fid; 18" h; fs. 7" diam; creamy white, flushed empire rose. PL. 17:51. 1961.
 'Dawn Rose' (BM. 1954), R; A-581, D-5B; U-2fid; 16" h; fs. 7" diam; porcelain rose (HCC-620) and white, scarlet stitching; spr. PL. 17:51. 1961.
 'Day Dream', R; A-776, D-5A; U-4fid; 19" h; fs. 7" diam; dawn pink (HCC-523), lower petsegs lighter shade; spr., dec. I.—Goed. for a Dutch breeder.
 'Debra Solomon' (Sol. 1961), R; A-673, D-5A; U-4fid; 16" h; fs. 8" diam; rose bengal (HCC-25/2-25), darker throat; spr. PL. 18:42. 1962.
 'Deceit' (Zeiner, 1944), R; A-88; fs. 8" diam; rose with white stripe, later changing to scarlet. Hb. 11:266. 1944.
 'Decora' (VW. 1960), R; A-655, D-5; U-4fid; 20" h; fs. 8" diam; rose with carmine ribs, carmine blotch towards throat; e. spr. PL. 17:53. 1961.
 'Deetta Pye' (Vas. 1940), R; A-89; fs. 8" diam; red with stamens yellow at base. Hb. 6:155. 1940.
 'Defiance' (V. Hou.), R; A-85. Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'DeGraff' (Graaff, J. de), R; A-90. Hb. 1:47. 1934.
 'Delilah' (Lud. 1954), R; A-429, D-5A; U-4fid; 25" h; fs. 8" diam; begonia pink (HCC-619), darker throat; spr; dec. c. Ludwig & Co. 1954. PL. 14:55. 1958.
 'Diamond' (Lud. 1954), R; A-430, D-5A; U-4fid; 25" h; fs. 9" diam; geranium lake (HCC-20), glossy red throat; spr; dec. PL. 14:55. 1958.
 'Diana', NR; HB. 1:63. 1934.
 'Dido' (VM), NR; salmon rose.
 'Digweedi' (Herb.), R; A-91; *A. reticulata* x *A. vittata*. Hb. 1:47. 1934.
 'Display' (BM. 1958), R; A-582, D-5A; U-4fid; 18" h; fs. 7" diam;

vermilion (HCC-18), carmine flushing; spr. PL. 17:52. 1961.

'Dixie' (BM. 1958), R; A-583, D-5B; U-2fld; 18" h; fs. 8½" diam. scarlet (HCC-19) flushed white in center; spr. PL. 17:52. 1961.

'Doanes', R; A-92; zinnabar red with white edge. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Donald Mitchel' (Mitch. 1961), R; A-675, D-5A; U-4fld; 22" h; fs. 9" diam; tyrian rose (HCC-24/1), white midrib, greenish-white throat. PL. 18:42. 1962.

'Don Camilo' (Lud.), NR; scarlet.

'Don Juan' (VM), NR; brilliant red.

'Donnii' (Herb.), R; A-93. Hb. 1:47. 1934.

'Dorathy May' (Arms. 1945), R; A-95, D-5B; fs. 9" diam; white bordered pink. Hb. 12:104. 1945.

'Doris', R; A-94. Chitt. 1933. Hb. 1:47. 1934.

'Doris Lilian' (Lud. 1950), R; A-431, D-5B; U-4fld; 26" h; fs. 7½" diam; carmine rose (HCC-21), tips lighter shade, glossy red throat; spr; dec. c. Ludwig & Co. 1954. PL. 14.55. 1958.

'Drakensberg' (BM. 1958), R; A-584, D-5B; U-3fld; 18" h; fs. 9" diam; blood red (HCC-820). PL. 17:52. 1961.

'Dresden Beauty' (Ram. 1959), R; A-544, D-4A; 22" h; fs. 6½" diam; white with porcelain rose (HCC-620) edging and markings; spr; dec. PL. 18:76. 1960.

'Dr. Johns' (Dug. 1958), R; A-402, D-3; 24" h; fs. 7½" diam; cardinal red (HCC-822); fr. PL. 14.54, 1958.

'Dr. Masters' (Will.), R; A-96, D-5; clear red; A. pardinum hybrid. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Dr. Pickard' (Pick. 1959), R; A-537, D-5A; fs. 9" diam; dark red. PL. 16:106, f. 27. 1960.

'Duchess of Windsor' (T & H. 1938), R; A-97; pink. Hb. 5:91. 1938.

'Duke of York', R; A-103. Chitt. 1933. Hb. 1:47. 1934.

'Dulas', R; A-104; rose, deep red towards center. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Dutch Belle' (Lud. 1963), R; A-755, D-5A; U-3-4fld; 26" h; fs. 8" diam; rose opal (HCC-o22), darker throat; spr.

'Dutch Doll' (Lud. 1962), R; A-703, D-5A; U-4fld; 24" h; fs. 9" diam; picotee type, pure white with red edge; spr. PL. 19:65. 1963.

'Dutch Gold' (Lud.), NR; copper color.

'Dutch Master' (W-WS. 1962), R; A-709. D-5A; U-2fld; 22" h; fs. 7½" diam; rose bengal (HCC-25) on white base, white edge on segs; spr. PL. 19:65. 1963.

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'Early Queen' (Lud.), NR.

'Early White' (Lud. 1948), R; A-105. U-4-5fld; 22" h; fs. 7½" diam; pure white. Hb. 15:69. 1948.

'Eastern Glory' (BM. 1954), R; A-585, D-5B; U-3fld; 18" h; fs. 7" diam; mandarin red (HCC-17), oxblood red flush towards center spr. PL. 17:52. 1961.

'Eclatante' (Ker), R; A-106, D-5; red with purple sheen. Hb. 1:47. 1934.

'Eclipse', R; A-107; white, veined red border. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Edelweiss' (Hay. 1936), R; A-108, D-5; fs. 7" diam; pure white. Hb. 3:92. 1936.

'Edith' (Hay. 1935), R; A-109. Hb. 2:92. 1935.

'Edith M. Wynne' (Veit.), R; A-110; **A. reticulata striatifolia** x **A. Leopoldii**; autm. Nehr. Amaryll. 1909. Hb. 1:47. 1934.

'Edlena' (McCann), NR; D-7; pink and white, segs keeled white. Traub, Amaryll. 90. 1958.

'Edward Hall' (Heat. 1935), NR; white with light red markings. Hb. 2:56. 1935.

- 'Eglamor' (Veit.), R; A-111, D-5; Nehr. Amaryll. 1909. Hb. 1:47. 1934.
 'Eldorado', R; A-112. Chitt. 1933. I.—Veit. 1893. Hb. 1:47. 1934.
 'Eleanor Roosevelt' (Dom. 1934), NR. Hb. 2:92. 1935.
 'Elizabeth' (Camm.), NR; Traub, Amaryll. 61. 1958.
 'Elizabeth Traub' (Henry, 1951), NR; D-8; U-2fld; 7" h; carmine (HCC-21/1); **A. belladonna** var. **haywardii** x **A. espiritensis**; win; ev. PL. 7:117-118 f. 22. 1951.
 'Ella Maie Stevens' (T & H, 1937), R; A-113, D-5B; U-4-6fld; 24" h; fs. 8" diam; white base, veined red, white midrib. Hb. 4:143. 1937.
 'Elvira Aramayo' (W-WS. 1962), R; A-684, D-5A; U-4fld; 20" h; fs. 7" diam; carmine (HCC-21), magenta rose overlay. PL. 19:65. 1963.
 'Emma Piper' (T & H, 1937), R; A-114, D-5B; U-5fld; 25" h; fs. 8" diam; upper three segs banded white and veined rose, lower setsegs and lower, petseg, white. Hb. 4:143. 1937.
 'Empress of India' (Graaff, S. 1860), R; A-115; U-4-6fld; **A. psittacina** x cl. 'Graveana'. Hb. 1:48. 1934.
 'Enchantress' (Veit.), R; A-116; rose red, striped carmine; fr. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
 'Eola' (Heat. 1934), R; A-117; white with light red markings. Hb. 2:56, 90. 1935.
 'E. P. Hall' (Heat. 1934), R; A-118. Hb. 2:90. 1935.
 'Ernestine' (Hay. 1937), R; A-119, D-5B; fs. 9" diam; lavender rose red with white keel. Hb. 4:115, PL. 58. 1937.
 'Ernest Pye' (Vas. 1940), R; A-120; fs. 8" diam; red, suffused with white towards center. Hb. 6:155. 1940.
 'Ernst Ludwig' (Lud.), NR; dark red.
 'Eros', R; A-121. Chitt. 1933. I.—Veit. 1896. Hb. 1:48. 1934.
 'Esther' (Pfis.), R; A-122; cl. 'Dr. Masters' x **A. pardina**. Hb. 1:48. 1934.
 'Eternal Youth' (Terry, 1961), R; A-676, D-5A; U-4fld; 20" h; fs. 8" diam; upper segs delft rose (HCC-20/1), petseg to half of tip, white; spr; cl. 'Pink Favorite' x cl. 'Ludwig Dazzler'. PL. 18:42. 1962.
 'Ethel Duckworth' (Hay. 1937), R; A-123, D-5B; fs. 8" diam; velvet red, darker in throat, seg tips lighter shade. Hb. 4:142. pla. 59:116. 1937.
 'Etiole' (Sou.), R; A-124; A vittatum hybrid; yellowish white, red stripes. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
 'Etna' (BM. 1959), R; A-586, D-5A; U-3fld; 22" h; fs. 7½" diam; dutch vermilion (HCC-717). PL. 17:52. 1961.
 'Etta McNeel' (T & H, 1938), R; A-125; pink. Hb. 5:91. 1938.
 'Eubank's White' (Eub. 1961), R; A-668, D-5A; U-4fld; 20" h; fs. 8½" diam; white, light chartreuse green in throat. PL. 18:42. 1962.
 'Eurasian', R; A-126. Chitt. 1933. I.—Veit. 1913. Hb. 1:48. 1934.
 'Evalena' (Arms. 1949), R; A-127, D-5A; fs. 9½" diam; velvety red, white throat; fr. PL. 5:88. 1949.
 'evansiae' (Traub & Nelson), species; three color forms—pastel pink, chartreuse, and very light yellowish; from Bolivia. Baileya 4:85-88, f. 30-31. 1956. PL. 14:29, f. 4:29. 1958. (see 'Senorita').
 'Excellent', R; A-128. Chitt. 1933. I.—Veit. 1893. Hb. 1:48. 1934.
 'Exhibition' (Zeiner), NR; scarlet, with white stripe. Hb. 11:256. 1944.
 'Extase' (W-WS. 1962), R; A-710, D-5A; U-3fld; 36" h; fs. 9" diam; cardinal red (HCC-822), darker throat, bearded, ruffled edges; spr. PL. 19:66. 1963.
- F—
- 'Fabiola' (VM. 1953), R; A-521. D-4; 24" h; fs. 8" diam; bright red. PL. 15:46. 1959.
 'Fair Lady', R; A-129. Chitt. 1933. I.—Veit. 1903. Hb. 1:48. 1934.
 'Fair Lady', R; A-777, D-5A; U-3fld; 18" h; fs. 8"-9" diam; pinpoint of vermilion (HCC-18/1) appears as solid color, blood red and light white lines; spr., dec. I.—Goed. 1962 for a Dutch breeder.

- 'Faith' (Heat. 1934), R; A-130; U-3fld; fls. 7½" diam; bright red, veined darker red, red keel; ev. Hb. 1:105. 1934.
- 'Faith' (Park. 1955), NR; U-2fld; fls. 8" diam; white, red border; reflexed; spr. PL. 11:62. 1955.
- 'Fan Tan' (Har. 1959), R; A-549, D-5A; 22" h; fls. 8" diam; signal red (HCC-719), white stripes forming a star, greenish throat, white border; spr; fr. PL. 16:75. 1960.
- 'Fantasy' (Lud. 1948), R; A-131; rose, lighter throat, margins on segs. Hb. 15:69. 1948.
- 'Fantasy' (Lud. 1950), R; A-432, D-5A; U-4fld; 25" h; fls. 7½" diam; delft rose (HCC-o20), light rose stripe on each seg, apple green throat with faint red ring deep in throat. c. Ludwig & Co. 1954. PL. 14:55. 1958.
- 'Fashion' (Laine, 1963), R; A-747, D-5A; U-3-4fld; 18" fls. 7" diam; scarlet red (HCC-19).
- 'Faust' (VM. 1949), R; A-522, D-4; 32" h; fls. 8" diam; dutch vermilion (HCC-717). PL. 15:46. 1959.
- 'Favorite' (Veit.), R; A-132; *A. reticulata* X *A. leopoldii*; autm. Hb. 1:48. 1934.
- 'Feline Repose' (BM. 1956), R; A587, D-5B; U-3fld; 18" h; fls. 7" diam; geranium lake (HCC-20), fused with white. PL. 17:52. 1961.
- 'Fidelity' (Lud. 1950), NR; U-3-4fld; 24" h; fls. 7½" diam; spinel pink (HCC-o625-o625/1). PL. 7:73. 1951.
- 'Fiedelio' (VE), R; A-133. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
- 'Field Marshall', R; A-134. Chitt. 1933. I.—Holf. 1906. Hb. 1:48. 1934.
- 'Finette' (Ker), R; A-135, D-5; white, few red stripes. Nehr. Amaryll. 1909; Hb. 1:48. 1934.
- 'Fire' (T & H. 1938), R; A-136; red. Hb. 5:91. 1938.
- 'Fire Bird', R; A-678, D-5A; U-4fld; fls. 9" diam; orange red, darker throat, back of segs white, spotted red. I.—Goed. 1961. PL. 18:43. 1962.
- 'Firebrand', R; A-137. Chitt. 1933. I.—Paul, 1892. Hb. 1:48. 1934.
- 'First Century' (BM. 1962), NR; white, scarlet flushing.
- 'Fire Dance' (Lud. 1958), R; A-465, D-5A; U-4fld; 24" h; fls. 10" diam; dutch vermilion (HCC-717), violet red throat; spr; dec. PL. 15:43. 1959.
- 'Fire Fly' (Lud. 1958), R; A-469, D-8; U-4-6fld; 16" h; fls. 4" diam; capsicum red (HCC-715), darker throat; spr; dec. PL. 15:43. 1959.
- 'Fire King' (Lud.), NR; U-4fld; 18" h; fls. 6" diam; scarlet, deepening to medium red in throat. PL. 7:72. 1951.
- 'Fire King' (Camm.), NR; PL. 10:79. 1954.
- 'Five Star General' (Lud. 1955), R; A-434, D-5A; U-4fld; 30" h; fls. 10" diam; signal red (HCC-719), white star in center, dark red ring in throat; spr; dec. c. Ludwig & Co. 1955. PL. 14:55. 1958.
- 'Flamboyant' (W-C. 1962), R; A-726, D-5A; U-3-4fld; 16" fls. 7" diam; orient red (HCC-819); spr. I.—Goed. 1962. PL. 19:67. 1963.
- 'Flame' (Hay. 1935), NR; Hb. 2:92. 1935.
- 'Flame' (Schm. 1962), R; A-693, D-7; U-4fld; 20" h; fls. 6" diam; vermilion red (HCC-18); spr. PL. 19:66. 1963.
- 'Flamingo' (Whe. 1941), R; A-138, D-5A; fls. 8" diam; rose pink, shading to shell pink. Hb. 8:92. 1941.
- 'Flora' (Ker), R; A-139, D-5; white, pale red border and veins. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
- 'Floralien' (W-WS. 1962), R; A-711, D-5A; U-4fld; 24" h; fls. 8" diam; blend of white and rose madder (HCC-23), veined rose red and white stripe on edge of segs. PL. 19:66. 1963.
- 'Floral Queen' (Lud. 1960), R; A-556, D-5A; U-4fld; 26" h; fls. 8" diam; spinel red (HCC-o625), dark veins deep in throat; spr. PL. 17:53. 1961.
- 'Florence Raasch' (Raa. 1960), R; A-554, D-4A; U-4fld; 26" h; fls. 6½" diam; rose red (HCC-724), darker in throat; spr. PL. 17:51. 1961.

- 'Florence Springer' (Spring. 1937), R; A-140; U-4-5fld; 24" h; fs. 7" diam; medium red (M & P, 2-L-8), white penciling in throat and center of segs; ev. Hb. 4:142. 1937.
- 'Floriade' (W-WS. 1962), R; A-712, D-5A; U-4fld; 24" h; fs. 9" diam; blend of white and rose pink (HCC-427), tyrian rose (727) stripes each side midrib on upper three segs. PL. 19:66. 1963.
- 'Florida' (Tilg. 1934), NR. Hb. 2:90. 1935.
- 'Florida' (BM. 1957), R; A-588, D-5B; U-2fld; 16" h; fs. 7½" diam; azalea pink (HCC-618), flushed white. PL. 17:52. 1961.
- 'Florida Beauty' (Camm.), NR. PL. 10:79. 1954.
- 'Florida Maid' (Hay. 1938), R; A-141, D-5; U-4fld; fs. 8" diam; rose pink, flushed and veined on white. Hb. 5:146. 1938.
- 'Flower Record' (W-WS. 1959), R; A-516; 23" h; fs. 3" diam; deep scarlet (HCC-19). PL. 15:45. 1959.
- 'Flying Cloud', R; A-679, D-5A; U-4fld; fs. 8" diam; white with green throat. I.—Goed. 1961. PL. 18:43. 1962.
- 'Formosa', R; A-142; *A. reticulata* hybrid. Bak. Amaryll. 1888. Hb. 1:48. 1934.
- 'Foster Dulles' (VW. 1960), R; A-656; U-4fld; 24" h; fs. 8" diam; scarlet (HCC-19). PL. 17:53. 1961.
- 'Francisca', R; Nehr. Amaryll. 1909. Hb. 1:48. 1934.
- 'Francis Drake' (BM. 1954), R; A-589, D-5B; U-3fld 18" h; fs. 7" diam; geranium lake (HCC-20), scarlet and signal red fused with white. PL. 17:52. 1961.
- 'Franklin Roosevelt' (Lud. 1954), R; A-433, D-5B; U-4fld; 25" h; fs. 7½" diam; currant red (HCC-821), upper segs darker, dark red throat; spr; dec. c. Ludwig & Co. 1954. PL. 14:55. 1958.
- 'Frank Wootten' (Traub, 1934), NR. Hb. 2:92. 1935.
- 'Freckles' (Zeiner, 1947), R; A-145, D-5B; white with pink spots and stripes. Hb. 14:128. 1947.
- 'Friendship' (VM. 1956), R; A-523, D-4; 28" h; fs. 7" diam; salmon with a white glow. PL. 15:46. 1959.
- 'Frilled Queen' (Chandler), NR. SPN. 13. 1942.
- 'Fritz Kreisler', R; A-778, D-5A; U-4-5fld; 22" h; fs. 6"-7" diam; camelia rose (HCC-622-622/1); spr., dec. I.—Goed. 1962 for a Dutch breeder.
- 'Fuchsia Rose' (Ram. 1959), R; A-545, D-5A; 22" h; fs. 6½" diam; fuchsia rose; spr; dec. PL. 16:76. 1960.
- 'Fucinus', R; A-146; cream yellow, dotted red. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
- 'Fulda' (VW. 1958), R; A-407; U-3-4fld; 28" h; fs. 10" diam; orange red (HCC-19). PL. 14:55. 1958.
- 'Fulgens', R; A-147. Chitt. 1933. I.—Back. 1865. Hb. 1:48. 1934.
- 'Full Moon' (Hay. 1935), NR. Hb. 2:92. 1935.

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- 'Garfieldii' (GPC. 1937), R; A-148; U-4fld; orange red with star. syn: "Hippecoris Garfieldii no. 30". I.—AAS. 1937. Hb. 4:142. 1937.
- 'Garfield Triumph' (GPC), NR; D-3.
- 'Garibaldi' (VM), NR; orange red.
- 'Garnet King' (Zeiner), NR; solid red. Hb. 11:256. 1944.
- 'Gem', R; A-149. Chitt. 1933. I.—Veit. 1894. Hb. 1:48. 1938.
- 'Gemato' (Mull. 1962), R; A-701, D-5B; U-4fld; 15" h; fs. 5½" diam; blood red (HCC-820), white band around all petals; spr; fr. PL. 19:67. 1963.
- 'General Buller', R; A-150. Chitt. 1933. I.—Veit. 1902. Hb. 1:48. 1934.
- 'General Eisenhower' (VW. 1960), R; A-657, D-5A; U-3-4fld; 21" h; fs. 7" diam; salmon (HCC-412), darker throat. PL. 17:53. 1961.
- 'Gerald Ash' (BM. 1958), R; A-590, D-5B; U-3fld; 18" h; fs. 8" diam; geranium lake (HCC-20), flushed carmine rose and white. PL. 17:52. 1961.

- 'Geranium Lake' (BM. 1955), R; A-641, D-5B; U-4-5fld; 24" h; fls. 7½" diam; geranium lake (HCC-20), slight white flush. PL. 17:52. 1961.
- 'Gereant', R; A-151. Chitt. 1933. I.—Holf. 1910. Hb. 1:48. 1934.
- 'Gertrude' (BM. 1962), NR; creamy white, brushed in scarlet, white border.
- 'G. Firth' (Will.), R; A-152; 'Defiance' x *A. reticulata*; autm. Hb. 1:48. 1934.
- 'Ghent' (BM. 1958), R; A-591, D-5B; U-3-4fld; 18" h; fls. 9" diam; azalea pink (HCC-618), white star, poppy red overlay. PL. 17:52. 1961.
- 'Giant Goliath' (VM. 1953), R; A-524; 28" h; fls. 9" diam; vermilion (HCC-18). PL. 15:46. 1959.
- 'Giant Near White' (Camm.), NR. PL. 10:79. 1954.
- 'Giant Orange' (Zeiner, 1944), R; A-153; orange with white stripe. Hb. 11:266. 1944.
- 'Gilroy' (Brn. 1943), R; A-154; U-3fld; fls. 8" diam; red. Hb. 10:94. 1943.
- 'Girl Guide' (BM. 1962), NR; vermilion, white star.
- 'x gladwynensis' (Henry, 1950), hybrid; U-2fld; carmine in type; *A. belladonna* var. *haywardii* x *A. johnsonii*. PL. 7:118-121, pla. 18. 1951. cl.
- 'Mary Davis', PL. 8:86. 1952.
- 'Glamour' (Whe. 1941), R; A-155, D-4B; fls. 8" diam; white, wine red splotches upper three segs and upper half of lower setsegs. Hb. 8:92. 1941.
- 'Gloria' (Heat. 1938), R; A-156, D-4; light violet with darker veining shaded to light pink at tips. Hb. 5:146. 1938.
- 'Gloriosa', R; A-157; *A. reticulata* hybrid. Bak. Amaryll. 1888. Hb. 1:48. 1934.
- 'Glorious' (Heat. 1935), NR. SPN. 13. 1942.
- 'Gold Dust' (Zeiner, 1947), R; A-158, D-5A; fls. 8½" diam; orange red. Hb. 14:128. 1947.
- 'Golden Triumphator' (W-WS. 1962), R; A-696, D-5A; U-3fld; 21" h; fls. 9" diam; mars orange (HCC-o13), orange and brick red blend to throat in upper 3 segs, lower segs lighter shade. PL. 19:65. 1963.
- 'Goliath' (Hay. 1935), NR. Hb. 2:92. 1935.
- 'Gondibar' (VM), NR; red.
- 'Gorgeous', R; A-159; carmine red, Nehr. Amaryll. 1909. I.—Veit. 1895. Hb. 1:48. 1934.
- 'Gowenii' (Herb.), R; A-160; *A. reticulata* x *A. elegans*. Hb. 1:48. 1934.
- 'Gracchus', R; A-161. Chitt. 1933. I.—Veit. 1909. Hb. 1:48. 1934.
- 'Grace' (Schm. 1962), R; A-696, D-5A; U-3fld; 18" h; fls. 6" diam; white, orient red stripes and edging on 2 upper petsegs, greenish throat. PL. 19:66. 1963.
- 'Gracilis Boegschoten' (VM. 1946), R; A-536, D-8; U-2fld; 18" h; fls. 3" diam; red. PL. 15:47. 1959.
- 'Grahamii' (Herb.), R; A-162; *A. johnsonii* x *A. vittata*. Hb. 1:48. 1934.
- 'Grand Bay' (Perr. 1962), R; A-698, D-5A; U-4fld; 18" h; fls. 6" diam; geranium lake (HCC-20/1), white midribs, segs dotted with reddish spots. PL. 19:66. 1963.
- 'Grand Mist' (Perr. 1961), R; A-674, D-4A; U-4fld; 20" h; fls. 7" diam; white, green throat, red markings deep in throat. PL. 18:43. 1962.
- 'Grand Monarch', R; A-163. Chitt. 1933. I.—Veit. 1890. Hb. 1:48. 1934.
- 'Graveana' (Graaff, J. de), NR; x *A. vittata* and *A. striata* vars. *fulgida* and *crocata*. Hb. 1:48. 1934. Traub, Amaryll.:46. 1958.
- 'Gravinae' (Mel.), R; A-164, D-4; glowing red, banded white. Bak. Amaryll. 1888. Hb. 1:48. 1934.
- 'Greta Garbo' (Traub, 1934), NR. Hb. 2:92. 1935.
- 'Griffinii' (Grif.), R; A-165; *A. psittacina* x *A. johnsonii*. Herb, Amaryll. 1837. Hb. 1:48. 1934.
- 'Guardman' (Chandler), NR; SPN. 13. 1942.

—H—

'Haarlem' (BM. 1957), R; A-592, D-5B; U-4fld; 24" h; fls. 7½" diam;

- vermilion (HCC-18), white on midribs. PL. 17:52. 1961.
 'Haarlem' (VW. 1960), R; A-658, D-5; U-3-4fd; 21" h; fls. 7" diam;
 bishop's red, with satin red throat. PL. 17:53. 1961.
 'Hades' (VM. 1962), NR; dark red. I.—Goed. 1962.
 'Halley' (Lud. 1950), R; A-435, D-5B; U-4fd; 25" h; fls. 8½" diam;
 poppy red (HCC-16), dark throat and veins. PL. 7:72. 1951.
 'Hannibal' (VM), NR; scarlet.
 'Happy Memory' (Lud. 1963), R; A-757, D-5A; U-4fd; 32" h; fls. 10"
 diam; capsicum red (HCC-715) and white combination.
 'Harlequin' (Chandler), NR. SPN. 13. 1942.
 'Harrisonii' (Harr., R.), R; A-166; **A. reticulata** x **A. stylosa**. Herb.
 Amaryll. 1837. Hb. 1:48. 1934.
 'Harry Searles' (Searles, 1934), NR; Hb. 2:92. 1935.
 'Harry St. John' (St. J. 1956), R; A-391, D-5B; 20" h; fls. 7" diam;
 dark red, darker throat; spr; ev. PL. 14:54. 1958.
 'Harvest Moon' (Camm.), NR; PL. 10:79. 1954.
 'Haylockii' (Sweet), R; A-167; **A. elegans** x **A. striata**, Herb. Amaryll.
 1837. Hb. 1:48. 1934.
 'Heaven Sent' (Lud. 1963), R; A-758, D-5A; U-3fd; 22" h; fls. 9"
 diam; camelia rose (HCC-622-622/2).
 'Helen' (Heat. 1934), NR. Hb. 2:90. 1935.
 'Helen' (Lud. 1954), R; A-436, D-5B; U-4-5fd; 28" h; fls. 8" diam.
 begonia pink (HCC-619-619/1), white ring in throat; spr; dec. v. Ludwig
 & Co. 1954. PL. 14:55. 1958.
 'Helen Hull' (McCann), NR; D-7. PL. 10:28, f. 2. 1954.
 'Helen Jane' (Tilg. 1934), NR; light red. Hb. 2:58. 1935.
 'Helen L. Heaton' (Heat. 1938), R; A-168, D-5; pure white, violet
 feathering on upper segs. Hb. 5:146. 1938.
 'Helen Tilgman' (Tilg. 1934), NR; fls. 8" diam; red, white star. Hb.
 2:58, 90. 1935.
 'Hellas' (VM. 1962), NR; stone red, white center. I. Goed. 1962.
 'Hendersonii', R; A-169, D-5; Nehr. Amaryll. 1909. Hb. 1:48. 1934.
 'Hendersonii Coccinea', R; A-170; **A. leopoldii** hybrid. Nehr. Amaryll.
 1909. Hb. 1:48. 1934.
 x **henryae** Traub, PL. 7:117-118, f. 22. 1951; Amaryll. Man. fc. (frontis-
 piece). 1958; fls. light pink; **A. belladonna** var. **haywardii** x **A. spiritensis**.
 'Henry Nehrling' (Heat. 1934), NR. Hb. 2:90. 1935.
 'Henslowii' (Herb.), R; A-171; **A. reginae** x **A. striata**. Hb. 1:48. 1934.
 'Heracles' (Lud.), NR; U-4fd; 28" h; fls. 9" diam; oxblood red (HCC-
 820). c. Ludwig & Co. 1954.
 'Herbertii' (Sweet), NR; pale orange. Herb. Amaryll. 1909. Hb. 1:48.
 1934.
 'Her Majesty' (Will.), R; A-172; cl. 'Defiance' x **A. reticulata**; autm.
 Nehr. Amaryll. 1909. Hb. 1:48. 1934.
 'Hermita' (Veit.), R; A-173, D-5; lilac red with green throat. Nehr.
 Amaryll. 1909. Hb. 1:48. 1934.
 'Hex River' (BM. 1958), R; A-593, D-5B; U-3fd; 18" h; fls. 7" diam;
 mandarin red (HCC-17). PL. 17:52. 1961.
 'Hidalgo', R; A-174; orange red, shaded carmine. Nehr. Amaryll. 1909.
 Hb. 1:48. 1934.
 'Hidenley' (Str.), R; A-175; "Acramanii Pulcherrinum" x **A. reticulata**;
 autm. Nehr. Amaryll. 1909. Hb. 1:48. 1934.
 "Hippecoris Garfieldii", NR. (see 'August Koch').
 'Holloway Belle' (Will.), R; A-176, D-5; Nehr. Amaryll. 1909. Hb.
 1:48. 1934.
 'Home Decorator' (Lud. 1962), R; A-702, D-5A; U-4fd; 28" h; fls.
 9" diam; poppy red (HCC-16/1), darker throat, suffused with salmon. PL.
 19:64. 1963.
 'Hong Kong' (VM. 1962), R; A-720, D-5A; U-4fd; 22" h; fls. 8" diam;
 blood red (HCC-820), currant red throat, slightly bearded. PL. 19:67. 1963.
 'Hon. Maurice Gifford', R; A-177. Chitt. 1933. Hb. 1:48. 1934.

'Hoodii' (Sweet), NR; *A. belladonna* x *A. reginae*. Herb. Amaryll. 1837. Hb. 1:48. 1934.

'Hookeri' (Herb.), NR; 'Gowenii' x *A. vittata*. Hb. 1:48. 1934.

'House of Orange' (VW. 1958), R; A-408; U-3-5fld; 28" h; fls. 2" diam; flaming orange. PL. 14:55. 1958.

—I—

'Iceberg', R; A-178. Chitt. 1933. I.—Holf. 1925. Hb. 1:48. 1934.

'Ideala' (Veit. 1897), R; A-179; creamy white with orange-scarlet dots. Nehr. Amaryll. 1909. Hb. 1:48. 1934.

'Ignacite', R; A-180; white, light green in throat, feathered red. Nehr. Amaryll. 1909. I.—Veit. 1897. Hb. 1:48. 1934.

'Ignescens', R; A-181. I.—Veit. 1865. Hb. 1:49. 1934.

'Imperator' (VM), NR; orange red.

'Imperatrice du Bresit', R; A-182. Chitt. 1933. I.—Law. 1902. Hb. 1:49. 1934.

'Impertinence' (BM. 1954), R; A-594, D-5B; U-4fld; 16" h; fls. 7½" diam; white, veined turkey red and blood red. PL. 17:52. 1961.

'Independence' (VW. 1962), R; A-735, D-5A; U-4fld; 26" h; fls. 8" diam; vermilion red (HCC-18), currant red deep in throat. PL. 19:67. 1963.

'Invincible' (Lud. 1950), R; A-437, D-5A; U-4fld; 28" h; fls. 9" diam; capsicum red (HCC-715), dark red throat; spr. PL. 7:72. 1951.

'Invitation' (BM. 1954), R; A-595, D-5B; U-3fld; 14" h; fls. 7" diam. creamy white, speckled camelia rose. PL. 17:52. 1961.

'Irene' (W-WZ. 1962), R; A-713, D-5A; U-4fld; 18" h; fls. 8" diam; salmon pink (HCC-619), lighter seg margins. I.—Goed. 1962. PL. 19:66. 1963.

'Iris' (Ker), R; A-183, D-5; white, pale red veins. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Istanbul' (BM. 1958), R; A-596, D-5-B; U-3fld; 14" h; fls. 7" diam; turkey red (HCC-721), central white star. PL. 17:52. 1961.

—J—

'Jack Frost' (Zeiner, 1947), R; A-184, D-4B; white with pink stripes. Hb. 14:128. 1947.

'Jasper', R; A-186. Chitt. 1933. I.—Ker, 1906. Hb. 1:49. 1934.

'Jasper' (BM. 1954), R; A-597, D-5B; U-3fld; 20" h; fls. 7½" diam; shades of jasper red (HCC-018), capsicum red flushing. PL. 17:52. 1961.

'Java' (Rice), NR; purple or magenta with pure white throat. PL. 11:84. 1955.

'Jaygee' (Arms. 1949), R; A-185, D-5B; fls. 7" diam; light red, dark markings in throat. PL. 5:88. 1949.

'Jean Swope' (Vas. 1940), R; A-187; fls. 7"-8" diam.; cerise red, yellowish in center. Hb. 6:155. 1940.

'Jean Van Doesburg' (BM. 1958), R; A-598, D-5B; U-3fld; 18" h; fls. 9½" diam; begonia (HCC-619), flushed white towards center. PL. 17:52. 1961.

'Jefferson' (Whe. 1941), R; A-188, D-4A; fls. 9" diam; medium dark red. Hb. 8:91-92. 1941.

'Jewel Box' (BM. 1958), R; A-599; shades of salmon, brick red, scarlet, and jasper red. PL. 17:52. 1961.

'Joan of Arc' (W-WS), R; A-498; U-4-6fld; 24" h; fls. 7½" diam; pure glistening white with green in throat. PL. 15:45. 1959.

'John Heal' (Veit.), R; A-189. *A. leopoldii* hybrid. Hb. 1:49. 1934.

'John Ruskin', R; A-190; orange scarlet, white bands. Hb. 1:49. 1934. x *johnsonii* (John. 1800), NR; syn: *Amaryllis braziliensis*; *H. vittatua* x *A. reginae*. Hb. 1:49. 1934. Nehr. Amaryll. 1909.

'John Vasku' (Vas. 1940), R; A-191; fls. 8" diam; red, white throat and keels. Hb. 6:155. 1940.

'Joy' (VM. 1963), R.; A-770; salmon with white stripe.

'J. R. Pitcher', R; A-192. Chitt. 1933. I.—Will. 1891. Hb. 1:49. 1934.

- 'Julia' (VM. 1950), R; A-525, D-4; 24" h; fls. 7½" diam; orange red. PL. 15:46. 1959.
 'Juliana' (BM. 1954), R; A-600, D-5B; U-3fld; 18" h; fls. 8½" diam; dutch vermilion (HCC-717), rose and flushed white. PL. 17:52. 1961.
 'Julius', R; A-193. Chitt. 1933. I.—Veit. 1903. Hb. 1:49. 1934.
 'Juno' (VM), NR; scarlet.

—K—

- 'Kansas' (Brn. 1943), R; A-194; U-3fld; fls. 8" diam; dark red, darker red throat. Hb. 10:94. 1943.
 'Karen Marlys' (Arms. 1945), R; A-195, D-5A; fls. 9" diam; white, red pencilings in throat. Hb. 12:104. 1945.
 'Kathberg' (BM. 1962), NR; blood red, glossy throat.
 'Katherine Auchter' (T&H. 1938), R; A-197; pink. Hb. 5:91. 1938.
 'Kathleen Dobson' (BM. 1955), R; A-601, D-5B; U-3fld; 16" h; fls. 7½" diam; creamish white, light currant red pencil lines. PL. 17:52. 1961.
 'Kathleen Ferrier' (VW. 1956), R; A-393; 28" h; fls. 10" diam; pure white with creamy throat. PL. 14:54. 1958.
 'Kaye' (Schm. 1962), R; A-695, D-5A; U-3fld; 22" h; fls. 6½" diam; jasper red (HCC-o18), faint white streak center of segs; spr. PL. 19:66. 1963.
 'Kay Harding' (T&H. 1938), R; A-198; pink. Hb. 5:91. 1938.
 'Killarney' (Whe. 1940), R; A-199, D-5A; very dark red, darker satiny throat. Hb. 7:130. 1940.
 'Kineton', R; A-200; light red with white star. Nehr. Amaryll. 1909. Hb. 1:49. 1934.
 'King Gustav VI Adolph' (VM. 1956), R; A-526, D-4; 32" h; fls. 8" diam; bright red. PL. 15:46. 1959.
 'King of Stripes' (W-WS), R; A-499; U-3-4fld; 24" h; fls. 5" diam; pale pink to white, two carmine lines on each seg. PL. 15:45. 1959.
 'Kirby Pink' (Hay. 1935), NR; Hb. 2:92. 1935.
 'Kismet' (BM. 1955), R; A-602, D-5B; U-3fld; 22" fld; fls. 8" diam; white with carmine flushing and veining. PL. 17:52. 1961.
 'Klein Pink' (Kl. 1956), R; A-392, D-5A; 26" h; fls. 8" diam; pink to tip of segs, light green throat. PL. 14:54. 1958.
 'Kohinoor' (Gron.), R; A-201, D-5; lilac red ground, tips of segs and center yellowish white. cl. 'Brilliant' x *A. psittacina*. Nehr. Amaryll. 1909. Hb. 1:49; 1934.
 'Kranskop' (BM. 1962), NR; currant red.

—L—

- 'Lady Ardilaun' (Will.), R; A-202, D-5; Nehr. Amaryll. 1909. Hb. 1:49. 1934.
 'Lady Helen' (Rice, 1943), R; A-203; deep blood red. Hb. 10:149. 1943.
 'Lady Howick', R; A-204. Chitt. 1933. I.—Holf. 1907. Hb. 1:49. 1934.
 'Lady in Red' (Whe. 1941), R; A-205, D-5A; fls. 7½" diam; brilliant scarlet, orange tones only in lighter parts. Hb. 8:92. 1941.
 'Lady Juliet Duff', R; A-206. Chitt. 1933. I.—Lady Duff, 1929. Hb. 1:49. 1934.
 'Lady Margaret' (Veit.), R; A-207. *A. reticulata* x *A. leopoldii*; autm. Nehr. Amaryll. 1909. Hb. 1:49. 1934.
 'Lady Winifred Gore', R; A-208. Chitt. 1933. I.—Smith, 1896. Hb. 1:49. 1934.
 'Lafayette' (BM. 1954), R; A-603, D-5B; U-4fld; 16" h; fls. 8" diam; dutch vermilion (HCC-717), white central star. PL. 17:52. 1961.
 'La Forest Morton' (Lud. 1956), R; A-390, D-5B; U-4fld; 26" h; fls. 8"-9" diam; china rose (HCC-o24/1) to lilac purple (o31/1) to pansy violet (o33), almost black at bottom of throat; spr. PL. 14:54, f. 8:53. 1958.
 'Lakemont' (Whe. 1940), R; A-209, D-5A; solid red, darker throat, velvety texture. Hb. 7:130. 1940.

- 'Lamberti' (Herb.), NR; cl. 'Cartoni' x cl. 'Grahami'. Hb. 1:49. 1934.
- 'Laura' (Chandler), NR. SPN. 13. 1942.
- 'Lavalier' (HDL. 1963), R; A-765. I.—Goed. 1964.
- 'Lawrence' (Brn. 1943), R; A-210; U-3fld; fls. 9" diam; striped and spotted on white ground. Hb. 10:94. 1943.
- 'Leading Lady' (W-WS), R; A-500; U-3-4fld; 20" h; fls. 7" diam; pure white with greenish throat. PL. 15:45. 1959.
- 'Leah Williams' (BM. 1962), NR; soft cream, brick red.
- 'Lena B. Hughes' (T & H, 1937), R; A-211, D-5B; U-3fld; 28" h; fls. 8" diam; salmon-rose, white band in center of all segs. Hb. 4:143. 1937.
- 'Leo Gestel' (VM. 1963), R; A-771; salmon pink.
- 'Leone Schweizer' (BM.), R; A-642; pure white, carmine rose and claret rose margins. PL. 17:52. 1961.
- 'Leoni', R; A-212; pure white, seg tips orange red. Nehr. Amaryll. 1909. Hb. 1: 49. 1934.
- 'Liberator' (Lud. 1948), R; A-213; U-3-4fld; 26" h; fls. 7" diam; salmon-rose, rose-red throat, white mid-stripe lower petals. PL. 7:73. 1951.
- 'Liberty Hyde Bailey' (Lud. 1958), R; A-466, D-5A; U-4fld; 26" h; fls. 8"-9" diam; oriental red (HCC-819). PL. 15:43. 1959.
- 'Lightning' (Zeiner, 1947), R; A-214, D-4B; white, pink stripes. Hb. 14:128. 1947.
- 'Lightning' R; A-215. Chitt. 1933. I.—Paul, 1893. Hb. 1:49. 1934.
- 'Lillian' (Arms. 1949), R; A-216, D-5B; fls. 8" diam; pink. PL. 5:88. 1949.
- 'Lillian Yost' (Whe. 1940), R; A-217, D-5A; fls. 8"-9" diam; shell pink, darker rose pink feathering. Hb. 7:130. 1940.
- 'Lindleyi' (Herb.), NR; cl. 'Griffini' x 'Carnarvoni'. Hb. 1:49. 1934.
- 'Lindseyi' (Hebr.), NR; *A. aulica* x *A. reticulata*. Hb. 1:49. 1934.
- 'Lion's Head' (BM. 1958), R; A-604, D-5B; U-2fld; 16" h; fls. 9" diam; currant red (HCC-821). PL. 17:52. 1961.
- 'Little Diamond' (W-WS, 1962), R; A-714, D-5A; U-4fld; 18" h; fls. 8" diam; dawn pink (HCC-523), white midrib in all segs; spr. PL. 19:66. 1963.
- 'Little Sweetheart' (Lud. 1958), R; A-470, D-8; U-4-5fld; fls. 4" diam; salmon-red, soft greenish-white star-like throat, darker red streaks, spr. PL. 15:43. 1959.
- 'Lois', R; A-218. Chitt. 1933. I.—Holf. 1901. Hb. 1:49. 1934.
- 'Lord Amherst' (Whe. 1941), R; A-219, D-5A; fls. 9" diam; dark crimson with violet tones. Hb. 8:91. 1941.
- 'Lord Bovington', R; A-220. Chitt. 1933. I.—Holf. 1901. Hb. 1:49. 1934.
- 'Lord Brassey' (Will.), R; A-221, D-5A; Nehr. Amaryll. 1909. Hb. 1:49. 1934.
- 'Lord Roberts', R; A-222. Chitt. 1933 I.—Will. 1895. Hb. 1:49. 1934.
- 'Louise Hayward' (Hay. 1940), R; A-223; snowy white, apple green shading in throat. Hb. 7:131, Plate 180:129. 1940.
- 'Love's Desire' (Lud. 1954), R; A-438, D-5A; U-4fld; 26" h; fls. 9" diam; coral pink (HCC-0619) and porcelain rose, reddish stripes; spr; dec. c. Ludwig & Co. 1954. PL. 14:55. 1958.
- 'Love Fire' (Lud.), NR; orange red.
- 'Lucifer' (W-WS, 1950), R; A-501; U-3fld; 19" h; fls. 8" diam; medium dark red. PL. 7:74. 1951.
- 'Lucky Strike' (Lud. 1957), R; A-443, D-5A; U-3-4fld; 24" h; Oriental red (HCC-819), oxblood red throat; spr; dec. PL. 14:55. 1958.
- 'Ludwig's Ace' (Lud. 1959), R; A-540, D-5A; U-4fld; 23" h; fls. 8" diam; azalea pink, shaded light brick red with delft rose throat; spr. PL. 16:76. 1960.
- 'Ludwig's Dazzler' (Lud. 1957), R; A-439, D-5A; U-4fld; 26" h; fls. 8½" diam; pure white with nearly white throat; spr; dec. PL. 14:55. 1958.

'Ludwig's Goliath' (Lud. 1957), R; A-442, D-5A; U-4fld; 25" h; fs. 11" diam; orient red (HCC-819), darker throat; spr; dec. PL. 14:55. 1958.

'Ludwig's It' (Lud. 1958), R; A-467, D-5A; U-4fld; 30" h; fs. 10" diam; dark blood red (HCC-820), currant red throat; spr; dec. PL. 15:43. 1959.

'Ludwig's Masterpiece' (Lud. 1954), R; A-440, D-5A; U-4-5fld; 30" h; fs. 8" diam; dutch vermilion (HCC-717), darker throat; spr; dec. PL. 14:55. 1958.

'Ludwig's Scarlet' (Lud. 1950), R; A-441, D-5A; U-4fld; 25" h; fs. 7½" diam; dark blood red (HCC-820), darker in throat; spr; dec. PL. 14:55. 1958.

'Ludwig's Sensation' (Lud.), NR; U-4fld; 18" h; fs. 7" diam; white, greenish throat. Traub, Amaryll. Man. 82. 1958.

'Ludwig's Splendor' (Lud.), NR; U-4fld; fs. 8½" diam; dutch vermilion (HCC-717), darker throat. c. Ludwig & Co. 1954.

'Lyso', R; A-224; white and red, veined green. Hb. 1:49. 1934.

—M—

'Mac Arthur' (Lud. 1954), NR; U-4fld; 30" h; fs. 7½" diam; dutch vermilion (HCC-717). c. Ludwig & Co. 1954.

'Madam Curie' (W-WZ. 1962), R; A-717, D-5A; U-3fld; 14" h; fs. 6" diam; shrimp red (HCC-616), veining in all segs. I.—Goed. 1962. PL. 19:66. 1963.

'Madam Van Waveren' (VW. 1962), R; A-736, D-5A; U-3-4fld; 28" h; fs. 8" diam; white, red pencil stripes in upper segs, lower segs white; spr. PL. 19:67. 1963.

'Madira Bickel' (McCann), NR; brick red, ruffled edges. Traub, Amaryll. Man. 90. 1958.

'Madonna' (Veit.), R; A-225. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Magic', R; A-226. Chitt. 1933. I.—Holf. 1926. Hb. 1:49. 1934.

'Magnificent', R; A-227. Chitt. 1933. I.—Ker. 1909. Hb. 1:49. 1934.

'Magnolia' (BM), R; A-643, large white. PL. 17:52. 1961.

'Maiden's Blush' (Camm.), NR. PL. 10:79. 1954.

'Major Wilson', R; A-228, D-5; dark red ground color, tips creamy white; 'Brilliant' x *A. psittacina*. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Malay Star' (BM. 1955), R; A-644, D-5B; U-4fld; 16" h; fs. 7½" diam; rose opal (HCC-022), white central star. PL. 17:52. 1961.

'Maluti' (BM. 1959), R; A-605, D-5B; U-3fld; 21" h; fs. 9" diam; cardinal red (HCC-822). PL. 17:52. 1961.

'Mandarin's Joy' (BM. 1955), R; A-606, D-5B; U-4fld; 20" h; fs. 8" diam; mandarin red (HCC-17). PL. 17:52. 1961.

'Mandarin's Pride' (BM. 1954), R; A-607, D-5B; U-2fld; 18" h; fs. 7½" diam; light mandarin red (HCC-17). PL. 17:52. 1961.

'Mansore' (VM.); NR; crimson-purple.

'Marathon', R; A-229. Chitt. 1933. I.—Veit. 1901. Hb. 1:49. 1934.

'Marcelle' (Hay. 1938), R; A-230, D-5; U-4fld; fs. 8" diam; deep red self. Hb. 5:146. 1938.

'Marcus', R; A-231. Chitt. 1933. I.—Veit. 1909. Hb. 1:49. 1934.

'Margaret Pomfret' (Gron.), R; A-232, D-5; dark red, seg tips creamy white. cl. 'Brilliant' x *A. psittacina*. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Margaret Rose' (Camm.), NR; PL. 10:79. 1954.

'Margaret Rose' (Lud. R; A-444, D-5A; U-4fld; 28" h; fs. 8"-9" diam; shrimp red (HCC-616/3) striped, mandarin red on upper segs, begonia rose on lower segs. PL. 14:55. 1958.

'Miss Margaret Truman' (Lud. 1954), R; A-446, D-5A; U-4fld; 28" h; fs. 8" diam; porcelain rose (HCC-620), camelia rose reflection, darker throat; spr; dec. PL. 14:55. 1958.

'Margie Clements' (Clem. 1957), R; A-401, D-7; U-4fld; 22" h; fs. 5½" diam; dutch vermilion (HCC-717), segs pointed and reflexed. PL.

'Ludwig's Goliath' (Lud. 1957), R; A-442, D-5A; U-4fd; 25" h; fs. 11" diam; orient red (HCC-819), darker throat; spr; dec. PL. 14:55. 1958.

'Ludwig's It' (Lud. 1958), R; A-467, D-5A; U-4fd; 30" h; fs. 10" diam; dark blood red (HCC-820), currant red throat; spr; dec. PL. 15:43. 1959.

'Ludwig's Masterpiece' (Lud. 1954), R; A-440, D-5A; U-4-5fd; 30" h; fs. 8" diam; dutch vermilion (HCC-717), darker throat; spr; dec. PL. 14:55. 1958.

'Ludwig's Scarlet' (Lud. 1950), R; A-441, D-5A; U-4fd; 25" h; fs. 7½" diam; dark blood red (HCC-820), darker in throat; spr; dec. PL. 14:55. 1958.

'Ludwig's Sensation' (Lud.), NR; U-4fd; 18" h; fs. 7" diam; white, greenish throat. Traub, Amaryll. Man. 82. 1958.

'Ludwig's Splendor' (Lud.), NR; U-4fd; fs. 8½" diam; dutch vermilion (HCC-717), darker throat. c. Ludwig & Co. 1954.

'Lyso', R; A-224; white and red, veined green. Hb. 1:49. 1934.

—M—

'Mac Arthur' (Lud. 1954), NR; U-4fd; 30" h; fs. 7½" diam; dutch vermilion (HCC-717). c. Ludwig & Co. 1954.

'Madam Curie' (W-WZ. 1962), R; A-717, D-5A; U-3fd; 14" h; fs. 6" diam; shrimp red (HCC-616), veining in all segs. I.—Goed. 1962. PL. 19:66. 1963.

'Madam Van Waveren' (VW. 1962), R; A-736, D-5A; U-3-4fd; 28" h; fs. 8" diam; white, red pencil stripes in upper segs, lower segs white; spr. PL. 19:67. 1963.

'Madira Bickel' (McCann), NR; brick red, ruffled edges. Traub, Amaryll. Man. 90. 1958.

'Madonna' (Veit.), R; A-225. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Magic', R; A-226. Chitt. 1933. I.—Holf. 1926. Hb. 1:49. 1934.

'Magnificent', R; A-227. Chitt. 1933. I.—Ker. 1909. Hb. 1:49. 1934.

'Magnolia' (BM), R; A-643, large white. PL. 17:52. 1961.

'Maiden's Blush' (Camm.), NR. PL. 10: 79. 1954.

'Major Wilson', R; A-228, D-5; dark red ground color, tips creamy white; 'Brilliant' x *A. psittacina*. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Malay Star' (BM. 1955), R; A-644, D-5B; U-4fd; 16" h; fs. 7½" diam; rose opal (HCC-022), white central star. PL. 17: 52. 1961.

'Maluti' (BM. 1959), R; A-605, D-5B; U-3fd; 21" h; fs. 9" diam; cardinal red (HCC-822). PL. 17:52. 1961.

'Mandarin's Joy' (BM. 1955), R; A-606, D-5B; U-4fd; 20" h; fs. 8" diam; mandarin red (HCC-17). PL. 17: 52. 1961.

'Mandarin's Pride' (BM. 1954), R; A-607, D-5B; U-2fd; 18" h; fs. 7½" diam; light mandarin red (HCC-17). PL. 17:52. 1961.

'Mansore' (VM.); NR; crimson-purple.

'Marathon', R; A-229. Chitt. 1933. I.—Veit. 1901. Hb. 1:49. 1934.

'Marcelle' (Hay. 1938), R; A-230, D-5; U-4fd; fs. 8" diam; deep red self. Hb. 5:146. 1938.

'Marcus', R; A-231. Chitt. 1933. I.—Veit. 1909. Hb. 1:49. 1934.

'Margaret Pomfret' (Gron.), R; A-232, D-5; dark red, seg tips creamy white. cl. 'Brilliant' x *A. psittacina*. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Margaret Rose' (Camm.), NR; PL. 10:79. 1954.

'Margaret Rose' (Lud. R; A-444, D-5A; U-4fd; 28" h; fs. 8"-9" diam; shrimp red (HCC-616/3) striped, mandarin red on upper segs, begonia rose on lower segs. PL. 14:55. 1958.

'Miss Margaret Truman' (Lud. 1954), R; A-446, D-5A; U-4fd; 28" h; fs. 8" diam; porcelain rose (HCC-620), camelia rose reflection, darker throat; spr; dec. PL. 14:55. 1958.

'Margie Clements' (Clem. 1957), R; A-401, D-7; U-4fd; 22" h; fs. 5½" diam; dutch vermilion (HCC-717), segs pointed and reflexed. PL.

14:54. 1958.

'Marginata', R; A-233; **A. elegans** hybrid. Bak. Amaryll. 1888. Hb. 1:49. 1934.

'Marginatum Conspicuum' (V. Hou.), R; A-234. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Marginatum Venustum' (V. Hou.), R; A-235. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Maria Goretti' (Lud. 1950), R; A-445, D-5B; U-4fld; 24" h; fls 9" diam; pure white, greenish throat; spr; dec. PL. 14:55. 1958.

'Marie' (Heat. 1934), NR; U-4fld; fls. 11" diam; pink with white markings; ev. Hb. 1:105. 1934.

'Marie Ash' (BM. 1958), R; A-608, D-5B; U-3fld; fls. 7½" diam; scarlet (HCC-19), flushed white towards center. PL. 17:52. 1961.

'Marina' (Traub, 1936), R; A-236, D-5B; fls. 10½" diam; white with pink markings. Hb. 3:92. 1936.

'Marion' (Pfs.), R; A-237; 'Dr. Masters' x **A. pardina**. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Marion' (W-WS. 1962), R; A-682, D-5A; U-4fld; 23" h; fls. 8½" diam; ruffled white with rose pencil stripes in top petals; spr. PL. 19:65. 1963.

'Marjory', R; A-238. Chitt. 1933. I.—Holf. 1906. Hb. 1:49. 1934.

'Mars' (Hay. 1935), NR. Hb. 2:92. 1935.

'Mars', R; A-239. Chitt. 1933. I.—Paul, 1892. Hb. 1: 49. 1934.

'Mars' (VM. 1962), R; A-721, D-5A; U-4fld; 28" h; fls. 9" diam; currant red (HCC-821), darker throat; spr. PL. 19:67. 1963.

'Martinique' (Bur. 1909), R; A-240; fls. 9" diam; Hb. 9:154, f. 78:153. 1942.

'Mary Davis' (Hay. 1937), R; A-241, D-5B; fls. 8" diam; pure white, light green throat. Hb. 4: f., 106. 1937.

'Mary Davis', NR; cl. of **Amaryllis** x **gladwynsis**, which see under x **gladwynsis**. PL. 8:86. 1952.

'Maryland' (W-WS. 1962), R; A-687, D-5A; U-2-3fld; 20" h; fls. 7½" diam; begonia (HCC-619) shading to scarlet, lower segs begonia with white veins; spr; PL. 19:65. 1963.

'Mary McCann' (McCann), NR; D-7; delicate shade of pink, veined white, Traub, Amaryll. Man. 89, 90. 1958.

'Maryon' (Lud.), NR; U-3fld; fls. 6" diam; dutch vermilion (HCC-717/2). PL. 10:35. 1954.

'Matopos' (BM. 1962), NR; blood red.

'Matrooskop' (BM. 1962), NR; blood red.

'McCann's Double' (McCann), R; A-242; shades of red. Hb. 9:211. 1942.

'Melanie' (BM. 1958), R; A-609, D-5B; U-4fld; 16" h; fls. 7" diam; scarlet (HCC-17). PL. 17:52. 1961.

'Melpomene' (Ker), R; A-243, D-5; reddish white, veined red. Hb. 1:49. 1934.

'Mendeli', NR; **A. aulica** hybrid. Bak. Amaryll. 1888. Hb. 1:49. 1934.

'Menelik' (Chandler), NR; SPN. 13. 1942.

'Mephisto', R; A-244; lilac red. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Mephisto' (Heat. 1934), NR; syn: "War". SPN. 13. 1942.

'Meteor' (Veit.), R; A-98. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Meteor' (BM. 1959), R; A-645, D-5B; U-3fld; 16" h; fls. 8" diam; vermilion (HCC-18), mandarin red influence; spr. PL. 17:52. 1961.

'Midorella' (VM.), NR; dark violet rose.

'Milton' (Veit.), R; A-99. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Minerva' (Ker), R; A-100, D-5; red ground color, white band and white veins. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Minerva' (VM. 1962), R; A-744, D-5A; U-4fld; 16" h; fls. 7" diam; delft rose (HCC-o20), pencil stripes and pinpoints delft rose; spr. PL. 19:67.

1963.

'Miss Annie' (Schm. 1962), R; A-697, D-5A; U-4fid; 18" h; fls. 6" diam; currant red (HCC-821); spr. UL. 19:66. 1963.

'Mme. Modjeska' (Gron.), R; A-101, D-5; dark red ground color, seg tips creamy white, greenish throat. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Model' (Ker), R; A-102, D-5; creamy white, red stripes and veining. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Modern Times' (VW. 1956), R; A-396; 28" h; fls. 8"-10" diam; deep blood red (HCC-820). PL. 14:54. 1958.

'Mohawk', R; A-680, D-5A; U-4fid; fls. 9" diam; solid light red. I.—Goed. 1961. PL. 18:43. 1962.

'Mona Lisa' (Lud. 1948), R; 245; U-3-4fid; 15" h; fls. 5½" diam; salmon, suffused pink. PL. 7:72. 1951.

'Monarch', NR. Hb. 1:63. 1934.

'Mont Blanc' (Kenny, 1940), R; A-246; White. Hb. 7:132, f. 52. 1940.

'Montezuma' (Nehr.), R; A-247; 39" h; fiery orange red with yellow star. **A. belladonna** x cl. 'Empress of India' Hb. 1:49. 1934.

'Moorriver' (BM. 1962), NR; mandarin red with white.

'Moreno' (W-WS), R; A-502; 26" h; fls. 8" diam; medium dark red, tinge of rose in throat. PL. 15:45. 1959.

'Morning Kiss' (VW. 1957), R; A-409; 28" h; fls. 8"-10" diam; salmon pink. PL. 14:55. 1958.

'Morning Star' (Lud.), NR; U-3-4fid; 30" h; fls. 8" diam; begonia pink (HCC-619), white star with red ring deep in throat. c. Ludwig & Co. 1954.

'Mother' (Heat. 1934), NR; U-3-4fid; fls. 8½" diam; dark wine red, veined rich purple; ev. Hb. 2:90. 1935.

'Mothersday' (Lud. 1950), R; A-447, D-5A; U-3-4fid; 30" h; fls. 9" diam; mandarin red (HCC-17), violet reflection in center, darker throat. PL. 7:74. 1951.

'Mount Blanc' (W-WZ. 1962), R; A-718, D-5A; U-2fid; 18" h; fls. 6" diam; pure white, segs ruffled with light green throat. I.—Goed. 1962. PL. 19:66. 1963.

'Mount Everest' (W-WS. 1962), R; A-715, D-5A; U-3fid; 20" h; fls. 8½" diam; blend of white, orient pink, and china rose. PL. 19:66. 1963.

'Mount Tacoma' (W-WS), R; A-503; 24" h; fls. 7" diam; pure white, faint green tinge in throat. PL. 15:45. 1959.

'Mozart', NR; fire red. I.—Goed. 1962 for a Dutch breeder.

'Mrs. Bilney', R; A-248; white dotted red. Nehr. Amaryll. 1909. I.—Veit. 1902. Hb. 1:49. 1934.

'Mrs. Burbank' (Bur. 1901), R; A-249; fls. 8" diam; Hb. 9:154. 1942.

'Mrs. Carl Jay' (Jay), R; A-250. Nehr. Amaryll. 1909. Hb. 1:49. 1934.

'Mrs. Cleveland' (Pfis), R; A-251; rose red. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Mrs. Donald Dudley' (Heat. 1934), NR; Hb. 2:90. 1935.

'Mrs. Garfield' (Veit.), R; A-252. **A. reticulata** x cl. 'Defiance'; autm. I.—Clarke, 1928. Hb. 1:50. 1934.

'Mrs. I. W. Heaton' (Camm.), NR. PL. 10:79. 1954.

'Mrs. Lamberton' (Heat. 1934), NR; Hb. 2:90. 1935.

'Mrs. Lancaster' (Lanc. 1940), R; A-253, D-8; U-4fid; 24" h; fls. 4" diam; rose red, darker veining and white stripe. **A. stylosa** x **A. reticulata** striatifolia, Mrs. Garfield. Hb. 6:205. 1939.

'Mrs. Lee' (Veit.), R; A-254. **A. reticulata** hybrid; autm. Hb. 1:50. 1934.

'Mrs. Montefiore', R; A-255; white. Nehr. Amaryll. 1909. I.—Veit. 1895. Hb. 1:50. 1934.

'Mrs. R. W. Wheeler' (T&H, 1938), R; A-256; red. Hb. 5:91. 1938.

'Mrs. T. R. Robinson' (T&H, 1938), R; A-257; pink. Hb. 5:91. 1938.

'Mrs. Wm. Lee' (Will.), R; A-258. progeny of **A. reticulata** x 'Defiance';

autm. Hb. 1:50. 1934.

'Munroi' (Col.), NR; *A. psittacina* x *A. belladonna*. Herb. Amaryll. 1837. Hb. 1:50. 1934.

'Murillo', R; A-259. Chitt. 1933. I.—Holf. 1899. Hb. 1:50. 1934.

'Muscatel' (HDL. 1963), R; A-766, D-5B; U-4fid; 10" h; fls. 7" diam; rose red (HCC-724/2), darkens slightly in throat.

'Musigny', R; A-260. Chitt. 1933. I.—Roths. 1912. Hb. 1:50. 1934.

'Mysterie' (W-WS), R; A-504; U-4fid; 20" h; fls. 7" diam; rose red, darker throat. PL. 15:45. 1959.

—N—

'Narcissa' (Nort. 1951), R; A-263, D-4B; U-2fid; fls. 8" diam; medium red (M&P 42-L-1), veined and dotted darker red. PL. 7:76. 1951.

'Nautch Girl' (Chandler), NR; SPN. 13. 1942.

'Navala', R; A-261. Chitt. 1933. I.—Veit. 1898. Hb. 1:50. 1934.

'Neel' (Schm. 1962), R; A-694, D-5A; U-4fid; 20" h; fls. 7" diam; orient red (HCC-819), green throat. PL. 19:66. 1963.

'Nestor' (Ker), R; A-262, D-5; red with white tips. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Neviso' (Hay. 1935), NR. Hb. 2:92. 1935.

'New Orleans' (BM. 1956), R; A-646, D-5A; U-3fid; 20" h; fls. 7½" diam; dawn pink, camelia rose, porcelain rose, begonia pink tips and white midribs. PL. 17:52. 1961.

'New Pink Pearl', R; A-264. Chitt. 1933. I.—Holf. 1926. Hb. 1:50. 1934.

'Nimrod', R; A-265. Chitt. 1933. I.—Veit. 1893. Hb. 1:50. 1934.

'Nivalis' (Lud. 1954), R; A-448, D-5B; U-3-4fid; 24" h; fls. 8" diam; pure white with faint greenish throat; spr; dec. PL. 14:55. 1958.

'Norma', R; A-267; shade of red and white. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Northern Queen' (VW. 1957), R; A-410; fls. 8"-10" diam; 28" h; salmon-orange, carmine-red towards center. PL. 14:55. 1958.

'Novelty', R; A-268. Chitt. 1933. I.—Paul, 1894. Hb. 1:50. 1934.

'Nysa', R; A-269. Chitt. 1933. I.—Veit. 1902. Hb. 1:50. 1934.

—O—

'Oasis' (W-WS. 1962), R; A-685, D-5B; U-3-4fid; 21" h; fls. 7½" diam; pure white with greenish throat; spr. PL. 19:65. 1963.

'O'Brien' (O'Bri.), NR; *A. pardina* x *A. reticulata*; autm. Hb. 1:50. 1934.

'Olympia', R; A-273. Chitt. 1933. I.—Veit. 1894. Hb. 1:50. 1934.

'Ophelia' (Will.), R; A-274, D-5; Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Orange Beauty' (VW. 1960), R; A-659, D-5A; fls. 7" diam; orange, cardinal red ribs, darker throat. PL. 17:53. 1961.

'Orangedale' (HDL. 1962), R; A-728, D-5A; U-4fid; 19" h; fls. 6½" diam; capsicum red (HCC-715), darker throat. I.—Goed. 1962. PL. 19:67. 1963.

'Orange Favorite' (W-WS. 1962), R; A-689, D-5A; U-3-4fid; 15" h; fls. 6½" diam; indian orange (HCC-713), glowing red throat; spr. PL. 19:65. 1963.

'Orange Fire' (Lud.), NR; U-4fid; fls. 8½" diam; mandarin red (HCC-17). c. Ludwig & Co. 1954.

'Orange King' (Heat. 1934), NR; Hb. 2:90. 1935.

'Orange King' (Lud. 1948), R; A-270; fls. 8" diam; dutch vermilion (HCC-717), brilliant red throat. Hb. 15:69. 1948. c. Ludwig & Co. 1954.

'Orange King' (W-WS. 1950), R; A-505; U-4fid; 18" h; fls. 8" diam; light red. PL. 15:45. 1959.

'Orange Nassau' (W-WZ. 1962), R; A-716, D-5A; U-3fid; 18" h; fls. 7" diam; burnt orange (HCC-o14). I.—Goed. 1962. PL. 19:66. 1963.

- 'Orange Perfection' (Heat. 1935). SPN. 13. 1942.
 'Orange Wonder' (Lud.), NR; fls. 9" diam; poppy red (HCC-16-16/1) to orange (HCC-12). c. Ludwig & Co. 1954.
 'Orange Wcnder' (W-WS. 1962), R; A-690, D-5A; U-3-4fld; 17" h; fls. 8" diam; indian orange (HCC-713) blending to capsicum red. PL. 19:65. 1963.
 'Orchid' (Heat. 1934), NR; Hb. 2:90. 1935.
 'Oriflamme' (Sou.), R; A-271. *A. vittata* hybrid. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
 'Orlando' (Heat. 1934), NR; white with light red markings. Hb. 2:56, 90. 1935.
 'Orlando Salmon' (Heat. 1936), R; A-272, D-5A; light salmon, darker throat. Hb. 3:92. 1936.
 'Osceola' (Tilg. 1934), NR; Hb. 2:90. 1935.
 'Osiris' (VM. 1962), R; A-722, D-5A; U-4fld; 24" h; fls. 8½" diam; orient red (HCC-819), blood red throat. PL. 19:67. 1963.
 'Otto Felix' (Dorr, 1962), R; A-700, D-5B; U-4fld; 23" h; fls. 6½" diam; delft rose and white, greenish throat; fr; spr. PL. 19:66. 1963.
 'Overture', R; A-779, D-5A; U-3-4fld; 16" h; fls. 7" diam; white with light green throat; spr; dec. I.—Goed. 1962 for a Dutch breeder.

—P—

- 'Palatka' (Tilg. 1934), NR; fls. 9½" diam; pink and white. Hb. 2:58, 90. 1935.
 'Pallas' (VM. 1962), R; A-745, D-5A; U-4fld; 13" h; fls. 8½" diam; scarlet red pinpoints to solid color at ends of tips, greenish-white throat, color mostly in upper segs. PL. 19:67. 1963.
 'Pamela' (Lud. 1960), R; A-559, D-8; U-5-6fld; 20" h; fls. 3" diam; capsicum red (HCC-715), uranium green star in throat. PL. 17:53. 1961.
 'Paprika' (BM. 1958), R; A-610, D-5B; U-4fld; 18" h; fls. 7½" diam; capsicum red (HCC-715), vermilion influence. PL. 17:52. 1961.
 'Pardinum', NR; Chitt. 1933. I.—Veit. 1867. Hb. 1:50. 1934.
 'Pardy' (Hay. 1935), NR. Hb. 2:92. 1935.
 'Parkeri' (Herb.), NR. *A. striata* x *A. reticulata*. Hb. 1:50. 1934.
 'Parsifal' (VM. 1962), NR; bright red orange glow. I.—Goed. 1962 for a Dutch breeder.
 'Peace' (Heat. 1934), NR; U-4fld; fls. 8" diam; white with delicate pink markings; fr. Hb. 1:105. 1934.
 'Peacefulness' (Lud.), R; A-449, D-5A; U-3-4fld; 28" h; fls. 8" diam; blood red (HCC-820), carmine red glow, dark red throat; spr; dec. PL. 14:55. 1958.
 'Pearl Maiden', R; A-275. Chitt. 1933. I.—Holf. 1906. Hb. 1:50. 1934.
 'Peppermint' (Lud. 1960), R; A-669, D-5A; U-4-6fld; 26" h; fls. 8"-9" diam; pure white, cardinal red stripes, greenish white throat; spr; dec. PL. 18:41. 1962.
 'Peppy' (Lat. 1963), R; A-749, D-5A; U-3-4fld; 16" h; fls. 6"-7" diam; white base with geranium lake (HCC-20) stripes, more color in upper segs.
 'Pera' R; A-276. Chitt. 1933. I.—Veit. 1897. Hb. 1:50. 1934.
 'Personality', R; A-780, D-5B; U-4fld; 28" h; fls. 8" diam; vermilion (HCC-18) with darker red markings deep in throat; spr., dec. I.—Goed. 1962 for a Dutch breeder.
 'Picardy' (BM. 1957), R; A-611, D-5B; U-3fld; 24" h; fls. 9" diam; poppy red (HCC-16), white star in center. PL. 17:52. 1961.
 'Picotee' (Lud. 1958), NR; U-4-5fld; 24" h; fls. 10" diam; pure white, speckled with red spots, picotee edge. c. Ludwig & Co. 1958.
 'Picta' R; A-277. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

- 'Picture' (Lud. 1958), R; A-471, D-8; U-4fld; 18" h; fls. 4" diam; orient red (HCC-819), white star, light red throat; spr; dec. PL. 15:44. 1959.
- 'Pink Azalea' (BM. 1954), R; A-612, D-5B; U-3fld; 14" h; fls. 9" diam; azalea pink (HCC-618). PL. 17:52. 1961.
- 'Pink Beauty' (Ker), R; A-278, D-5; light red rose with white star. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Pink Beauty' (W-WS. 1962), R; A-719, D-5A; U-3-4fld; 20" h; fls. 7" diam; rose pink (HCC-427) with white upper 3 segs, lower segs white with orient pink (416/3). PL. 19:66. 1963.
- 'Pink Blossom', R; A-279. Chitt. 1933. I.—Holf. 1925. Hb. 1:50. 1934.
- 'Pink Favorite' (Lud. 1948), R; A-280; pure pink. Hb. 15:69. 1948.
- 'Pink Favorite' (Lud. 1958), R; A-450, D-5B; U-3-4fld; 30" h; fls. 9" diam; camelia rose (HCC-622), tips lighter rose, darker throat; spr; dec. PL. 14:55. 1958.
- 'Pinkie', R; A-281. Chitt. 1933. I.—Holf. 1909. Hb. 1:50. 1934.
- 'Pink Pearl' (Whe. 1940), R; A-282, D-5A; fls. 8" diam; pure pink, darker pink in throat with pale green. Hb. 7:130. 1940.
- 'Pink Pearl' (Ker), R; A-283, D-5; red rose. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Pink Perfection' (Lud. 1950), R; A-451, D-5A; U-4fld; 28" h; fls. 8" diam; rose opal (HCC-o22), carmine rose tips, PL. 14:55. 1958.
- 'Pink Reflection' (BM. 1955), R; A-647, D-5B; U-3fld; 17" h; fls. 7½" diam; camelia rose, crimson, rose opal, with white. PL. 17:52. 1961.
- 'Pinksterflower' (Lud. 1954), R; A-452, D-5A; U-4-5fld; 27" h; fls. 8" diam; azalea pink (HCC-618), poppy red reflection; spr; dec. PL. 14:55. 1958.
- 'Pink Tipped' (Zeiner), NR; frosted ground color. Hb. 11:256. 1944.
- 'Pinzoon', R; A-284; deep scarlet red. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Piquant', R; A-781, D-5A; U-4-5fld; 25" h; fls. 7" diam; dutch vermilion (HCC-717) on white base, lower segs almost white, white border on all segs; spr., dec. I.—Goed. 1962 for a Dutch breeder.
- 'Pirlotti' (H & S), R; A-285. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Pixie' (Lud. 1960), R; A-560, D-8; U-5-6fld; 22" h; fls. 2½" diam; orange (HCC-12), lighter towards base, greenish throat. PL. 17:54. 1961.
- 'Polar Light' (VW. 1962), R; A-738, D-5A; U-4fld; 14" h; fls. 6"-7" diam; dazzling white, pale green throat. PL. 19:67. 1963.
- 'Pola Negri' (VW. 1962), R; A-737, D-5A; U-3-4fld; 17" h; fls. 7"-8" diam; indian lake red (HCC-826). PL. 19:67. 1963.
- 'Polar Night' (VW. 1960), R; A-665, D-5A; U-2-3fld; 20" h; fls. 7" diam; snow white, green luster and green throat. PL. 17:53. 1961.
- 'Polly Anderson' (BM. 1962), NR; brick red to shrimp red.
- 'Pomona' (Bur. 1913), R; A-286; U-4-7fld; fls. 7½" diam; fiery blooms, narrow white stripe to 4 segs. Hb. 9:154. 1942.
- 'Portola' (Bur. 1913), R; A-287; U-4fld; fls. 9" diam; pure white, ground-lined and flaked carmine. Hb. 9:154. 1942.
- 'Poussin' (VW. 1960), R; A-660, D-5A; U-3-4fld; 22" h; wine red with satin finish, crimson throat. PL. 17:53. 1961.
- 'Praelara', R; A-289. A reticulatum hybrid. Bak. Amaryll. 1888. Hb. 1:50. 1934.
- 'President Benes' (Vas. 1940), R; A-290; fls. 7" diam; stoplight shade of red. Hb. 6:155. 1940.
- 'President Carnot', R; A-291. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'President Roosevelt' (Heat. 1934), NR; orange red, white star in center. Hb. 2:90, f.:55. 1935.
- 'Pretoria' (S.-Afr. NH, 1947), R; A-292. Hb. pl. p. 21. 1945 (1947).
- 'Priam' (Whe. 1940), R; A-293, D-5A; fls. 8"-9" diam; light red on salmon. Hb. 7:130. 1940.

'Prima Donna' (Lud. 1959), R; A-541, D-5A; U-4fld; 28" h; fls. 9" diam; begonia rose (HCC-619), azalea pink and rosey red throat; spr; dec. PL. 16:76. 1960.

'Prince Edward', R; A-294. Chitt. 1933. I.—Veit. 1895. Hb. 1:50. 1934.

'Prince of Orange' (V. Hou.), R; A-295. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Prince of Orange' (W-WS), R; A-506; U-3-4fld; 19" h; fls. 8" diam; orange, blending to scarlet in throat. PL. 15:45. 1959.

'Princess Elizabeth' (T & H, 1937), R; A-296, D-4B; U-3fld; 27" h; fls. 7" diam; brilliant coronation red, greenish-white star, royal purple penciling at base of petals. Hb. 4:143. 1937.

'Princess Elizabeth' (Camm.), NR; PL. 10:79. 1954.

'Princess Osra', R; A-297. Chitt. 1933. I.—Holf. 1898. Hb. 1:50. 1934.

'Prins Willem' (BM. 1954), R; A-163, D-5B; U-2fld; 18" h; fls. 8½" diam; burnt orange (HCC-oo14), salmon and begonia, flush of cream. PL. 17:52. 1961.

'Prof. Koch', R; A-298. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Progress' (Ker), R; A-299, D-5; shining red. Hb. 1:50. 1934.

'Profusion' (Bur. 1903), R; A-288; **A. vittata** x **a. johnsonii** Hb. 9:154. 1942.

'Progress', NR. Hb. 1:63. 1934.

'Pulcherrima' (Garr. 1850), R; A-300; **A. aulica** x **a. johnsonii**; syn: **A. xacramanii pulcherrima**. Hb. 1:46. 1934.

'Pulchrum', NR. Chitt. 1933. I.—Veit. 1873, Hb. 1:50. 1934.

'Puniceum Ignescens', R; A-301. Chitt. 1933, I.—Preston, 1928. Hb. 1:50. 1934.

'Pure Pink' (VW. 1960), R; A-661, D-5A; fls. 7" diam; dark pink, carmine red ribs and throat. PL. 17:53. 1961.

'Purity', R; A-302. I.—Burns, 1908. Hb. 1:50. 1934.

'Purity' (Hay. 1935), NR. Hb. 2:92. 1935.

'Purple Queen' (VM. 1949), R; A-527, D-4; fls. 7" diam; dark red to purple. PL. 15:46. 1959.

—Q—

'Queen Alexandra', R; A-304. Chitt. 1933. I.—Veit. 1902. Hb. 1:50. 1934.

'Queen Mary', R; A-305. Chitt. 1933. I.—Ker, 1911. Hb. 1:50. 1934.

'Queen of Scarlets' (VW), R; A-411; U-4-5fld; 24" h; fls. 8" diam; brilliant scarlet. PL. 14:55. 1958.

'Queen of Sheba' (Whe. 1942), R; A-306, D-5A; salmon red shading to darker tones in throat. Hb. 9:123. 1942.

'Queen of Sheba' (VM. 1958), R; A-528; 24" h; fls. 7½" diam; pink, darker shade in throat. PL. 15:47. 1959.

'Queen of Spots' (Bon.), R; A-303; **A. pardina** hybrid. Nehr. Amaryll. 1909. Hb. 1:50. 1934.

'Queen of the Pinks' (VM. 1957), R; A-530; 24" h; fls. 7" diam; soft camelia pink. PL. 15:47. 1959.

'Queen of the Whites' (W-WS), R; A-507; U-4-5fld; 25" h; fls. 9" diam; waxy-white, faint green tint in throat. PL. 15:45. 1959.

'Queen Rose' (VM), R; A-531; 24" h; fls. 7" diam; light red to rose white, star in center. PL. 15:46. 1959.

'Queen's Page' (W-WS.), R; A-508; U-4fld; 20" h; fls. 8" diam; salmon orange. PL. 7:72., f. 13:73. 1951.

'Queen Superiora' (VM. 1948), R; A-529; 22" h; fls. 7" diam; dark red. PL. 10: f. 10:71. 1954. PL. 15:47. 1959.

—R—

'Radiance' (BM. 1959), R; A-614, D-5B; U-2fld; 18" h; 7½" diam; deep bright scarlet (HCC-19). PL. 17:52. 1961.

'Ralph Wheeler' (Heat. 1934), NR. Hb. 2:90. 1935.

- 'Ray V. Denslow' (Lud.), NR; U-4fld; 30" h; fls. 7½" diam; capsicum red (HCC-715), darker throat. c. Ludwig & Co. 1954.
- 'Reba Cooper' (T & H, 1938), R; A-307; pink. Hb. 5:91. 1938.
- 'Red Champion' (VW), R; A-112; U-4fld; 22" h; fls. 8"-9" diam; brilliant red. PL. 14:55. 1958.
- 'Red Emperor' (Heat. 1935), NR. SPN. 13. 1942.
- 'Red Emperor' (VM), NR; clear red.
- 'Red Guard' (Lud. 1948), R; A-308; beautiful red. Hb. 15:69. 1948.
- 'Red Guard' (VW), R; A-413; U-4-5fld; 24" h; fls. 9" diam; deep scarlet. PL. 14:55. 1958.
- 'Red Lion' (VW), R; A-414; U-4fld; 22" h; fls. 8" diam; dark red. PL. 14:55. 1958.
- 'Red Majesty' (W-WS. 1955), R; A-550, D-5A; 24" h; fls. 10" diam; red with frosty sheen; spr; dec. PL. 16:76. 1960.
- 'Red Master' (W-WS. 1950), R; A-551, D-5A; U-2-3fld; 24" h; fls. 11"-12" diam; dark red; spr; dec. PL. 16:76. 1960.
- 'Red Shank' (VW. 1963), R; A-772. Red.
- 'Red Sparkle' (Lud.), NR; U-3-4fld; 34" h; fls. 9" diam; dutch vermilion (HCC-717), darker throat; la. spr; dec. c. Ludwig & Co. 1954.
- 'Red Sunset' (Heat. 1936), R; A-309, D-5A; blood red, veined with darker keel. Hb. 3:92. 1936.
- 'Red Wing' (Heat. 1934), R; A-310, Hb. 2:90. 1935.
- 'Rembrandt' (VM. 1962), R; A-751, D-5A; U-4fld; 16" h; fls. 7" diam; signal red (HCC-719), glossy throat. I.—Goed. 1962.
- 'Rex' (Arms. 1945), R; A-311, D-5B; fls. 9" diam; dark red, light green star in center. Hb. 12:104. 1945.
- 'Rialto', R; 312. Chitt. 1933. I.—Veit. 1901. Hb. 1:50. 1934.
- 'Rilona' (VM. 1962), R; A-723, D-5B; U-4-6fld; 23" h; fls. 8" diam; shrimp red (HCC-616/1), darker shade in throat. PL. 19:67. 1963.
- 'Robespierre' (BM. 1954), R; A-615, D-5B; U-3fld; 18" h; fls. 9" diam; white with delft rose brushing. PL. 17:52. 1961.
- 'Robin', R; A-313. Chitt. I.—Holf. 1899. Hb. 1:50. 1934.
- 'Rocket' (HDL. 1963), R; A-767, D-5A; U-3-4fld; 12" h; fls. 7" diam; rose red (HCC-724/1), purple tinge, green throat blending to white midrib halfway up segs. I.—Goed. 1963.
- 'Ronda', R; A-314; white ground with little red. Nehr. Amaryll. 1909. I. Veit. 1904. Hb. 1:50. 1934.
- 'Rosalind', R; A-315. Chitt. 1933. I.—Veit. 1896. Hb. 1:50. 1934.
- 'Rosaline' (HDL. 1962), R; A-729, D-5A; U-2fld; 19½" h; fls. 7½" diam; mottled magenta rose (HCCo27/3). I.—Goed. 1962. PL. 19:67. 1963.
- 'Rose Beauty' (VW. 1960), R; A-662, D-5A; U-3fld; fls. 7" diam; cyclamen rose with crimson red blotch in throat. PL. 17:53. 1961.
- 'Rosedale' (HDL. 1963), R; A-768, D-5A; U-2-4fld; 11" h; fls. 6" diam; turkey red (HCC-721), darker in throat. I.—Goed. 1963.
- 'Rose du Barry', R; A-316. Chitt. 1933. I.—Roths. 1912. Hb. 1:50. 1934.
- 'Rose Lace' (BM. 1955), R; A-616, D-5A; U-4fld; 20" h; fls. 7½" diam; rose madder (HCC-23), white star along midribs. PL. 17:52. 1961.
- 'Roselinde' (Lud.), R; A-453; U-3-4fld; 22" h; fls. 7" diam; carmine rose (HCC-621-621/1), greenish-white throat. c. Ludwig & Co. 1954.
- 'Rose Madder', R; A-319. Chitt. 1933. I.—Ker. 1906. Hb. 1:50. 1934.
- 'Rosemarie' (Heat.), NR; light red, yellowish star. Hb. 2:56. 1935.
- 'Rose Marie' (Arms. 1945), R; A-317, D-5B; fls. 9" diam; pink, white throat white midrib halfway up segs. Hb. 12:104. 1947.
- 'Rose Marie' (VM. 1962), R; A-724, D-5A; U-4-5fld; 24" h; fls. 8" diam; carmine rose (HCC-621), light midrib halfway up segs. PL. 19:67. 1963.
- 'Rosemary', R; A-318. Chitt. 1933. I.—Roths. 1931. Hb. 1:50. 1934.
- 'Rose Perfection' (Ker), R; A-320, D-5; rose red. Hb. 1:50. 1934.
- 'Rose Queen' (VW. 1949), R; A-415; U-3-4fld; 24" h; fls. 8" diam; old rose, darker throat. PL. 14:55. 1958.

- 'Rose Violet' (VM), NR; purplish violet.
- 'Rossini' (Lud.), R; A-454, D-5A; U-2-3fd; 26" h; fls. 7½" diam; carmine rose (HCC-21) with neyron rose (623) seg tips, darker shade in throat; spr; dec. c. Ludwig & Co. 1954.
- 'Rostenli' (VM.), NR; white center with pink edge.
- 'Rosy Cloud' (VW. 1960), R; A-663, D-5A; U-4fd; 18" h; fls. 8" diam; pearl pink, darker ribs, center of segs flushed carmine, green and white throat. PL. 17:53. 1961.
- 'Rosy Dawn', R; A-782, D-5A; U-4fd; 18" h; fls. 7" diam; carmine rose (HCC-621), darker shade in throat; spr., dec. I.—Goed. for a Dutch breeder.
- 'Rotterdam' (W-WS. 1962), R; A692, D-5A; U-4fd; 20" h; fls. 7" to 8" diam; currant red (HCC-821/2) to (821) in throat. PL. 19:65. 1963.
- 'Rouge' (Vas. 1936), R; A-321, D-5B; deep red. Hb. 3:92. 1936.
- 'Royal Dutch' (Lud. 1961), R; A-670, D-5A; U-4fd; 24" h; fls. 7"-8" diam; tips orient red (HCC-818/1) changing to light scarlet inwards to pure white and greenish in throat. PL. 18:41. 1962.
- 'Royal Garnet' (Whe. 1940), R; A-322, D-5A; fls. 7½" diam; dark red, darker throat, satiny appearance, Hb. 7:130. 1940.
- 'Royal Ruby' (W-WS. 1959), R; A-552, D-5A; U-4fd; 28" h; fls. 9" diam; brilliant medium red. PL. 16:76. 1960.
- 'Royal Standard' (Veit.), R; A-323. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Royal Velvet' (VW. 1956), R; A-394; U-3-4fd; 24" h; fls. 8" diam; deep red to purple. PL. 14:54. 1958.
- 'R. P. Pitcher' (Will.), R; A-324; cl. 'Defiance' x *A. reticulata*; autm. Nehr. Amaryll. 1909. Hb. 1:50. 1934.
- 'Ruby', R; A-325. Chitt. 1933. I.—Schr. 1931. Hb. 1:51. 1934.
- 'Ruby' (Hay. 1935), NR. Hb. 2:92. 1935.
- 'Ruby' (Zeiner, 1946), R; A-326, D-5A; fls. 6½" diam; dark ruby red. Hb. 13:110. 1946.
- 'Ruby Gem' (Ker), R; A-327, D-5; ruby red. Hb. 1:51. 1934.
- 'Ruby Glow' (HDL. 1962), R; A-730, D-5A; U-4fd; 19" h; fls. 6" diam; geranium lake (HCC-20) with ruby red throat. I.—Goed. 1962. PL. 19:67. 1963.
- 'Ruby Supreme', NR. Hb. 9:211. 1942.
- 'Ruth' (Pfis), R; A-328; cl. 'Dr. Masters' x *A. pardina*. Nehr. Amaryll. 1909. Hb. 1:51, 1934.
- 'Ruth' (Chandler), NR. SPN. 13. 1942.

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- 'Safari' (HDL. 1963), R; A-761, D-5B; U-3-4fd; 12" h; fls. 6½" diam; orient red (HCC-819), darker throat. I.—VZ. 1963.
- 'Salisbury' (Brn. 1943), R; A-329; fls. 8" diam; red lines on light background. Hb. 10:94. 1943.
- 'Salmon Beauty' (Heat. 1935), NR; SPN. 13. 1942.
- 'Salmon Beauty' (VW. 1956), R; A-395; U-4fd; 20" h; fls. 8" diam; salmon pink. PL. 14:54. 1958.
- 'Salmonea' (VW), R; A-417; U-4fd; 24" h; fls. 8"-9" diam; delicate light pink. PL. 14:55. 1958.
- 'Salmonette' (W-WS), R; A-509; U-4-6fd; 24" h; fls. 8" diam; clear salmon, darker throat. PL. 15:45. 1959.
- 'Salmon Giant' (VW), R; A-416; 28" h; fls. 8"-10" diam; coppery salmon pink. PL. 14:55. 1958.
- 'Salmon Joy' (Lud. 1948), R; A-330; U-4fd; 22" h; fls. 9" diam; salmon scarlet blending to deep red. PL. 7:72, f. 13:73. 1951.
- 'Salmon Joy' (Lud.), R; A-445, D-5A; U-3-4fd; 30" fls. 8½" diam; mandarin red (HCC-17/1), darker red throat; spr; dec. PL. 14:55. 1958.
- 'Salmon Queen' (Hay. 1935), NR. Hb. 2:92, f. :91. 1935.
- 'Salmon Queen' (Camm.), NR. PL. 10:79. 1954.
- 'Salmon Streak' (Zeiner, 1945), R; A-331, D-4B; fls. 6" diam; salmon

- with white stripe in center of each seg. Hb. 12:104. 1945.
 'Salmon Supreme' (Zeiner, 1945), R; A-332, D-5B; fls. 6½" diam; salmon colored. Hb. 12:104. 1945.
 'Salome' (BM. 1962), NR; azalea pink, salmon pink, and shrimp red, cream bordered.
 'Salvator Rosa', R; A-333. Chitt. 1933. I.—Paul, 1893. Hb. 1:51. 1934.
 'Sappho' (Ker), R; A-334. D-5; carmine red. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
 'Sarah Cole' (T & H, 1938), R; A-335; pink. Hb. 5:91. 1938.
 'Sarong' (BM. 1954), R; A-617, D-5B; U-3fld; 26" h; fls. 9" diam; dutch vermilion (HCC-717). PL. 17:52. 1961.
 'Scarlet Beauty' (W-WS), R; A-510; U-4fld; fls. 9" diam; 24" h; scarlet to medium red, darker throat. PL. 15:45. 1959.
 'Scarlet Gem' (Ker), R; A-336, D-5; pure brilliant scarlet red. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
 'Scarlet Globe' (VW. 1962), R; A-739, D-5A; U-3-4fld; 24" h; fls. 6"-7½" diam; scarlet red (HCC-19/1). PL. 19:67. 1963.
 'Scarlet King' (Chandler), NR; SPN. 13. 1942.
 'Scarlet Leader' (Lud. 1948), R; A-337; U-4fld; 22" h; fls. 7" diam; scarlet, suffused with red, darker throat. Hb. 15:69. 1948.
 'Scarlet Leader' (VW), R; A-418; U-4fld; 28" h; fls. 8"-10" diam; scarlet red, darker red spot in throat. PL. 14:55. 1958.
 'Scarlet O'Hara' (BM. 1958), R; A-618, D-5A; U-4fld; 24" h; fls. 9" diam; scarlet on white base and midribs. PL. 17:52. 1961.
 'Scarlet Pimpernel' (VW), R; A-419; U-4fld; 26" h; fls. 8"-9" diam; pure scarlet self. PL. 14:55. 1958.
 'Scarlet Queen' (Chandler), NR. SPN. 13. 1942.
 'Scarlet Triumph' (W-WS), R; A-511; U-4fld; fls. 10" diam; clear scarlet, nearly light red. PL. 15:45. 1959.
 'Schubert' (BM. 1958), R; A-648, D-5B; U-3fld; 18" h; fls. 9" diam; azalea pink (HCC-618), vermilion, and white midribs. PL. 17:52. 1961.
 'Scotty's White' (Dorr, 1962), R; A-699, D-5A; U-4fld; 18" h; fls. 6" diam; white with greenish tint. PL. 19:66. 1963.
 'Sea Nymph', R; A-338. Chitt. 1933. I.—Paul, 1899. Hb. 1:51. 1934.
 'Selma' (VM), NR; salmon.
 'Seminola' (Hay. 1938), R; A-339; U-3fld; fls. 7"-8" diam; dark red self. Hb. 5:146. 1938.
 'Senator Wallace' (VW. 1958), R; A-420; U-4fld; 24" h; fls. 8" diam; rose, shaded white. PL. 14:55. 1958.
 'Senorita', NR; *a. evansiae* x *A. striata*; pink changing to soft pink as the flower ages, chartreuse star in throat. c. Claude W. Davis. 1962.
 'Sensation' (Cron. 1960), R; A-652, D-5A; U-4fld; 24" h; fls. 10"-11" diam; white, rose madder border. Mead strain pink x 'White Dazzler'. PL. 17:51. 1961.
 'Seraph', R; A-340; lilac red, white, white star and streaks. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
 'Seraphis', R; A-341; lilac red, white stripes. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
 'Serapis II' (Heat. 1934), NR. Hb. 2:90. 1935.
 'Seymour' (Herb.), NR; *A. aulica* x *A. vittata*. Hb. 1:51. 1934.
 'Shakespeare' (Lud.), R; A-456, D-5A; U-4fld; 26" h; fls. 8" diam; dark orient red (HCC-819), dark red throat; spr; dec. c. Ludwig & Co. 1954.
 'Shepherdess' (BM. 1957), R; A-619, D-5B; U-3fld; 16" h; fls. 7" diam; delft rose (HCC-020), carmine rose influence. PL. 17:52. 1961.
 'Show Boat' (BM. 1962), NR; orient red.
 'Show Girl' (Lud.), NR; U-4fld; fls. 8" diam; turkey red (HCC-721), dark blood red (HCC-820) in throat. c. Ludwig & Co. 1954.
 'Siam' (BM. 1962), NR; azalea pink, soft white center.
 'Sibyl Houdyshel' (Houd. 1934), R; A-342; white, narrow pink line on border, flushed and lined pink in throat; fr. Hb. 9:211. 1943.
 'Sight Show' (Lud. 1961), R; A-671, D-5A; U-4fld; 26" h; fls. 8"-9"

- diam; porcelain rose to carmine rose, darker throat. PL. 18:41. 1962.
- 'Signal Hill' (BM. 1954), R; A-620, D-5B; U-3fld; 18" h; fls. 7½" diam; signal red (HCC-719), white central star. PL. 17:52. 1961.
- 'Silver Halo' (Ram. 1959), R; A-546, D-5A; 22" h; fls. 6½" diam; scarlet (HCC-19), white throat, ⅓" silver edge on margins; spr; dec. PL. 16:76. 1960.
- 'Silver Lining' (Lud. 1956), R; A-458, D-5A; U-4-5fld; 28" h; fls. 9"-10" diam; red and white striped, segs white edged, spr; dec. PL. 14:55. 1958.
- 'Silver Queen', R; A-343. Chitt. 1933. I.—Paul, 1892. Hb. 1:51. 1934.
- 'Singapore' (BM), R; A-621; orient red. PL. 17:52. 1961.
- 'Sir Christopher Wren', R; A-344. Chitt. 1933. I.—Holf. 1902. Hb. 1:51. 1934.
- 'Siren' (Lud. 1953), R; A-459, D-5A; U-4fld; 27" h; fls. 8"-9" diam; salmon rose violet shaded, lighter in center of segs. PL. 14:55. 1958.
- 'Sir William', R; A-345. Chitt. 1933. I.—RBG, Kew, 1899. Hb. 1:51. 1934.
- 'Skilwag' (BM, 1956), R; A-622, D-5B; U-3-4fld; 15" h; fls. 8½" diam; deep vermilion (HCC-18). PL. 17:52. 1961.
- 'Smollet', R; A-346; scarlet red, darker in center. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Snowdon' (Fiel.), R; A-347, D-5; white. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Snow King' (Ker), R; A-348, D-5; pure white. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Snow Man' (VW. 1950), R; A-664, D-5; fls. 6" diam; snow white with green throat; fr. PL. 17:53. 1961.
- 'Snow Queen' (Lud. 1948), R; A-349; U-4fld; 18" h; fls. 7½" diam; pure white; e. spr. c. Ludwig & Co. 1954. Hb. 15:69. 1948.
- 'Snowstorm' (VW. 1956), NR; U-2-3fld; 20" h; fls. 7" diam; pure white, green lustre and green throat. PL. 14:54. 1958.
- 'Socrates' R; A-350. Chitt. 1933. I.—Veit. 1898. Hb. 1:51. 1934.
- 'Solina' (VM), NR; salmon orange.
- 'Sonia' (Vas. 1940), R; A-351; red, white keels. Hb. 6:155. 1940.
- 'Sorita' (VM), NR; salmon.
- 'Southey', R; A-352. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Speciosa' (Ker), R; A-353, D-5; edges and tips white, middle deep red. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Spectabile', R; A-354; reginae hybrid. Bak. Amaryll. 1888. Hb. 1:51. 1934.
- 'Spectabilis' (Ker), R; A-355, D-5; red, tips, white. Hb. 1:51. 1934.
- 'Speculum', R; A-356. Chitt. 1933. I.—Veit. 1894. Hb. 1:51. 1934.
- 'Splendidum' (Herb. 1824), R; A-357; **A. vittata** x **A. reginae** Hb. 1:51. 1934.
- 'Spofforthiae' (Herb.), R; A-358; **A. aulica** x 'Carnarvoni'. Hb. 1:51. 1934.
- 'Spot' (Zeiner, 1945), R; A-359, D-5B; fls. 7" diam; pure white, with a few pink spots. Hb. 12:104. 1945.
- 'Spotted Angelina' (Bon. 1909), R; A-360; **A. pardina** hybrid. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Spotted Orfeo' (Bon.), R; A-361. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Spring Butterfly' (BM. 1957), R; A-623, D-5B; U-3fld; 24" h; fls. 7" diam; white, flushed scarlet and picotee edge. PL. 17:52. 1961.
- 'Spring Dream' (Lud. 1959), R; A-542, D-5A; U-4fld; 25" h; fls. 7"-8" diam; delft rose (HCC-o20/1), rosy red glossy throat. PL. 16:76. 1960.
- 'Springsong' (Ram. 1959), R; A-547, D-5A; 22" h; fls. 7½" diam; oriental red (HCC-819), white star in throat; spr. PL. 16:76. 1960.
- 'Square Dance' (Lud. 1962), R; A-704, D-5A; U-4fld; 28" h; fls. 9"-10" diam; picotee novelty, red edge on each white seg, green throat. PL. 19:65. 1963.

- 'St. James' (VM), NR; deep red.
- 'Stained Glass' (BM. 1954), R; A-649, D-5A; U-2fld; 20" h; fls. 8" diam; porcelain rose (HCC-620), with white. PL. 17:52. 1961.
- 'Stansted' (Chal. 1935), NR; fls. 13" diam; pure white. SPN. 13. 1942.
- 'Star Burst' (Muns. 1963), R; A-753, D-7; U-2-3fld; 20" h; fls. 4" diam; azalea pink (HCC-618) and begonia pink (619), pale green throat blending to white 1/3 of segs.
- 'Star of Bethlehem' (W-WS), R; A-512; 24" h; fls. 3 1/2" diam; salmon pink, white towards margins forming a star. PL. 15:45. 1959.
- 'Star of India', R; A-362; dark red, broad white bands. Hb. 1:51. 1934.
- 'Stella' (Dug. 1957), R; A-403, D-7; 22" h; fls. 7" diam; geranium lake (HCC-20), darker in throat. PL. 14:54. 1958.
- 'Stratford' (BM. 1962), NR; light and dark azalea, changing to porcelain rose.
- 'Strawberry Glow' (Hay. 1935), NR; Hb. 2:92. 1935.
- 'Streaking Stripes' (Lud. 1962), R; A-705, D-5A; U-4fld; 28" h; fls. 8"-9" diam; pure white with mandarin red stripes, greenish throat. PL. 19:65. 1963.
- 'Striped Beauty' (W-WS), R; A-513; U-3-4fld; 20" h; fls. 6" diam; white, orange scarlet bands. PL. 15:45. 1959.
- 'Striped Superiora' (VM), NR; descr. lacking.
- 'Summer Rose' (Zeiner, 1944), R; A-363; fls. 8" diam; rose with white stripe. Hb. 11:266. 1944.
- 'Sunburst' (HDL. 1963), R; A-769, D-5B; U-4fld; 10" h; fls. 6 1/2" diam; white, carmine red stripes, less color in lower segs, greenish-white throat. I.—Goed. 1963.
- 'Sunrise' (Whe. 1940), R; A-364; light red, darker to throat. Hb. 7:130. 1940.
- 'Sunset' (Heat. 1934), NR; Hb. 2:90. 1935.
- 'Sunset' (Zeiner, 1945), R; A-365, D-4B; orange, white midrib. Hb. 12:104. 1945.
- 'Superba' (VM), NR; bordeaux red.
- 'Susan Hough' (Whe. 1940), R; A-366, D-4A; old rose, 4-I-2, lighter on outside and center of segs, darker in center of flower. Hb. 7:130. 1940.
- 'Susie Pink' (Gasp. 1958), R; A-398, D-5A; 28" h; fls. 7 1/2" diam; rose madder (HCC-23), light greenish throat; fr.; spr. PL. 14:54. 1958.
- 'Swahili' (HDL. 1963), R; A-762, D-5A; U-4fld; 16" h; fls. 7" diam; dutch vermilion (HCC-717), slightly darker throat. I.—VZ. 1963.
- 'Sweetii' (Sweet), NR; *A. reticulata* x *A. johnsonii*. Herb. Amaryll. 1837. Hb. 1:51. 1934.
- 'Sweet Seventeen' (W-WS), R; A-514; U-4fld; 20" h; fls. 9" diam; salmon rose on white, flesh pink in throat. PL. 15:45. 1959.
- 'Sylvannus', R; A-367. Chitt. 1933. I.—Veit. 1902. Hb. 1:51. 1934.
- 'Sylvia' (Veit), R; A-368; *A. reticulata* x *A. leopoldii*; autm. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Symphony' (Lud. 1960), R; A-557, D-5A; U-4fld; 26" h; fls. 8 1/2" diam; delft rose (HCC-o20), darker throat. PL. 17:53. 1961.
- 'Syren', R; A-369; clear rose. Nehr. Amaryll. 1909. I.—Veit. 1893. Hb. 1:51. 1934.

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- 'Tacola', R; A-370. Chitt. 1933. I.—Veit. 1898. Hb. 1:51. 1934.
- 'Talisman Cove' (Fitch), R; A-672, D-5A; U-4-5fld; 27" h; 7"-8" diam; rose madder (HCC-23/1) to rose bengal (HCC-25/1) in throat. PL. 18:42. 1962.
- 'Tangerine' (HDL. 1962), R; A-731, D-5A; U-4fld; fls. 6" diam; bright and clear delft rose (HCC-o20). I.—Goed. 1962. PL. 19:67. 1963.
- 'Tartan' (Camm.), NR. PL. 10:79. 1954.

- 'Telemus', R; A-371; white, veined lilac red. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Television' (W-WS. 1962), R; A-691, D-5A; U-4-5fid; 20" h; fls. 6½" diam; french rose (HCC-520) blended with white, porcelain rose in upper segs. PL. 19:65. 1963.
- 'Telstar' (VW. 1962), R; A-740, D-5A; U-3-4fid; 12" h; fls. 7" diam; solferina purple (HCC-26). PL. 19:67. 1963.
- 'Terra Cotto' (HDL. 1962), R; A-732, D-5A; U-4fid; fls. 6" diam; bright vermilion (HCC-18). I.—Goed. 1962. PL. 19:67. 1963.
- 'Tettaui', NR; form of *A. aulica robusta*. Hb. 1:51. 1934.
- 'Thaba Nchu' (BM. 1958), R; A-624, D-5B; U-3fid; 20" h; fls. 8½" diam; blood red (HCC-820). PL. 17:52. 1961.
- 'Thalia' (VM. 1962), R; A-746, D-5A; U-3-4fid; 12" h; fls. 7½" diam; azalea pink (HCC-618/1) on white base and border, greenish throat. PL. 19:67. 1963.
- 'The Bride', R; A-372. Chitt. 1933. I.—Holf. 1926. Hb. 1:51. 1934.
- 'The Champion', R; A-373. Chitt. 1933. I.—Veit. 1890. Hb. 1:51. 1934.
- 'The Czar', R; A-374. Chitt. 1933. I.—Holf. 1897. Hb. 1:51. 1934.
- 'The Fortress' (BM. 1958), R; A-625, D-5B; U-2fid; 14" h; fls. 9" diam; brick red (HCC-016), short white midribs. PL. 17:52. 1961.
- 'The Hon. W. F. D. Smith', R; A-375. Chitt. 1933. I.—Hamb. 1893. Hb. 1:51. 1934.
- 'Theodore L. Mead' (Heat. 1934). Hb. 2:90. 1935.
- 'The Pirate' (BM. 1954), R; A-650, D-5B; U-4fid; 20" h; fls. 8" diam; blood red with white star and white flushing. PL. 17:52. 1961.
- 'The Queen' (W-WS), NR; cerise.
- 'The Rebel' (BM. 1955), R; A-626, D-5B; U-4fid; 26" h; fls. 8" diam; scarlet, flushed white. PL. 17:52. 1961.
- 'The Schooner' (BM. 1958), R; A-627, D-5B; U-2fid; 16" h; fls. 9" diam; azalea pink (HCC-618), flushed creamy white. PL. 17:52. 1961.
- 'The Vigil', R; A-376; white striped red. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Thornkill' (Whe. 1940), R; A-377, D-5A; medium dark red, darker throat. Hb. 7:131. 1940.
- 'Thriller' (Lud.), NR; orient red.
- 'Thunberg' R; A-378; Chitt. 1933; I.—Veit. 1897. Hb. 1:51. 1934.
- 'Time Signal' (BM. 1958), R; A-628, D-5B; U-3fid; 18" h; fls. 8" diam; signal red (HCC-719). PL. 17:52. 1961.
- 'Timmy' (Cal. 1958), R; A-404, D-5B; 26" h; fls. 5½" diam; cherry red (HCC-722) seg margins whitish, faint white mid-stripe; fr. PL. 14:55. 1958.
- 'Tippy' (Zeiner, 1946), R; A-379, D-4B; fls. 4½" diam; white with salmon stripes. Hb. 13:110. 1946.
- 'Titan', R; A-380. Chitt. 1933. I.—Veit. 1900. Hb. 1:51. 1934.
- 'Topaz', R; A-381; orange red, border and striped white. Nehr. Amaryll. 1909. Hb. 1:51. 1934.
- 'Topscore' (W-C, 1962), R; A-727, D-5A; U-4fid; 15" h; fls. 7½" diam; signal red (HCC-719/1), glossy blood red throat; spr. PL. 19:67. 1963.
- 'Traffic Stop' (Lud. 1958), R; A-468, D-5A; U-4fid; 25" h; fls. 8½" diam; capsicum red (HCC-715), slightly darker throat; spr; dec. PL. 15:44. 1959.
- 'Triple Treat' (Zeiner, 1944), R; A-382; fls. 6" diam; scarlet to rose, white midrib. Hb. 11:266. 1944.
- 'Tristan' (VM. 1955), R; A-532; 24" h; fls. 8" diam, dark purple red. PL. 15:47. 1959.
- 'Trixie' (Lud. 1962), R; A-706, D-5A; U-4fid; 24" h; fls. 8"-9" diam; cherry red (HCC-722/2) to tyrian rose (24/1/2), darker throat. PL. 19:65. 1963.

'Tropical Sunset' (Ram. 1959), R; A-548, D-5A; 26" h; fls. 7" diam; signal red (HCC-719), white throat and red spots; spr; dec. PL. 16:76. 1960.

'Tzaneen' (BM. 1958), R; A-629, D-5B; U-4fld; 16" h; fls. 7½" diam; mandarin red (HCC-17), white on midribs. PL. 17:52. 1961.

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'United Nations' (Lud. 1963), R; A-759, D-5B; U-4fld; 28" h; fls. 9" diam; vermilion stripes on pure white petals.

—V—

'Vandyke', R; A-383. Chitt. 1933. I.—Veit. 1891. Hb. 1:51. 1934.

'Venus', NR. Hb. 1:63. 1934.

'Verona' (VM. 1961), R; A-752, D-5A; U-2fld; 12" h; fls. 6½" diam; carmine red (HCC-21/1), light green throat, white midribs halfway up segs.

'Vesta', NR. Hb. 1:63. 1934.

'Violetta' (W-WS), R; A-515; U-4fld; 22" h; fls. 8" diam; medium to dark rose, light rose throat and midribs. PL. 15:45. 1959.

'Virginia' (Heat. 1934), NR; Hb. 2:90. 1935.

'Virgin Queen', NR. Hb. 1:63. 1934.

'Viscountess Hambledon', R; A-384. Chitt. 1933. I.—Smith, 1896. Hb. 1:51. 1934.

'Vittata Harrisoniana', NR. Chitt. 1933. I.—Bull, 1894. Hb. 1:51. 1934.

'Volendam' (VM. 1956), R; A-533; 22" h; fls. 7" diam; white, edged rose pink. PL. 15:47. 1959.

'Voodoo' (Lud. 1960), R; A-561, D-8; U-4-6fld; 16" h; fls. 3"-3½" diam; scarlet, star shape white striped, light green throat. PL. 17:54. 1961.

'Vulcan', R; A-385. Chitt. 1933. I.—Holf. 1907. Hb. 1:51. 1934.

—W—

'War' (Chandler), NR. SPN. 13. 1942.

'War' (Heat. 1934), NR; U-2-3fld; fls. 6" diam; dark red, heavily veined. 1. hom: 'Mephisto'. Hb. 2:90. 1935.

'Watermelon' (Zeiner, 1945), NR; D-5A; fls. 9" diam; rose-red self. Hb. 12:104. 1945.

'White Abundance' (VW), R; A-397; U-4fld; 26" h; fls. 8" diam; pure white, throat slightly greenish turning to pure white. PL. 15:46. 1959.

'White Beauty' (Heat. 1935), NR. SPN. 13. 1942.

'White Belle' (BM. 1954), R; A-630, D-5B; U-3-4fld; 16" h; fls. 7½" diam; creamy white, broken lines and pinpricks of currant red on upper segs. PL. 17:52. 1961.

'White Christmas' (VM. 1956), R; A-534; 24" h; fls. 8" diam; completely pure white. PL. 15:47. 1959.

'White Crane,' R; A-681, D-5B; U-4fld; 20" h; fls. 7"-9" diam; pure white, light green throat. I.—Goed. 1961. PL. 18:43. 1962.

'White Favorite' (Lud. 1960), R; A-558, D-5A; U-4fld; 26" h; fls. 8" diam; pure white, greenish throat. PL. 17:53. 1961.

'White Giant' (Lud.), R; A-460, D-5A; U-3-4fld; 24" h; fls. 9" diam; white, of heavy substance, greenish throat; spr; dec. c. Lud. & Co. 1954.

'White Orchid' (Brn. 1934), R; A-386; fls. 8½" diam; pure white, whitish green throat. Hb. 10:94. 1943.

'White Star' (Zeiner), NR; rose white stripe. Hb. 11:256. 1944.

'Willem Coetzer' (BM. 1960), R; A-651, D-5B; U-2fld; 12" h; fls. 9" diam; chartreuse green flushed brick red. PL. 17:52. 1961.

'Will Rogers' (Traub, 1934), NR; Hb. 2:92. 1935.

'Wings of Snow' (Camm.), NR. PL. 10:79. 1954.

'Winks' (BM. 1957), R; A-631, D-5B; U-3ffd; 14" h; fs. 7½" diam; begonia (HCC-619), vermilion and white. PL. 17:52. 1961.

'Winner' (Beck. 1960), R; A-667, D-5A; U-4ffd; 20" h; fs. 7" diam; orient red (HCC-819), greenish mid-stripe. PL. 18:42. 1962.

'Winter Carnival' (Lud. 1962), R; A-707, D-5A; U-4ffd; 27" h; fs. 9"-10" diam; pure white with slight greenish-yellow throat. PL. 19:65. 1963.

'Winter Joy' (Lud. 1956), R; A-461; U-4ffd; 23" h; fs. 8"-9" diam; vermilion red with dark red throat. PL. 14:55. 1958.

'Wisley' (BM. 1958), R; A-632, D-5B; U-4ffd; 16" h; fs. 9" diam; azalea pink with poppy red and white on midribs. PL. 17:52. 1961.

'W. N. Campbell' (Rice, 1943), R; A-387; red and white striped. Hb. 10:149. 1943.

'Wyndham Hayward' (Traub, 1934), NR. Hb. 2:92. 1935.

'Wyndham Hayward' (Lud. 1953), R; A-462, D-5A; U-4ffd; 30" h; fs. 9" diam; dark oriental red (HCC-819) with dark blood red throat. PL. 14:55. 1958.

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'Zanzibar' (HDL. 1963), R; A-763, D-5A; U-4-5ffd; 18" h; fs. 6" diam; delft rose (HCC-o20), greenish-white midrib halfway up segs. I.—VZ. 1963.

'Zebediela' (BM. 1962), NR; bright signal red.

'Zenith' (VM. 1956), R; A-535; 24" h; fs. 8" diam; 3 upper segs rose on white, 3 lower segs white. PL. 15:47. 1959.

'Zephyr', R; A-388. Chitt. 1933. I.—Veit. 1900. Hb. 1:51. 1934.

'Zulu' (Rice, 1943), R; A-389, nearly black. Hb. 10:149. 1943.

'Zulu' (HDL. 1963), R; A-764, D-5B; U-4ffd; 14" h; fs. 7½"-8" diam; mandarin red (HCC-17), darkens slightly in throat, heavily veined. I.—VZ. 1963.