PLANT LIFE, VOL. 10, NO. 1, JANUARY, 1954

HERBERTIA

1954

H.P.T.

THE AMERICAN PLANT LIFE SOCIETY

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

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MRS. LYDIA BARNETT, *Membership Secretary*
The American Plant Life Society
3162 Haven Park, El Monte, California

PLANT LIFE, VOL. 10, NO. 1, JANUARY, 1954

HERBERTIA

1954

Year Book of
The American Amaryllis Society

SECOND AMARYLLIS EDITION

EDITED BY
HAMILTON P. TRAUB
HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY
3162 Haven Park, El Monte, California

THE AMERICAN PLANT LIFE SOCIETY

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

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Correspondence about affiliated membership of regional and local societies in the Society should be addressed to: **Mrs. Lydia Barnett, Membership-Secretary, 3162 Haven Park, El Monte, Calif.**

I. THE AMERICAN AMARYLLIS SOCIETY

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[THE AMERICAN AMARYLLIS SOCIETY—continued on page 133.]

PREFACE

This second Hybrid Amaryllis edition of HERBERTIA, the 20th issue, is appropriately dedicated to Thomas R. Manley, who received the 1954 HERBERT MEDAL for his outstanding contributions in the field of evaluating vegetatively propagated Amaryllis clones, and methods of forcing them into bloom for show purposes. Besides the charming autobiography, Mr. Manley contributes three valuable articles in his special field—the evaluation of Amaryllis clones, problems in evaluating and merchandizing Amaryllis, and the forcing of Amaryllis for exhibition purposes.

As usual, there is a wealth of amaryllis lore in this 20th Anniversary edition.

There is a revision of the Divisions of cultivated Amaryllis; and an article on the personal evaluation of hybrid Amaryllis by Dr. Thornburgh. There are articles on the McCulloch hybrid Amaryllis by Mrs. Strout and Mrs. Anderson; the growing of Amaryllis by Mr. Spies (Illinois), Mrs. Morton (Louisiana), and Mrs. Evans (Louisiana); the Cammack and Sangster hybrid Amaryllis by Mr. Hayward; the use of spaghnum in Amaryllis culture and troubles of an Amaryllis importer by Mr. Hayward; Amaryllis in flower arrangements by Dr. Corliss; experiences in propagating Amaryllis by Mr. Weisner; Amaryllis pests and their control by Dr. Smith; and the Broad Mite of Amaryllis by Mr. Burlingham.

The other amaryllids are not neglected in this issue. There are reports on the 1954 New Orleans and Mobile Amaryllis shows, and the 14th Central Florida Daylily show. There are articles on a new *Crinum* species from South Africa; Texas Alliums, and collecting *Zephyranthes* in Mexico by Lt. Howard; daylily evaluation by Prof. Saxton; daylily inheritance data by Prof. Ballard; early blooming Narcissus by Dr. Cooley; and Crinum moorei forms by L. S. Hannibal. Other contributions include Amaryllid notes by H. P. Traub; Amaryllid genera and species by Dr. Moldenke; and registration of New Amaryllid clones.

Miss Pauline Buck, who had served as Membership-Secretary since January 1, 1953, was married to Mr. Charles J. Turner, Route 1, Box 24, Fort Bragg, Calif., in March 1954, and therefore she tendered her resignation on March 24, 1954, in order to devote her time to the vocation of home-making. We are certain that we speak for the membership in thanking Mrs. Turner for her efficient service in the interests of the Society during her term in office, and in extending all good wishes for her happiness in her new role as home-maker.

Mrs. Lydia Barnett, 3162 Haven Park, El Monte, Calif., an enthusiastic gardener, interested in amaryllids and other plants, accepted the position of Membership-Secretary on March 24, 1954.

The 1955 issue of Herbertia will be dedicated to Dr. Robert F. Hoover, of San Luis Obispo, Calif., who cleared up the naming of the BRODIAEA LILIES—*Brodiaea, Dichelostemma, Triteleia* and *Triteleiopsis.*

In the past, the naming of these beautiful plants had been confused so that different names for the same species were often used. Dr. Hoover's work has remedied this condition. As is customary, articles on Amaryllis and other amaryllids are needed for this issue, and should be sent in to the editor as soon as ready—by September 1, 1954 if possible—in order to insure early publication.

1531 Rodeo Road.
Arcadia, California
March 29, 1954

Hamilton P. Traub
Harold N. Moldenke

[PLANT LIFE LIBRARY, continued from page 132.]

MITOSIS—THE MOVEMENT OF CHROMOSOMES IN CELL DIVISION, by Franz Schrader. 2nd ed., Columbia Univ. Press, 2960 Broadway, New York 27, N. Y. pp. 170. Illus. $4.00.

The marked increase in the number of publications dealing with mitosis since 1944, has necessitated the publication of this second edition. The treatise deals with "karyokinesis or mitosis in the old (and correct) sense—a division of the nucleus that involves the spindle apparatus. As such it includes meiotic mitosis but not cytokinesis". The book is divided into five sections—(1) Introduction, (2) Structure—living cells, fixed cells, the actuality of structural elements in the spindle, and the nature and origin of the spindle apparatus, (3) Hypotheses of mitosis, (4) Related problems—resting stage, pairing, telomere, heteropycnotic attraction, kinetochore attraction, the nuclear membrane, and the pre-metaphase stretch, and (5) Conclusion.

This concisely and clearly written book is of interest to the biologist, cytologist, embryologist, geneticist or physiologist, and is an indispensable addition to his library.

GROWTH AND DIFFERENTIATION IN PLANTS, edited by W. E. Loomis. Iowa State College Press, Ames, Ia. 1953. Pp. 458. Illus. $7.50.

In this monograph of the American Society of Plant Physiologists, the authors and topics "have been chosen to give a rounded and thorough coverage of . . . a complex field"—Growth and Differentiation in Plants. The contributions include the Introduction by W. E. Loomis, Plant morphogenesis, by E. W. Sinnott, Growth of the root-tip by G. B. de la Pena, Elongation of the cotton fiber, by J. C. O'Kelley and P. W. Carr, Anatomical differentiation in shoot and root axes, by Katherine Esau, Some elementary mathematics of plant growth, by R. E. Buchanan, Heterosis, by G. F. Sprague, Dormancy, by N. C. Thornton, Reactions of plants to photoperiod, by A. W. Naylor, Vernalization of growing plants,

[PLANT LIFE LIBRARY, continued on page 17.]

Dedicated to

Thomas R. Manley, M. S.

Herbert Medalist—Thomas R. Manley, *M. S.*

Plate 1

THOMAS ROY MANLEY, M. S.

An autobiography

One often ponders as to why he has chosen a certain profession when the range of selection is so very wide and the rewards vary from a meager livelihood to one of great sums. For me it seems that I was predestined to be an horticulturalist for my entire life has been associated with plant growing and the companionship of those whose interests were similar to mine.

My mother, a flower loving farm girl of Dutch and Amerindian ancestry was raised on the fertile plains of the Susquehanna Valley in Pennsylvania. My father, a civil engineer, was raised on a farm in the rolling hills of West Virginia. Only when his college days were over did he move to the industrial areas surrounding Pittsburgh, Pennsylvania where I was born on June 15, 1918 in McKeesport, Pennsylvania. Tragically, my father died when I was seven. Mother, sister and I then moved to Fairmont, West Virginia where as a youth I possessed great desire to study plants and endeavored to grow them to perfection in a small back-yard garden. My grandfather was the head gardener on the estate of Col. Kimble White, one of the great coal producers of West Virginia. It was on the White estate, under his keen eye and typical English methods of horticulture, that I learned the fundamentals of growing and caring for plants. Mrs. White's garden was the envy of the city and the pride of my grandfather's life in his late years. Well do I remember his growing the first delphiniums—Blackmore and Langdon strains—in the city, with spikes six and seven feet tall. Well, too, do I remember the hours spent freeing the lawn of dandelions, raking leaves and spading in manure and bonemeal while a most interesting football game was in progress a block away.

When high school days crowded away my hours of leisure, spent working in the garden, I studied with great enthusiasm biology and chemistry, winning the award given annually to the best student in biology. The summers were spent caring for lawns and flower gardens in the neighborhood. Our home garden—the best in the community—was always the center of attraction as each crop of flowers bloomed. In 1937, a very good friend and neighbor whose garden I cared for, Dr. Paul Musgrave, world authority on the Coleoptera Family of Insects, moved from our town leaving me his famous iris collection which included 'San Francisco,' 'Purissima,' 'Ramases,' 'Mary Geddes' and numerous other fine iris of that time. These were moved to the Manley garden and my first attempts in hybridization were made. Many thousands of seedlings have resulted from these and later crosses. Many were outstanding but were lost during my four years in the military service during the war.

My first attempts at exhibition were in 1938 when I displayed stalks of iris in the local flower show then dominated by the wife of a leading politician in our State. How well do I remember the indignation of the

ladies when a college freshman exhibited iris that were far superior to those of the ladies of the "fourth estate" so to speak. Judging, as it so often happens in small shows, was based on personalities who entered the varieties rather than on the variety itself so I lost to 'Lord of June', the perennial favorite of the before mentioned lady. It taught me a great lesson, one I have never forgotten as I have studied and worked for the fair evaluation of ornamentals ever since.

The year 1937 was perhaps the most crucial one in my life for during that year I made certain decisions that have affected my entire life. As a freshman working my way through college, I had to decide on a career. My mother had hoped I would become a surgeon or physician, others a geologist while within me I felt a college teaching career as a botanist would fulfill my ambition.

It was my good fortune to be assigned to work for Professor C. M. Roberts as a biology laboratory assistant, which as a freshman amounted to cleaning up after classes and collecting plant material for classes. This I enjoyed immensely and through it I became acquainted with "Prof." Roberts who, aside from his teaching of biology and botany, collected mosses as a hobby. I accompanied him on many field trips and he became my very good friend. It was at his suggestion that I chose a flower to grow as a hobby and thus I became a gladiolus hobbiest. His interest in me and all his botany majors made "Prof." Roberts one whom one could rely on for advice and knowledge. His easy going mannerisms and unselfish loyalty to his pupils has made him a friend to whom I go quite often for advice.

My first gladiolus were purchased from Mr. Elmer Gove, Champlain View Gardens, Burlington, Vermont in 1938. This is the firm of which I am now a partner and production manager. These gladiolus grew so well that I rapidly became a fancier and exhibitor. In order to have a gladiolus show near home a few other gladiolus fanciers and I formed the West Virginia Gladiolus Society in the fall of 1938. This organization held its first show in Grafton, West Virginia in August 2-3, 1939. This show has grown from one in a small store-room to one of the nation's highest quality shows. The leading exhibitors of Ohio, Pennsylvania, Maryland, Virginia, Kentucky and New York annually display their spikes in the huge Pine Room at Oglebay Park, Wheeling, West Virginia. As secretary, 1938-1941, and President, 1945-1949, with a wonderful team of cooperative growers, we have endeavored to make the West Virginia Gladiolus Society one of the nation's finest. Its shows, trial gardens, 1939 to 1942 and 1946 to 1949, and the active participation of its members in the gladiolus council and other neighboring state society activities attest to the success of this organization.

My first experience with testing plants came in 1938 when I assisted Dean Oliver Shurtleff, noted dahlia authority, with the American Dahlia Society Test Garden in Fairmont. The following year, 1939, the West Virginia Gladiolus Trial Garden was established under my supervision. This test garden was in operation until 1942. It was disbanded during the war but was re-established in 1946. As secretary of the West Virginia Gladiolus Society I soon became a member of several commit-

tees of the New England Gladiolus Society, especially the trial garden and classification committees. I participated in the Hartford and Poughkeepsie conferences on gladiolus classification and championed the size-color classification now used for gladiolus.

As a graduate student at West Virginia University I worked extensively on the various materials and methods of breaking the dormancy of gladiolus corms and cormels, colchicne treatment of gladiolus cormels, developed much of the research on the use of lysol as a pre-planting dip, and soil reaction studies on gladiolus corm production. Many articles were published from this work in leading horticultural magazines. My thesis for the Master of Science (M. S.) in Genetics was on the Origin of the "Tangerine Beard" in Iris, a most interesting study of the breeding trends in the development of a pink iris.

Early in 1942, the war interrupted any further graduate work. The next four years were spent in the air force where I worked on conservation control on a large proving ground in southern Indiana. I persuaded the enlisted men on the post to grow a large garden and several acres of potatoes to supplement the mess fund.

For several seasons we were quite successful raising several thousand dollars worth of produce each year. One year our potato crop was the record for the county. For this activity I was awarded two commendations by the Commanding General of the Proving Ground Command. I further served as a Horticultural Specialist on claims of damage by farmers whose crops were damaged by falling planes or other army activities.

With evenings of leisure I became associated with three men who wanted to form a gladiolus organization for growers and amateurs of the United States and Canada. I agreed to be the temporary secretary and contact interested parties in behalf of the organization. There appeared a great need for such an organization as there were many gladiolus societies working as individuals who were endeavoring to solve problems that affected the entire gladiolus industry. The New England Gladiolus Society was endeavoring to solve these problems. However, much dissension existed and prejudiced persons prevailed and progress was stopped temporarily.

Well do I remember the evenings spent writing letters long-hand to hundreds of interested persons requesting ideas and formulating plans. I spent a great deal of time drawing up a constitution which I hoped would weld the societies together for the benefit of a great industry. Fortunately many of these ideas worked and when a meeting was called on January 17, 1944 in Detroit, Michigan there emerged from it the North American Gladiolus Council with 18 affiliated societies. Today over 63 societies are working with this organization which directs the gladiolus activities of the nation. Its achievement Award, a beautiful bronze plaque, presented each year to the outstanding gladiolus personality has been given to many deserving, tireless workers of the gladiolus industry. A dream of mine come true. As first Secretary of the Council, 1944 to 1947, I aided its beginning and have continually

worked for its betterment. Upon retiring from office to complete my graduate work in 1948, I was awarded the first Gold Medal of the N. A. G. C. for distinguished service to the organization.

In the summer of 1945 I was transferred by the Army Air Force to California where I worked in the food distribution department of a large army base. This enabled me to procure many kinds of fruits and vegetables purchased by the base. I also had many opportunities to visit the vineyards, orchards and fields where these food products were grown. Fascinated by the lush semi-tropical growth, I spent many weekends visiting leading horticulturalists of the West coast. Carl Salbach, Sydney Mitchell, Frank Reinelt and many others provided me with an abundance of information. Visits to the Redwood and Sequoia forests were equally inspiring as were visits to the canneries and packing houses of figs, dates, raisins and other dried fruits. Until my discharge in December 1945 my army life provided me an education in horticulture because I took advantage of every opportunity to study the cultivated plants of that particular region.

My college sweetheart, a farm girl, majoring in Home Economics, Evelyn Snoderly and I were married in 1943 in Indiana. Her great love for plants and outdoors has been a great aid in my horticultural progress. Our two children are growing up amid the myriad of objects a plantsman must have. Long walks with their mother have familiarized them with many animals, birds and plants in the fields and forests. Helping her father in the garden has enabled the five year old daughter, Natalie Anne, to hybridize iris, lilies, gladiolus, and to emasculate and pollinate amaryllis in the greenhouse or window garden. Full explanations are made by this little lass to any inquiring new-comer not familiar with plant breeding. My son, Carl Lance, at the age of four was observed instructing a new gladiolus amateur visiting our garden at planting time in the procedure necessary to remove the husk and de-eye gladiolus corms; and reminding the fellow to wash his hands as soon as he finished as there was DDT on the corms for thrips control and that it made one ill to get it in one's system. Like plants their mother has carefully nurtured them with the abundance of beauty and wisdom of the outdoors. Surely one of these children will follow his father's footsteps.

Spring 1947 found the Manley's living in Oglebay Park, Wheeling, West Virginia where I was floriculturist of the Wheeling Park Commission and Director of the Wheeling Garden Center. Many noteworthy activities transpired in Wheeling to enhance my horticultural career. The Garden Center developed a garden for testing hundreds of new varieties of flowering annuals, bulbs and corms. The task became so great I asked Professor R. F. Marsh, Head of the Dept. of Horticulture, West Virginia University, if there were not some students in his classes interested in ornamentals. As a graduate of the University I knew no classes were offered in floriculture or ornamental horticulture. However, the thought occurred to me there might be students there whose interests were similar to mine and fortunately there were,—eight of them. These students were enrolled in a sum-

mer ornamentals course outlined by Dr. Marsh and myself and classes were held at Oglebay Park. Thus, the test garden was carefully nurtured and records taken. The greenhouses were also used for class work and an annual chrysanthemum show was revived with over 3,000 8-inch pots of giant chrysanthemums on display the first season. The following season another group of students came to Oglebay Park and from this small beginning a new department was established at the University. At present it has two fine young horticulturists, one on woody ornamentals and the other on greenhouse crops to instruct the growing classes in floriculture. Its nationally known lily research work in conjunction with the United States Department of Agriculture forms a vital part of the research now being conducted by that Department.

In the Fall of 1947 we formed the Men's Garden Club of Wheeling. I was the first Secretary and Program Chairman. This group soon had over seventy members with monthly meetings and an annual flower and garden show. Members of this organization have taken an active part in the regional and national activities of the Men's Garden Club of America.

The Garden Center continued to grow in membership and in the scope of its activities. Most of all the test garden grew in size, variety of plants evaluated, and scope, bringing many leading hybridists to view the plantings and study the material there. This further emphasized the need for a series of national trial gardens.

In 1949 I received a scholarship from the Ohio Florists Association to work on my Ph.D. in Floriculture under world renowned Prof. Alex Lauire at Ohio State University. Reluctantly we moved from beautiful Oglebay Park with its acres of rolling hills covered with over 100 varieties of trees to an army type housing project on the fringe of the campus in Columbus, Ohio.

My research was a nutritional study of gladiolus and amaryllis which progressed well during the winter. However, I was continually being offered very promising positions in the horticultural field. Three of the leading garden magazines offered me garden editorships and a large national seed company offered me the position of head of its bulb department. These dazzling plums were quite tempting, making my thoughts wander from research but not quite enough to abandon it. However, that day did soon arrive when Arnold Davis, one of America's leading horticulturists offered me a position as head of the Dutch Elm Disease Program in Cleveland under the sponsorship of the Garden Center of Greater Cleveland. To work with Arnold Davis was something I had never dreamed of. A chance to do something greater than all my research would ever bring was in the offing. So, early in April we moved to Cleveland and I waded into the program of educating the people of Cleveland in methods of combating the dreaded Dutch Elm disease.

Working with Arnold Davis, a man who does a dozen things well at once, I soon acquired that habit and together with the support of the Garden Center and the Biology Department of Western Reserve

University we developed a series of activities operating under the title of the Valleevue Trial Gardens.

Valleevue, a 300 acre farm substantially endowed and bequeathed to the University by a wealthy benefactor was ideally situated to planting of large acres in horticultural crops. Twelve years of inactivity at the farm was soon ended by the varied plantings of iris, gladiolus, hemerocallis, liliums, roses, delphiniums, chrysanthemums, dahlias, tulips and many other types of flowers. Over 2100 different varieties of these plants were grown and evaluated each season. Material was submitted for trial from Europe, Australia, New Zealand, Canada, South Africa and the United States.

From its very beginning the garden displayed the importance of such a project in the United States. Aside from the beauty and display value of the planting for garden lovers in Cleveland and the surrounding areas it became the center of research on garden flowers. Mr. Davis and I organized many interested groups which became small plant societies such as the hemerocallis and iris growers in Cleveland, local flower societies took an active participation in the project caring for the various gardens and supplying judges for evaluation of the many varieties. The Cleveland and Forest City Rose Societies, Ohio State Gladiolus Society, the Ohio Dahlia Society are typical. National plant societies as The Hemerocallis Society, North American Gladiolus Council, The North American Lily Society and others designated these plantings as regional trial gardens.

My great desire for the adoption of uniform standards of show judging and field evaluation caused me to form an annual judging school of the Ohio State Gladiolus Society followed by the Ohio Dahlia Society with its judging school.

Research has always fascinated me and with the wealth of material at hand I carried out many experiments, namely, a three year mulching experiment, using many organic materials, plant nutrition work on foliar fertilization, temperature studies of mulches and cultured techniques for forcing amaryllis and gladiolus. Numerous flower shows were held in conjunction with the trial gardens. The Garden Center also served as the meeting place for small national plant societies. In 1950 The Hemerocallis Society, 1951 The American Peony Society, 1952 The North American Lily Society and in 1953 The North American Gladiolus Council held meetings in Cleveland.

Trial gardens are exhaustive to a staff regardless of of size. Many periods of bloom would bring up to 5000 persons to view the plantings. To say the trial garden became a mecca for garden clubs is putting it mildly. The trial garden each year grew in size and scope of activities with the Garden Center of Cleveland placing all possible funds to its disposal. However, it became too big for the University to handle its portion of the activities and due to pressure exerted by certain staff members the project was doomed to abandonment.

The trial garden had brought me in contact with many persons who offered me positions of many kinds, however, my great love of gladiolus and the world-wide prestige of Champlain View Gardens

caused me to leave Cleveland and the project Mr. Davis and I cherished so much came to an end.

In the Fall of 1951 I was awarded the Silver Medal of the Men's Garden Club of America for Distinguished Service in Horticulture and the Fostering of Better Methods of Plant Evaluation. At that particular time my trial garden activities had caused me to hold the following offices in plant societies. President of the Ohio State Gladiolus Society, Vice President of the North American Lily Society, Regional Director of the Hemerocallis Society, Chairman of Trial Gardens of the North American Gladiolus Council, Accredited Judge of the American Iris Society and The Hemerocallis Society, Vice President of Chagrin Falls Men's Garden Club, and Chief Tester of the Men's Garden Club of Cleveland.

Moving to Burlington, Vermont to assume the responsibility of caring for 100 acres of Gladiolus corms, plus the flowers that are cut by the 1000 dozens during August and September is a great challenge—one I enjoy. Time can be found to grow several acres of seedlings each season resulting from hundreds of crosses. The opportunity to display gladiolus grown to perfection throughout the eastern portion of the United States increases the delights of my new occupation. In the greenhouse are my priceless amaryllis bulbs. Each season additional varieties are added for evaluation from the best growers in Holland, Australia and America.

In the fall of 1952 my second gladiolus honorary award was received—the Gold Medal of the New England Gladiolus Society, for many contributions to the betterment of the gladiolus, research, trial gardens, cultural techniques and contributions to the literature on gladiolus.

At this time we are forming a new gladiolus society in Vermont with many interested persons enrolling to make the Vermont organization a most active one.

Amaryllids usurp Gladiolus

One, no doubt, wonders why an organization as The American Amaryllis Society, which is affiliated with The Plant Life Society would bestow its coveted William Herbert Medal on a man who had worked on gladiolus for most of his life. But I must confess that although I have worked long with gladiolus and still do, this does not mean that I am less interested in Amaryllis.

I always have an excellent collection of narcissus in the garden and *Amaryllis* x *johnsonii* as a pot plant in my room. I likewise was a student and friend of Dr. Leon H. Leonian, breeder of red hemerocallis and world renowned delphinium hybridizer. I assisted him in the greenhouse at West Virginia University with the germination and transplanting of thousands of hemerocallis seedlings. I learned much from his casual remarks concerning many types of flowers. The great day came when William Dieckmann imported 50 Van Meeuwen Superiora Amaryllis from H. DeGraff & Sons, Lisse, Holland. These bulbs

were given to me to grow and enjoy. In 1946 few people in the North grew amaryllis and fewer still had ever seen the 8- to 19-inch wide flowers that these varieties could produce. When they were in full bloom I held a show in the Garden Center at Wheeling, West Virginia. Those in attendance were spell-bound on seeing the size and dazzling colors of these clones which I was soon to realize were below average in comparison with the excellent named clones available today.

Careful rogueing of these varieties reduced their number to eight which I have grown for six years. These made me an amaryllis fancier and I boast with joy of having one of the finest collections of named varieties available anywhere.

In 1949 through Ludwig & Co., Hillegom, H. DeGraff & Son, Lisse, and P. J. Komen, representative for W. S. Warmenhoven & Son, Lisse, Holland, I was able to obtain practically all of the named Dutch amaryllis clones for a comparison trial test at Valleevue. The collection amounted to over 400 huge bulbs. Realizing the great beauty this collection would possess, Mr. Davis and I decided to enter them as a 500-foot display in the Cleveland Flower Show. The uniqueness of the display and the perfection of the flowers made it the highlight of the spring show. Thousands of bulbs were sold by various stands at the show. A repeat performance in 1950 presented a more elaborate display with greater interest than we anticipated. From it Cleveland and northeastern Ohio became Amaryllis conscious.

Unknown to me at the time was the great interest our trial garden reports on Amaryllis were creating throughout the nation. Articles in leading magazines flooded us with letters as to the source of these bulbs and, to my surprise, the growers in Holland were sold out. In some instances they shipped undersized bulbs much to my regret. The trial garden plus the reports published throughout the world established the Dutch Hybrid Amaryllis as a product without a peer and gave the American flower loving public a brilliantly colored new flower for the home.

I am continuing the evaluation of amaryllis for the Dutch hybridists, enabling them to receive a report each season on the new seedlings they deem worthy of introduction. A report will be made annually in "Herbertia".

My garden contains many of the finest hemerocallis varieties in existence. Each season I await with great anticipation the opening of each bud heralding another period of brilliant color in the garden. Although a gladiolus grower by profession, my love of amaryllis, iris and many other flowers will keep my garden and greenhouse, as well as my pen, alive with stories of the ever-increasing numbers of new flowers that appear. At 34 I am only beginning what I hope to be a long life time of study, research and enjoyment from flowers.

EVALUATION OF VEGETATIVELY PROPAGATED AMARYLLIS CLONES

THOMAS R. MANLEY, *Vermont*

The Valleevue Trial Garden established a comparison trial method of evaluating named varieties of amaryllis. Most of the flowers on trial were evaluated according to established score sheets. However for amaryllis evaluation the committee recommended a comparison evaluation method. Since the collection contained all of the named clones available for sale in Holland it was obvious that no clone superior to those on trial existed there with stock sufficient for introduction.

As each variety bloomed its color value was carefully determined by the color classification committee. The factors considered for evaluating color are saturation, depth, color harmony, defects in color such as flecking, fading, feathering of color and peeling of color.

Substance and texture of the flowers were noted—data was collected on the lasting quality of the flowers as well as the physical quality which ranges from soft or thin to heavy or thick.

Form of the flowers was studied as well as the number of flowers per scape. Refinement and balance of the flowers in regard to the size and height of the scape was particularly noted. Heavy scapes with small sized flowers were penalized as the coarse scape destroyed the gracefulness of the plant.

Flower size was measured and checked each season for three years for an average dimension. Although size is not always a factor clones with large flowers—nine to twelve inches, were usually found on scapes that contained but two flowers, a definite disadvantage as a larger number of flowers per scape is desirable for increased length of blooming period and greater display value. Public choice of varieties tends toward clones with seven to eight inch flowers. Smaller flowers were not acceptable unless the color pattern was unusual. The public is seeking large flowers in spectacular colors which even under poor culture will produce flowers of acceptable size when compared with American field grown hybrids.

A study of color preferences showed the public to favor light and medium red as the most desirable color with white and scarlet as second, red and white striped third, followed by salmon, rose and pink. New blends such as 'Bouquet' (Ludwig), will no doubt change this color trend.

The final factor in the evaluation of the plant was vigor particularly in regard to heavy leaf growth, response to forcing and recovery from forcing. This was based on two seasons of forcing plus two seasons of normal growth under ideal conditions.

All data was carefully studied and compared before ratings were assigned to each clone. The letter rating of AA—Superior; A—Excellent; B—Good and C—Fair or discard, was given to each clone. The

letter rating was made annually for three seasons with the average rating designated as the permanent rating at the end of the third season. Reports may be found in Plant Life, Vol. 7, 1951, pp. 71-76; Vol. 8, 1952, pp. 70-74 and Vol. 9, 1953, pp. 41-46.

The clones rating highest in each color based on three years' testing were saved to be used as a comparison check for new clones received each year from Holland. These clones are:

Salmon:—'Queen's Page' (Warmenhoven); clean salmon, two scapes, twenty inches tall with 4, eight inch blooms.

Scarlet:—'Halley' (Ludwig); clear, frosty scarlet of great substance and growth, three scapes, twenty-two inches tall with 3 to 4, eight and one-half inch blooms.

Light and medium red:—'American Express' (Ludwig); huge clear red blending deeper in the throat; excellent substance, two to three scapes, twenty-eight inches tall with 4, ten inch blooms.

Dark and wine red:—'Red Master' (Warmenhoven); deepest wine or rose red amaryllis, huge florets usually two to three per scape, color excellent, two scapes twenty-four inches tall with two to three, eleven to twelve inch blooms.

White:—'Queen of the Whites' (Warmenhoven); glistening waxy pure white with faint tinge of green in the throat; two to three scapes, twenty-five inches tall with 4 to 5, nine inch blooms.

Rose, pink and striped varieties need considerable improvement to receive high ratings. Several new varieties on trial show merit in these colors and may be included after they have been tested three seasons.

The outstanding new named clones are—

'Cherokee' (Warmenhoven); clear sparkling metallic red with orangy cast; excellent substance, two scapes, twenty-six inches with 4, eight inch blooms. Rating 1953—A.

'Red Majesty' (Warmenhoven); huge very broad segmented red with a frosty sheen, excellent substance, foliage a reddish tinge, two scapes, twenty-four inches tall with 4, ten inch blooms. Rating 1953—AA.

'Royal Ruby' (Warmenhoven); brilliant clear medium red, excellent substance, two scapes twenty-eight inches tall with 4, nine inch blooms. Rating 1953—A.

'Beacon' (Warmenhoven); deep frosty salmon with clean well defined three-fourth inch band of glistening white down the midrib of each segment; two scapes, twenty-six inches high with 4, ten inch blooms. Rating 1953—AA.

'Wyndham Hayward' (Ludwig); Exceptionally clear rich red with a frosty sheen, self color. Two scapes, twenty-two inches tall with 4, nine inch blooms. Rating 1953—AA.

'Ludwig's Masterpiece' (Ludwig); brilliant light red slightly deeper red at the base of segments; two scapes, twenty-four inches tall with 4 to 5, seven inch blooms. Rating 1953—A.

'Bouquet' (Ludwig); the most beautiful blend of salmon and pink one can imagine. This huge blend has great substance and a frosty lustre; fades imperceptibly as it ages which increases its beauty; two

scapes, twenty-two inches tall with 4, seven to eight inch florets. Rating 1953—AA.

Many others are being evaluated but their performance does not merit a rating at this time.

[PLANT LIFE LIBRARY, continued from page 4.]

by H. C. Thompson, Growth correlation, by W. E. Loomis, Electric fields and correlation in plants, by H. F. Rosene and E. J. Lund, Physiology of hormone action, by S. A. Gordon, Hormonal control of flower initiation, by J. Bonner and L. Liverman, Structure and synthesis of protoplasm, by H. S. McKee, Cellular differentiation: an experimental approach, by B. Commoner and M. L. Zucker, Some factors associated with diseased growth in plants, by A. J. Ricker and A. C. Hildebrandt, and Comparative physiology of heterotrophic growth in plants, by S. H. Hutner.

Valuable bibliographies appear at the end of the articles, and there is a subject index. This is one of the most stimulating books that has appeared recently in the field indicated, and is indispensable to the plant physiologist, geneticist, plant pathologist, or agriculturist.

LIFE OF THE PAST—AN INTRODUCTION TO PALEONTOLOGY, by George Gaylord Simpson. Yale Univ. Press, New Haven, Conn. 1953. pp. 198. illus. $4.00.

This concise adequately illustrated and easily readable text on the science of reading the record of life (palentology) was written by an outstanding authority on the subject for the general reader and the beginning student. The topics discussed include—a walk through time, the remains of ancient life, fossils and rocks, fossils as living things, ancient communities, fossils and geography, the diversity of life, life and time, ways of organic change, theories of evolution, and fossils and mankind. The appendix is in the nature of a broad review of the forms of life "to show how varied it is and, in a general way, what the different forms are like".

This is by far the best book that has appeared on the subject treated for the general reader, and beginning student which can also be read with profit by the advanced student. It is very highly recommended.

[PLANT LIFE LIBRARY, continued on page 110.]

The Queen of the Official Amaryllis Show of New Orleans, 1953, Miss Charmaine Thompson, is crowned by Commissioner Victor H. Schiro. Photo The Times-Picayune-New Orleans States.
Plate 2

1. REGIONAL ACTIVITY AND EXHIBITIONS

NEW ORLEANS AMARYLLIS SHOW, 1953

MRS. W. D. MORTON, JR., *Chairman,*
Official Amaryllis Show, New Orleans

On March 21st., the doors of the McMain Junior High School Auditorium were opened to the FIFTH OFFICIAL AMARYLLIS SHOW of New Orleans, sponsored by the GARDEN CIRCLE GARDEN CLUB. The co-operation of the forty-one Garden Clubs has made the OFFICIAL AMARYLLIS SHOW one of the largest and most outstanding Flower Shows in New Orleans. The color scheme of the Club (Jade green and silver) was carried out in every detail, and made a beautiful setting for the various colors of Amaryllis.

The Show was Judged by twelve accredited Judges. Three Gold Cups, and five AMERICAN AMARYLLIS SOCIETY AWARDS, and numerous other gifts were awarded. Mrs. Charles Deal of the Ponchartrain Garden Club, received the GOLD CUP on artistic arrangement, Mrs. W. D. Morton, Jr., of the Garden Circle, the GOLD CUP on Horticulture, and Miss Jean Griffith, of the Lakeview Junior Club, the JUNIOR GOLD CUP. The McMain Junior High School received the GOLD SCHOOL CUP donated by the GARDEN CIRCLE.

The Mayor proclaimed AMARYLLIS WEEK.

The real event of the Show was the crowning of the OFFICIAL AMARYLLIS QUEEN, Miss Charmaine Thompson by Commissioner Victor H. Schiro (Plate 1). Her Court consisted of eight little girls as ribbon bearers, forming an aisle for the Maids and Queen. Miss Phyllis Masscotte, last year's Queen was back to present the Maids—Miss Sandra Montalbano, and Miss Carol LeCompte, the Crown bearer, the Flower girl and last the 1953 Queen.

Mrs. W. D. Morton, Jr., was Chairman of the Show, and Mrs. M. M. Sanchez is President of the GARDEN CIRCLE.

MOBILE AMARYLLIS SHOW, 1953

MRS. HERBERT J. JOHNSON, *Co-Chairman,*
Mobile 1953 Amaryllis Show

The Amaryllis Society of Mobile held its initial Amaryllis Show, March 28-29th in the Murphy High School cafeteria. This was a standard competitive show including five divisions, horticulture, artistic arrangements, educational, collector's corner and commercial exhibits. One invitational class was open to garden clubs only and was well filled. Competition was open to all amateur growers in the other classes, membership in the Society was not a requisite. The show was open to the public without charge—hundreds took advantage of the opportunities offered.

Mr. Ernest Thublin, flower Show chairman, with the splendid co-operation of his co-workers, staged an outstanding show. To undertake a big show after having been organized for only one year took courage as well as ability and hard work, all three of which this committee proved to have in abundance.

Our objective in staging this show was to stimulate more interest in growing and arranging hybrid Amaryllis, to acquaint gardeners with other members of the Amaryllis family. Keeping in mind always that all flower shows should be both inspirational as well as educational, we gave our show the theme, "Meet The Amaryllids", including classes that would bring into our show any plants or bulbs of this family. The educational exhibits were outstanding.

First, second, third and fourth place ribbons were given in all classes where merited, and seven large silver trophies were awarded for sweepstake and special awards. These were all new trophies, and therefore most of them were presented by the donors to the winner in impressive ceremonies after the six accredited judges had judged the show.

Mr. Lou Costa, editor of "Progressive Gardening" for the Mobile Press-Register, and Organizational President of this society had urged through his column that all interested in securing free amaryllis seeds should bring a self addressed stamped envelope to the show. He explained that as soon as seeds were available, these envelopes containing seeds would be mailed back to them. Envelopes were also available at the show for the forgetful ones. This proved successful beyond expectation—thousands taking advantage of this offer. Many amaryllis should be added to Mobile's floral beauty because of this one idea. Our second annual Amaryllis Show will be held in the same building on March 27-28, 1954.

14th CENTRAL FLORIDA HEMEROCALLIS SHOW, 1953

Mrs. G. B. Knight, Sr., *Florida*

The fourteenth annual Central Florida Hemerocallis Show was held in the Lodge at Mead Botanical Garden, Orlando-Winter Park, on Sunday May 3, 1953. Both in number of blooms exhibited and number of individual exhibitors, it was the largest ever held. A greater number of visitors attended the show than ever before coming from all over Florida.

More than 700 blooms were on display including more than 250 named varieties representing a large number of hybridizers from all over the United States, and unnamed seedlings of local exhibitors.

Mr. Ralph Wheeler, of Winter Park, exhibited about 100 of his own hybrids, including both named and as yet unnamed ones. Of the named varieties, six were shown for the first time: 'Concordia', Platinum Blonde', 'Arla', 'Sequin', 'Paprika' and 'Annie Oakley'.

Mrs. Bright Taylor, of Ocala, entered 40 blooms, some already introduced, some unnamed seedlings, and four which were new: 'Norma Borland', 'Quincy', 'Celebrity', and 'Moongleam'.

Mrs. C. M. Slaughter of Orlando entered three new introductions: 'Ruth Bayless', 'Susan Wynn' and 'Lucile', and many others of her seedlings.

Mr. and Mrs. G. B. Knight of Apoka had one new daylily: Alice Wherrette. They also showed about 25 of their own seedlings and a number of named varieties of Dr. Stout, Mrs. Bright Taylor; Mr. Wheeler, Nesmith and Lester.

Mr. Kenneth Soper of Orlando showed nearly 100 blooms representing daylilies from Russell, Sass, Stout, and Wheeler.

Mrs. Robert Wall of Clarcona showed a large number of Mrs. Lester's daylilies, some of Mrs. Bright Taylor's and some of Mr. Wheeler's besides a large number of her own seedlings.

Mr. and Mrs. Elvin Speede of Apoka, showed numbers of their seedlings. Mr. Frank Vasku entered an excellent collection of his unnamed hybrids. Mrs. Mary J. Scobie showed a number of named hybrids from several hybridizers and a collection of her own seedlings. Mrs. Carol Harrell of Lake Mary entered a splendid display of named daylilies from a number of different hybridizers.

The Mr. and Mrs. Garden Club sponsored the show, and furnished hosts and hostesses during the entire day.

NATIONAL BOTANICAL GARDEN OF INDIA

Word has been received that Sydney Percy-Lancaster, retired from service after fifty years as Secretary of the Royal Agri-Horticultural Society of India at Calcutta, and that he is now engaged by the Government of India as Senior Technical Assistant in the National Botanical Garden of India. He is interested in building up the collection of ornamental plants in the Garden, and would be very grateful to the members of the American Amaryllis Society, and the American Plant Life Society, with which it is affiliated, for donations of seeds and bulbs for the Garden.

He writes that he left most of his x*Cooperanthes* behind in Calcutta, and that he is beginning with further cross-breeding experiments. The temperature at Lucknow goes down to 40° F. in the winter, and frequently registers 116° F. in the summer. The soil is almost pure sand, very alkaline, and water is plentiful.

It is hoped that as many members as possible will write to Mr. Percy-Lancaster Nat'l Botanical Garden, Lucknow, India, to offer any available seeds and bulbs. He will then give instructions on how to send them.—*Hamilton P. Traub.*

Amaryllis ambigua Sweet, an example of the Long-trumpet Division of Cultivated *Amaryllis* (D-2). Photo by L. S. Hannibal.
Plate 3

2. SPECIOLOGY

[EVOLUTION, DESCRIPTION, CLASSIFICATION AND PHYLOGENY]

DIVISIONS OF CULTIVATED AMARYLLIS

HAMILTON P. TRAUB *

[NOTE BY AMARYLLIS COMMITTEE CHAIRMAN.—"In submitting his revision of the Divisions of Cultivated Amaryllis to the Amaryllis Committee for consideration, Dr. Hamilton P. Traub has offered the benefits of many years of experience, his deep knowledge, and extensive research into the subject. All members of the Amaryllis Committee were asked to offer comments and suggestions. Those of Mr. Thomas R. Manley were very valuable. Mr. Wyndham Hayward felt that simplicity should be stressed. Valuable recommendations were received from Col. Russell S. Wolfe, and his suggestion that illustrations be included has been accepted. Much to our loss, Major John W. Schaefer, a former member of the Committee, is recently deceased.

"This revision has been adopted to fill the present need for a more simplified classification of Amaryllis flower types. If further changes are desirable and needed, they may be made to equal the necessity. Suggestions and recommendations from those who are interested in future revisions are welcomed."—*Robert G. Thornburgh, Chairman, Amaryllis Committee.*]

Prior to 1933, when the American Amaryllis Society was organized, the flower types of cultivated Amaryllis had not been classified. As a rule, the primary aim of the breeder since the 1870's has been to produce the stiff, formal, open-faced, flattish type of flower, not realizing that there is inherent in the genus *Amaryllis* a very wide range of flower types, including among others, very graceful forms. The first classification adopted by the Society in 1934 has been gradually changed to take care of changing needs, but there is still room for improvement. The classification here presented has been especially revised for inclusion in the writer's complete handbook, "Amaryllis". It is an amplification and simplification of the last official American Amaryllis Society classification (Traub, 1950). The original draft was submitted to the Amaryllis Committee of the Society, and with some changes was approved in its present form subject to future revision if needed.

The subgenera of the small-flowering Division, formerly grouped under the genus *Amaryllis* L., have been restored to the general *Rhodophiala* Presl, and *Phycella* Lindl. (Traub, 1952; 1953) as previously indicated in Chapter 3, and thus the small-flowering division of cultivated forms is no longer included. However, a new division of Miniature or short-statured, relatively large-flowering Amaryllis has been added for the first time.

In order to simplify the classification as much as possible, the nine divisions of cultivated Amaryllis have been arranged in numerical order with brief statements about the distinguishing characters of each. This presentation will follow after a few brief explanatory remarks. In this

*This revision was prepared especially for inclusion in the complete popular book, "Amaryllis", by Hamilton P. Traub, which, according to present plans will be published during 1955.

Amaryllis gh. **belladonnaeoides** cl. 'Garfield Triumph', an example of Division of cultivated **Amaryllis.** (Reproduced from Herbertia 1936, plate on page 107).
Plate 4

form it can be readily understood by amateurs. It may be used as the basis or blue print for Amaryllis breeders, and as the foundation for exhibition schedules.

It should be noted that further subdivisions may be made within each of the nine groups, but for the present such subgroups have been introduced only to a very limited extent for Divisions 4 and 5.

The flower color variations are so large in Amaryllis that it is impractical to use these as the basis for larger subdivisions as has been done in the case of *Narcissus* L., where color variations are very limited. At the recent local Amaryllis shows in New Orleans and Mobile, no less than 18 color classes have been recognized for hybrid Amaryllis, and color classes are bound to increase with further breeding work. Thus it is necessary to base the primary classification of hybrid Amaryllis on flowering habit and flower structure, and then apply to each of the divisions or subdivisions the color variations that are actually met with locally in making up exhibition schedules.

The nine Divisions of cultivated Amaryllis are briefly considered in the present article.

DESCRIPTION OF DIVISIONS

DIVISION 1. Cultivated Wild Amaryllis (D-1)

All cultivated wild *Amaryllis* L., species, including subdivisions such as sub-species, varieties, forms, and so on, are included. The 45 recognized wild *Amaryllis* L., species have been described in the text by Traub & Moldenke (1949). These should be scrutinized for possible additions to the list of species already in cultivation.

DIVISION 2. Long-trumpet Amaryllis Hybrids (D-2)

Distinguishing characters: the pedicels are relatively long, and the flowers are distinctly drooping. The tepaltube is very long, 4 1/5 to 5½ inches long, and the whole flower is very long and trumpet-shaped similar to the Easter Lily, *Lilium longiflorum,* showing the influence of *Amaryllis immaculata, A. tucumana, A. viridiflora* and *A. elegans.*

Illustration: Plate 3, *Amaryllis ambigua* (reproduced from Herbertia 1943, page 152, fig. 106).

DIVISION 3. Belladonna Type Amaryllis Hybrids (D-3)

Distinguishing characters: the pedicels are relatively long, and the flowers are usually distinctly drooping. The tepaltube (below 4 inches in length) is much shorter than in Division 2, and the flowers are much shorter, and variously shaped, showing the influence of species with the informal flower structure such as *Amaryllis belladonna* L., *A. vittata,* and so on.

Illustration: Plate 4, *Amaryllis* gh. *belladonnaeoides* cl. 'Garfield Triumph' (reproduced from Herbertia 1936, plate on page 107).

Upper, Reginae Type Hybrid Amaryllis (Division 4)—*(Amaryllis* gh. *reginaeoides):* left, Hermon Brown un-named white (D-4a), markedly imbricated, photo by W. M. James; right, van Tubergen un-named picotee (D-4b), less imbricated, photo by van Tubergen, reproduced from 1947 Herbertia, page 152, fig. 183.

Lower, Leopoldii Type Hybrid Amaryllis (Division 5)—*(Amaryllis* gh. *leopoldaeoides):* left, cl. 'Doris Lillian', a Ludwig clone (D-5a), markedly imbricated, photo by Armyn Spies; right, an un-named E. McCulloch clone, (D-5b), less imbricated, photo by Mrs. Edith B. Strout. Plate 5

DIVISION 4. Reginae Type Amaryllis Hybrids (D-4)

Distinguishing characters: the pedicels are relatively shorter than in Divisions 2 and 3, and the flowers are slightly drooping, horizontal, or slightly upright. The tepaltube is very short (below 2 inches long) and

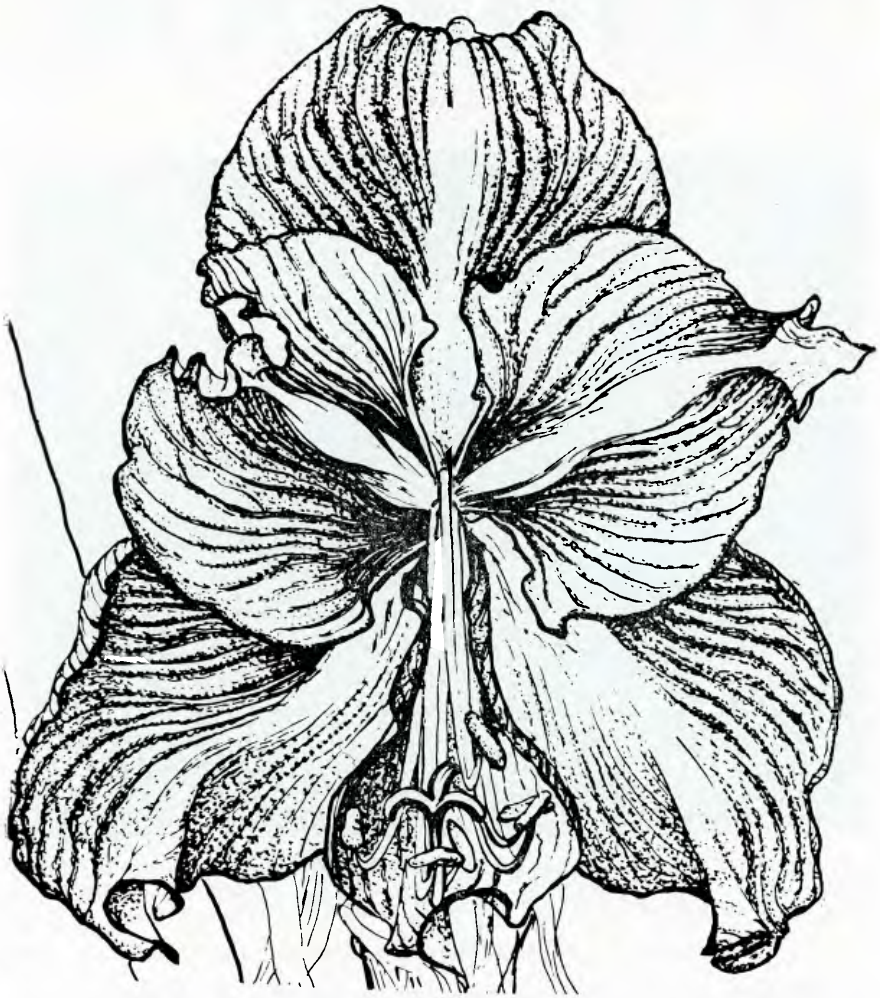

Fig. 1. Orchid-flowering Type Hybrid Amaryllis (Division 6)—*(Amaryllis* gh. *orchidaeflora):* cl. 'Cannae Butterfly', an E. McCulloch seedling raised by Mrs. Polly Anderson; reproduced from drawing by Kenneth Anderson.

the flowers are moderately open-faced, showing the influence of *Amaryllis reginae, A. striaeta, A. correiensis,* and so on. The length of the flower when viewed sideways measures above 4 inches.

Two sub-divisions are recognized at present:

D-4a. Markedly imbricated type: the flowers are markedly imbricated. The segs are overlapping for about ¾ or more of their lengths, and the tips are rounded, rarely somewhat pointed. Illustration: Plate 5, upper left, seg tips rounded (reproduced from Herbertia 1948, page 74, fig. 197).

D-4b. Less imbricated types: The flowers are less imbricated. The segs are overlapping for less than ¾ of their lengths, and the tips are somewhat rounded or pointed. Illustration: Plate 5, upper right, segs pointed and reflexed (Reproduced from Herbertia 1947, page 152, fig. 183.)

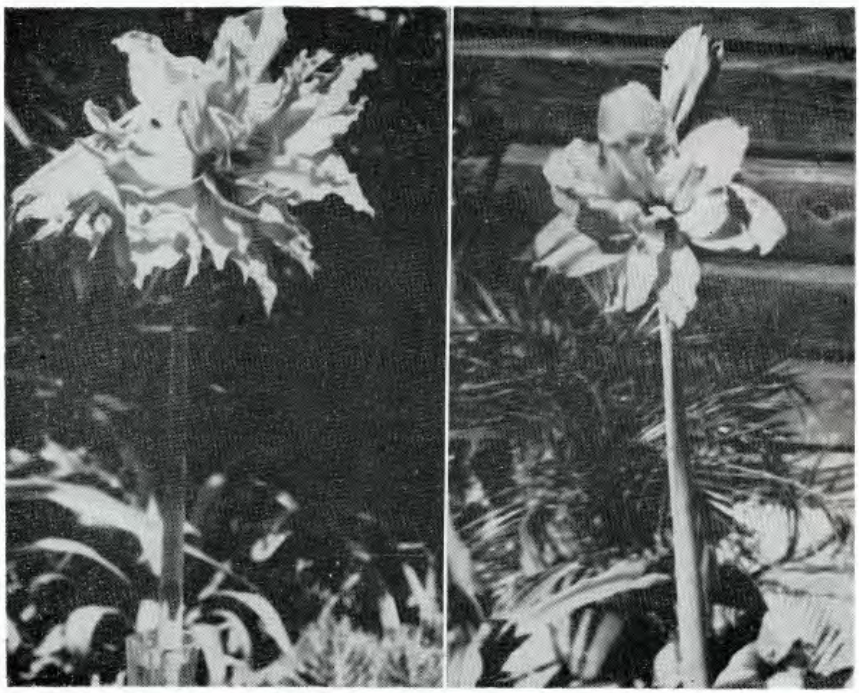

Fig. 2. Left, *Amaryllis reginae* var. *albertii,* the Double variety native to Cuba. Right, Double Hybrid Amaryllis (Division 7)—*(Amaryllis* gh. *multaetepala):* cl. 'Helen Hull', a McCann clone. Photos by Wyndham Hayward.

DIVISION 5. Leopoldii Type Amaryllis Hybrids (D-5)

Distinguishing characters: similar to Division 4, except that the flowers are wider open, often appearing flattish, and are held horizontally as a rule, showing the influence of *Amaryllis leopoldii* and *A.* pardina. The length of the flower when viewed sideways must be below 4 inches.

Two subdivisions are recognized at present:

D-5. Markedly imbricated type. The flowers are markedly imbricated. The segs are overlapping for almost their entire lengths, and the

tips are rounded. Illustration: Plate 5, lower left.

D-5b. Less imbricated type. Similar to D-5a, except that segs are slightly less imbricated, and the tips are rounded or slightly pointed. Illustration: Plate 5 lower right.

DIVISION 6. Orchid-flowering Amaryllis Hybrids (D-6)

Distinguishing characters: the segs are not arranged according to the usual *Amaryllis* L. flower pattern but are variously shaped, twisted or extremely reflexed, showing the influence of *Amaryllis cybister, A. maracasa,* and so on.

Fig. 3. Miniature Type Hybrid Amaryllis (Division 8)—*Amaryllis* x *henryae,* the Henry Miniature hybrid Amaryllis. Photo by Mrs. Mary G. Henry.

Illustration: Fig. 1, *Amaryllis* gh. *orchidaeflora* cl. 'Cannae Butterfly' (Reproduced from Plant Life Vol. 10. 1954). The reader should realize that this Division may contain variously shaped flower types, ranging from the extreme type (not yet produced in hybrids) as shown in *Amaryllis cybister,* in which the flowers are quite irregular as in *Sprekelia formosissima,* to the form in the only named hybrid in this Division at present, 'Cannae Butterfly' (Fig. 1), in which only the tips

of the segs are twisted. Hybridizers have neglected the possibilities offered in this Division, and it is hoped that before long they will fill in this gap.

DIVISION 7. Double Hybrid Amaryllis (D-7)

Distinguishing characters: This division includes all semi-double and fully double forms of hybrid origin under culture. Illustration: Fig. 2, right (reproduced from Herbertia Edition, Plant Life 1950, page 106, fig. 21.) Fig. 2, left, *Amaryllis reginae* var. *albertii* represents one of the parents of the McCann Double Hybrids; the other parents were Mead Strain hybrids.

DIVISION 8. Miniature Type Hybrid Amaryllis (D-8)

Distinguishing characters: distinctly dwarf-statured forms, including various flower types, showing the influence of *Amaryllis espiritensis, A. reticulata,* and other dwarf species. Although the flowers are somewhat smaller than those of the taller-statured types such as the Reginae and Leopoldii hybrids, they are still of good size and harmonize with the smaller peduncle diameter and height.

Illustration: since this division may contain various flower types, one illustration is not sufficient. At present only one of these types can be cited—*Amaryllis* x *henryae* (see Fig. 3). When other Miniature types are produced by breeders, it will be in order to cite additional illustrations.

DIVISION 9. Unclassified Hybrid Amaryllis (D-9)

Distinguishing characters: all hybrids that cannot be placed in any of the foregoing divisions, D-2 to D-8, inclusive.

It is suggested that for convenience and economy, the classification letter-number combinations, D-1, D-2, D-3, and so on, in parentheses, be placed after named hybrid Amaryllis clones when it is desired to indicate their classification.

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PERSONAL EVALUATION OF HYBRID AMARYLLIS CLONES, 1953

ROBERT GRANT THORNBURGH, *California*

For the past several years Mr. Thomas Manley's reports on his hybrid amaryllis trials have been followed with keen appreciative interest. They were so appealing that it was of interest to do the same for ones own pleasure. Though it is easy to express a preference, to analyze virtues or defects becomes difficult since one so often overlooks the questionable defects. It is not unlike an attempt to select which of Beethoven's 3rd, 5th, 7th or 9th symphonies he prefers over the rest. Yet it is not without reward to reflect upon the absolute nobility of the first movement of the Eroica, the brilliant C minor, the rhythm of the 7th or the stupendous 9th. It may be soaring a bit to mention so much perfection in music to those with ears when the problem at hand has to do with the gladdening of the eyes. It serves its purpose when one considers that the pastime of sorting flowers is a pleasant one and again a matter of individual preference.

It is to be hoped that the reader will not gain the feeling that this rating is intended as a dictum. On the contrary, it would be strange indeed if personal preferences did not differ.

Most of the named clones were from Holland and do that industrious people great credit. Very few named clones grown in large quantities can be found in the U. S. A., outside of Florida. It is not a little disquieting to think upon the fact that so many of those in this country who have contributed so much to hybridizing of amaryllis and amaryllids are venerable or else one by one are retiring from the production of worth while flowering bulbs. Of those who have devoted many years to improvement of these flowers, Mr. Hermon Brown has been and still is one of the most assiduous. Mr. W. E. Rice for many years had several acres in hybrid amaryllis. These he attempted to improve by new pollen and special crosses. Mr. Cecil Houdyshel, Mr. Frank Leach and Mr. Orpet have spent many years in growing and improving the amaryllids especially *Brunsvigia.* Although Mr. Fred Howard's immense plantings of excellent hybrid amaryllis still remain at the Howard & Smith's Nursery, there seems to be no one left there who matches his former enthusiasm for bettering the quality of hybrid amaryllis. It is the personal opinion of the writer that at the present time the best hybrid amaryllis grown in this country may be found at the Howard & Smith nursery where they still have fifteen acres planted. There seems to be no other to the best of my knowledge who produces hybrid amaryllis in large quantities that are above the level of the Meade strain in quality. It is to be hoped that the latter will be replaced by better and more worth while strains. The Meade strain has not proven more vigorous in the State of California than other strains. If it were not for the Dutch, then, good hybrid amaryllis in the U. S. A. would be rare indeed.

WHITE

'Casper Ludwig' (Ludwig), Grade B. Very pretty! Two blooms from one scape. Quite symmetrical. Pure white face with faint green in throat and only a fleck of pink on the posterior. The bulb was very small but had been pot bound for two years.

'Ludwig's Dazzler' (Ludwig), Grade AA. This again was the best of the whites I had. The center had no green, only a creamy yellow. Round, symmetrical, short tube, and very strong. Good substance to petals.

'White Giant' (Ludwig), Grade AA. Two scapes each with four flowers. Not so giant this time but very white with a soft green only at the base of each petal. Crenated margins noted this year not present last year.

'Marie Goretti' (Ludwig), Grade AA. This one is different from the last two—it is less formal but utterly graceful. Three scapes scattered over the year.

'Nivalis' (Ludwig), Grade A. Most worth while. See Fig. 4. AM-AAS, 1952.

BICOLORS

'Rose Queen' (van Meeuwen), Grade AA. Vermilion with white center. Blooms abundantly. Color is apt to fade more readily but this one will make your eyes pop.

'Fidelity' (Ludwig), Grade AA. This one is so delicate in appearance and so unusual that it was graded higher. The flowers were all small as hybrid amaryllis are ordinarily seen but there were eight at one time, the color reminded one of pink apple blossoms. The outer portions of petals were a soft pink blending to a white in the centers or throats of each one. Stamens were white to accentuate the effect. Glowing with life!

'Fantasy' (Ludwig), Grade B minus. This one did not appeal to me as much as the others. It was white with rose at tips of petals following back into throat in an undefined stripe. It is one that could insinuate itself into your appreciation since it is beautiful.

'Morning Star' (Ludwig), Grade A. This one is a whopper. If they all came as large as this one there would be no room for the rest. The star is formed by a well defined white stripe from throat to tip of each petal. This one falls in the salmon colored group and is veined enough to bring on a somewhat darker appearance. Very short tube, petals quite wide yet not the "pansy" shape since it is not round. The margins tend to be wavy. It is astonishing that such a large flower can have sufficient substance to keep its shape so well.

'van Tubergen pink', Grade A. Again the white stripes on each petal to form a star with the rest of the flower a Geranium Lake. Most attractive. The van Tubergen firm believes that their amaryllis are all worthy of names but do not attempt to produce clones. Those I have seen bear out their feeling about their product.

'Pink with White Center' (Howard & Smiths), Grade A plus. Geranium Lake (20/1) on borders in a veined net-work. Upper two anterior petals show symmetrical veining of deeper shade, the remaining petals are white. Throat white with soft green at throat. This was included because so many visitors have pointed it out as the one they liked the best. It was selected while in bloom at the nursery and has been used for breeding with very gratifying results.

ROSE

'Doris Lillian' (Ludwigs), Grade AA. This was the best of the rose colors. Very clear. This year it was Turkey red (771/3) and Cherry (722/3) on the Royal Horticultural Society's Colour Chart. At times this is so deep in color as to leave the rose color group and become a carmine-red. As it ages it takes on a bluish appearance sometimes.

'Moreno' (Warmenhoven), Grade A. Two scapes of four blooms each. All very flat faced, large and graceful. A porcelain Rose (RHS 620).

'Margaret Truman' (Ludwig), Grade AA. This is much like 'Pink Perfection' to the best of my recollection. One scape of three blooms, six and a half inches across. Petals individually wide. A clear uniform color of Carmine Rose (621 RHS).

'Pink Perfection' (Ludwig), Grade AA. Year after year this blooms regularly with strong blossoms and several scapes. Not only that but it is a good multiplier. It offsets readily and will bloom from small bulbs if there is a good root system. It was found to be quite hardy out of doors here in California. From all aspects it should really be this bulb that has proved the most satisfactory.

'American Fashion' (Ludwig), Grade B. This had a most attractive pink color with veining. Due to weather conditions it opened like a spring crocus. Since the color is good, it is to be hoped that it will do better the next season.

'Rossini' (Ludwig), Grade B plus. Two scapes of three blooms each. Seven inches across the face, each petal 3 inches wide. Faint green in the throat not noticeable except on close inspection but present on base posteriorly to a more noticeable extent. Tubular. Carmine Rose (621 RHS). Comparison of the flower color with color on printed paper of a color chart is seldom accurate. It was felt in this case that the color of this one was somewhat more vivid than the preceding but difficult to describe. The color did not seem to be a duplication of the others.

'Roselinde' (Ludwig), Grade A. Spinel Pink (0625/1 RHS) with a center of white and green. This one will undo your prejudice against green since here it is not an adulterant but actually enhances the pink color. It comes out quite bravely and effectively in the center and is not harsh. It is as soft as the pink is soft. One could hardly ask for more delicacy.

SALMON

'Pinkster Flower' (Ludwig), Grade B. Shrimp Red (616), greenish-white stripe on each petal extending about one-half the length of the

petal. Tends to a light picotee at the edges. Very wide, flat face, each petal is 3½ inches across. Seven to eight inches across face. This one greatly resembles Warmenhoven's 'Sweet Seventeen'.

'Salmon Joy' (Ludwig), Grade A. The bloom is so large, exuberant and bright that it can hardly fail to please anyone with an eye to bright colors. The small yellowish lines in the throat do not add to its attractiveness but are not noticeable to one who isn't looking for blemishes. It often seems ridiculous to be so critical of such a gorgeous production of nature.

Fig. 4. Miss Jassamine Thornburgh, and Dutch Hybrid Amaryllis. From left to right, 'Queen Superiora', 'Nivalis', 'Faust' (top), 'Moreno' and 'Superba'. Reproduced from a kodachrome by Dr. Robert G. Thornburgh.

REDS

'Queen Superiora' (van Meeuwen), Grade AA. (See Fig. 4, and Plate 7.) This variety made the top of my list for all amaryllis bloomed in 1953. It is capricious in the way it blooms and may not always come

out well. Last year a difference in the weather spoiled it. This year every one of this variety performed beyond expectations for any hybrid amaryllis. The buds were a self Garnet Brown (00918/1) but open up to a Blood Red (820/2 to 820 RHS). Others varied from Vermilion (18) to Scarlet (19) to Orient Red (819) and even deeper in color. One was a Dutch Vermilion (717). All were very clear selfs with no adulterants of any kind. Some were veined. The blooms characteristically pointed or angled upwards as contrasted to the drooping varieties. The petals had wavy margins and there were crinkled ears in the throats. Most of them showed two scapes of four blooms each. This is not always a dependable bloomer especially if too hot on the day of opening. The variations in shade do not necessarily prove that these are not clones. One finds that the same bulb will produce variation in shades from year to year. The humidity and temperature may have something to do with this.

'Superba' (van Meeuwen), Grade AA. (See Fig. 4.) Blood Red (820) to Current Red (821) on the posterior. Crinkled ears in the throat. A very dark red self much resembling 'Queen Superiora' except that it is much darker than the latter. Four blooms to each scape. Very wide petals with flat open face.

'Faust' (van Meeuwn), Grade B plus. (See Fig. 4.) Scarlet (18 RHS). Two scapes of four blooms each. Throat and posterior show green lines near the base of petals. Stamens green for an inch at base. Seven and a half inches across face. Petals 3 inches wide. No ears in throat. Face slightly up.

'Wyndham Hayward' (Ludwig), Grade B plus. Signal Red (719 RHS). One scape of four blooms. A good regular form. The color is uniform and clear without green anteriorly or posteriorly. Six inches across. Petals three inches wide. Fine veining.

'Maryon' (Ludwig), Grade B plus. Dutch Vermilion (717/2 RHS). Small self red without green on any portion. Flowers point up a bit. Petals three inches wide and face six inches across. Two scapes of three blooms each. Small ears at base of each petal.

'Lucifer' (Warmenhoven), Grade B plus. Mandarin Red (17 RHS). Some green streaks. Petals recurve.

'Julia' (van Meeuwen), Grade A. Dutch Vermilion (717). A uniform self bright color with green only at base of petals posteriorly. They scintillate like gold dust in the sunlight. Petals are wavy on the edges. Face is 5½ inches across. Though small this one was extraordinarily beautiful. There were crinkled petaloid ears deep in the throat that were curled or twisted both forward and backwards. Blooms angle up.

'Invincible' (Ludwig), Grade B plus. Poppy Red (16 RHS). Two scapes of four blooms each. Petals medium width. A clear self with no green or yellow anterior though a slight amount of green along keel posteriorly.

'Imperator' (van Meeuwen), Grade B. Signal Red (719/3). One 18 inch scape with three blooms 6½ inches across face. Crinkled ears

Dutch Hybrid Amaryllis (D-5) flowered by Dr. Robert G. Thornburgh—left, 'Bordeaux', and right, 'Queen Superiora'. Reproduced from kodachromes by Dr. Robert G. Thornburgh. Plate 7

in throat with short stubby yellow band ¼ inch by 1 inch at base of each petal. Blooms angle up.

'American Express' (Ludwig), Grade A plus. This one has always been the best of my reds in the past and is a consistent good bloomer. Very gratifying to those who enjoy the bright reds. Signal red (719 RHS). Scratchy lines in the throat at times that are not noted except upon very close inspection. Blooms droop slightly but not consistently. Four blooms to each scape. Very flat and silky. Shines in the sun light. Almost unbelievably bright red. Looks very much alive.

'Halley' (Ludwig), Grade A. Very wide petals with geometric symmetry. Fire Red (15 RHS). Clear self nearly uniform in color except for deepening of color in throat. Slight tendency for formation of ears. Very fine network of veins. One scape of four blooms. The appearance of blooms seemed slightly different than the previous year but again this may have been due to difference in humidity or temperature.

'Franklin D. Roosevelt' (Ludwig), Grade A. One of the deepest reds you will find. A clear self deep dark Orient Red (819 RHS). Throat tends to be Currant Red (821/2). Two scapes of four blooms each. Excellent flat symmetrical flower.

'Love Fire' (Ludwig), Grade B. This one opened poorly probably because the greenhouse became overheated. Undoubtedly it will do better under other circumstances. Signal Red (719 RHS). Center of throat slightly blood red (820/2) but with a very faint yellow almost invisible near the base of petals.

'General MacArthur' (Ludwig), Grade B plus. A good red.

'Ardor' (Ludwig), Grade B minus. Orient Red (817). This one didn't open very well and at the time the temperature was far lower than it should have been for good blooming. It was, however, definitely a self red with no green.

Van Tubergen Scarlets. Three bulbs showed blooms of Vermilion (18 RHS). Average was two scapes per bulb with four blooms each. These were all of such extreme brillance and were clear selfs without any show of green or yellow that each was worthy of being a named clone.

INTERMEDIATE-STATURED AMARYLLIS HYBRIDS

Graceful Strain (van Meeuwen), Grade AA. Scarlet (19 RHS). Very small and delicate. Perhaps such surpassing quality would merit the term exquisite. A most extreme self with no green anterior or posteriorly on one bulbs bloom but with some green at base of petals on another bulbs blooms. Very fine veining on petals. Blooms profusely. These are consistently intermediate and quite lovely. Since so many years were expended in producing this strain of selfs, they should be grown more widely. This is worth more rapturous description than I'm capable of giving.

Gracilis Strain (Ludwig), Grade A plus. Capsicum Red (715/1 RHS). A self scarlet with no green whatsoever. Faint yellow lines in mid line and at base of petals about ¾ inch long almost invisible. Two scapes of four blooms each. Petals delicately veined. Not quite as

small as the Graceful Strain of van Meeuwen but graceful indeed.

'Mignon' (Warmenhoven), Grade C minus. One long scape of four medium sized blooms. They were not miniature but almost the size of regular hybrid amaryllis so that they merely looked a bit undersized rather than a dwarf variety. Dull pale red border with white center and green throat.

After reading the foregoing material one may be impressed with the large number of double A ratings. Since Californians are said to use only extravagant terms in describing anything, it becomes difficult not to award the clone 'Queen Superiora' a triple A. It is suggested that with so many beautiful hybrid amaryllis that it is not easy to maintain a deliberate and scientific outlook on the matter. Therefore these ratings are hardly comparable to the scholarly compilation of exact information to be found in Mr. Thomas Manley's ratings.

At this point it may not be too inappropriate to add a word of encouragement to those who are growing and improving such magnificent hybrid amaryllis for our benefits. The commercially difficult feat of producing large numbers of clones by cuttage has proved impractical in California and elsewhere to all of those who have attempted it. Though accomplished in this country successfully, it has not been profitable. It requires the patience and careful attention that most growers are unwilling to give. Those of you who are too ready to pronounce the named varieties as non-clones should reconsider. Observe the same bulbs blooms over several seasons and note the variations.

Crinum gouwsii Traub, **sp. nov.**

HAMILTON P. TRAUB

In 1949, Dr. J. B. Gouws, of the University of Pretoria, published chromosome data on the first reported polyploid *Crinum* species, 2n = 72 (Plant Life 5: 68-72, Plate 5, fig. 5. 1949). In March, 1950, Dr. Gouws kindly sent seeds of this species to the writer. These germinated and flowers were produced at 1531 Rodeo Road, Arcadia, Calif., in early August, 1953 (see Plate 8). It was at once apparent that this species was quite distinct from *Crinum bulbispermum* (Brum.) M-R & Schw., to which Dr. Gouws had tentatively referred it. In connection with the preparation of the text of the writer's "Amaryllidaceae" for the printer, it was necessary to recognize the species as new, and it has appropriately been named, *Crinum gouwsii,* in honor of Dr. J. B. Gouws who was the very first to record natural polyploidy in the genus *Crinum.* The writer had induced polyploidy in *Crinum asiaticum* by means of colchicine treatment, but this tetroploid has not as yet been described in print.

Crinum gouwsii is a highly decorative species which is easily grown from seeds, and brought into flower in about three years. It is the first polyploid *Crinum* described and should be of value in breeding experiments. Dealers should include it in their collections so that it may become generally available.

Crinum gouwsii Traub, sp. nov.
- Plate 8 (Photo by Frederic Traub)

Crinum gouwsii Traub, **sp. nov. (Amaryllidaceae)**

Foliis fere "Lavender Green, RHS-ooo761" coloris usque ad 45 cm. longis curvatis, in linea centrali canaliculatis, marginibus albidis, ad apice usque ad mediam undulatis, prominentias irregulares minutes gerentibus; pedunculo usque ad 24.5 cm. alto subcomplanato, marginibus rotundatis; valvis spathae 2 libris lanceolatis usque ad 7 cm. longis; umbella triflora; pedicellis 0.5—1.6 cm. longis; ovario 1 cm. longo, 1.4 cm. lato; floribus bilateraliter symmetricis fragrantibus; tubo tepalorum deorsum curvato 10.5 cm. longo subviridi-rubello, segmentis ad apicem valde recurvatis 8—8.2 cm. longis, 2.5—3.2 cm. latis; staminibus styloque declinato-adscendentibus e perigonio paullo exsertis.

DESCRIPTION.—Chromosomes: 2n = 72 (Gouws, in Plant Life 5: 68-72, Plate 5, fig. 5. 1949).

Rootstock a tunicated *bulb,* the swollen part globose, up to 12 cm. long, 8.8 cm. in diam., neck 8 cm. long, 3.8 cm. in diam. *Leaves* several, near Lavender Green (ooo761—RHS), less frost hardy than in *Crinum bulbispermum,* up to 45 cm. long, 4.6 cm. near the base, abruptly enlarging to 5.6 cm. and then gradually narrowing to a pointed apex, the apical portion withering back to 0.6 cm. width in mature leaves, arcuate, with the two sides turned upward, both sides undulating, the margins coriaceous and provided with minute whitish irregular projections. *Peduncle* light green, 24.5 cm. tall, somewhat compressed, with rounded edges, 8.5 x 15 mm. wide at the base, 8.5 x 14 mm. near the apex, enlarging at the apex. *Spathe-valves* 2, free, lanceolate, acute, margins infolded, one 7 cm. long, 2.5 cm. wide at the base, the other slightly smaller; bracteoles very narrow. *Umbel* 3-flowered; flowers bilaterally symmetrical, delightfully sweet-scented. *Pedicels* light green, variable in length, 0.5—1.6 cm. long. *Ovary* 3-locular, light green, 1.4 cm. long, 1 cm. in diameter, slightly 3-sided, edges rounded, ovules many in each locule. *Tepaltube* curved downward, 10.5 cm. long, greenish, very slightly tinged reddish in the upper ¼, 3-sided, edges rounded, 5.8 mm. in diam. at the base, widening very gradually to near the base, and then abruptly to 8 mm. in diam. at the apex. *Tepalsegs* 6, decidedly recurved in the upper region, some apexes touching the back, each tepalseg pure white, with a reddish cusp at the apex, and banded reddish on the back, the color barely showing through on the inside. *Setepalsegs* (setsegs) 3, lanceolate, acute (when straightened out), all 8,2 cm. long, 2.5 cm. wide. *Petepalsegs* (petsegs) 3, the uppermost broadly-oblanceolate, 8 cm. long, 3.6 cm. wide; the lower two, oblanceolate, 8.2 cm. long, 3.2 cm. wide. *Stamens* 6, and *style* declinate-ascending, both slightly exserted from the perigone, the style more so than the stamens. *Filaments* attached at the mouth of the tepaltube, white, pollen light yellowish which appears grayish due to the black pollen-sacs beneath. *Style* white below, reddish in upper 1/3, stigma capitate, obscurely trifid. *Pollen grains* round, of two sizes, similar to the condition in chimaeras, but in this case the two sizes are apparently not due to such a condition because the plants were produced from seeds.

RANGE.—Duiwelskloof, Northern Transvaal. Holotype: Traub 522 (TRA). Additional specimens: Gouws 130, 133, 134, 135 and 147 (PRU). Type illustration: Plate 8.

NOTES.—According to Gouws (1949), this polyploid species "occupies the areas with the most favorable conditions for growth (high pre-

cipitation and temperature) while the diploids occur over wide and less favorable areas'' (specimens as cited by Baker, Flora Cap. 6: 203. 1894). At Arcadia, Calif., *Crinum gouwsii* has proved to be less frost hardy than *Crinum bulbispermum* grown in the same row next to it.

—*Hamilton P. Traub*

COLLECTING **ZEPHYRANTHES** IN MEXICO

Lt. Thad M. Howard, *Georgia*

During a hurried pleasure trip through Mexico in early July of 1953, it was my good fortune to collect four distinct species of *Zephyranthes* blooming in their native habitat in Central Mexico, following recent rains. Such luck was wholly unexpected and would be difficult to duplicate again. I was accompanied by a former college classmate of mine, David L. Jordan, who had just come back from Korea. At that time, he was just finishing his tour of duty in the Army and planning to return to College, while I had just finished College and was about to enter the Army. We both had a small amount of overlapping time on our hands, so we decided upon a short vacation into Mexico. The trip from San Antonio, Texas, to Mexico City and back, took only five days, but in this short span of time we were able to collect these small amaryllids as well as visit many interesting sites.

All of Northern Mexico was suffering from the same drought that was searing Texas and the South-west. As we passed through sun-scorched Orange groves south of Monterrey, I could not help but wonder what kinds of new *Zephyranthes* might possibly be buried in the dry soil, anxiously awaiting thirst-quenching rains to catapult them into bloom from their long period of dormancy. Unfortunately the dry conditions in the state of Nuevo Leon prevented us from finding out if any Rain Lilies were present. However, as we drove further into the interior of Mexico, into the state of Tamaulipas, the landscape changed into greener, more productive country, but still we saw no amaryllids.

It was not until we approached cooler, higher altitude of the mountainous regions that we encountered our first *Zephyranthes*. We had just passed through the little tourist resort town of Ciudad Valles in the state of San Luis Potosi when I spotted a colony of yellow *Zephyranthes* growing in a roadside ditch along the highway. Immediately recognizing it as a species new to me, I stopped the car to investigate.

They were light yellow in color, as large, if not larger than *Z. citrina,* but quite distinct from this or any other yellow species that I had seen. They were growing in heavy black soil in full sun and in the part shade of scattered trees. Many of them were standing in water which had collected from recent rains. The long linear foliage was not unlike that of *Z. citrina.*

I asked David to take some colored pictures of the plants and their surroundings so that we could better record the event. We had no tools to dig with, but luckily the soil was soft and mucky, so that it was not

difficult to slip the bulbs out of the earth. As I dug and David clicked his camera, some Mexican workers and some children drew near to see what the "Americanos" were up to. One of them, a friendly young man, volunteered that other Rain Lilies were to be found a bit further south, near Tamazunchale, and that these included white and pink colors.

There were also white *Zephyranthes* (of the subgenus *Cooperia)* scattered among the yellow Rain Lilies, which very strongly resembled *Zephyranthes brazosensis* (syn.-*Cooperia drummondii* Herb.),but I resisted the temptation of collecting them after I inspected them carefully as they did not greatly differ in any appreciable respect from *Zephyranthes brazosensis.* Except for their geographical range, I could not find anything about these white Rain Lilies that differed from the ones that grew around San Antonio. Nevertheless I shall always regret that I did not collect them for scientific reasons even though they offered little in the way of horticultural interest.

The Mexican man assured me that the white Rain Lilies near Tamazunchale were not the same as these. We thanked the man for the information and drove off, anxiously anticipating the finding of other species. We saw no more of the yellow *Zephyranthes* after leaving the original colony although we looked for them. This may explain why Mrs. Morris Clint and others have never located any yellow *Zephyranthes* in this region in their collecting trips in Mexico. Possibly this species may have a limited range, with this single colony being the only one to be found along this highway. As with all *Zephyranthes,* one must be at the right place at the right time after a rain to find them in bloom. It is easy to see how a colony such as this could be overlooked by the plant collector.

We did not have to wait very long that morning before I spotted another *Zephyranthes,* a pink one, blooming alongside the road. We found our second species in the lower mountainous regions about midway between Tamazunchale and Valles. It was a small rosy-pink flower with a lighter colored throat, rather like *Zephyranthes clintiae.* It grew beside the road in the grass in a heavy clay soil. Digging them was difficult as I had only a stick to gouge them out of the soil, and also because the soil was so heavy and gritty. We saw these scattered along the highway for several miles, but nowhere were they abundant.

We ate lunch in the little town of Tamazunchale in the south-eastern tip of the state of San Luis Potosi, before driving any further. Tamazunchale, popularly nick-named "Thomas and Charley" by tourists, is a favorite rest stop for travelers enroute to Mexico City, since about six hours of a steady mountain driving along the serpentine road lies ahead of the traveler after leaving this little village.

Later, in mid-afternoon of the same day, after we had entered the state of Hidalgo, somewhere in the mountains between Chapulhuacan and Jacala, we unexpectedly found our third *Zephyranthes.* By this time I had given up hope of finding any more *Zephyranthes* since we were too high in the mountains, or so I thought. How we discovered this species is an interesting story.

While winding our way around these mountains at an elevation of several thousand feet, we rounded a curve and passed three women and

a girl walking by the side of the road. The young girl waved at us as we passed and I noticed that she was holding a bunch of flowers in her hand. The flowers were of several kinds, but the thing that caught my eye was a large pink *Zephyranthes* in the center of the bunch. Instantly I began to wonder if these had come from a garden or if they had perhaps been picked in the wild. I discounted the second assumption and concluded that they were from a garden. My curiosity was aroused so I stopped the car and backed the car to where the women were standing. I asked the girl where she got the *Zephyranthes* and if she had any for sale. She shook her head and pointed up the road saying that they came from near her house near the top of the mountain. I assumed that perhaps she meant her own garden. Since they were still a good long way from the house she spoke of, and since the flower was apparently *Zephyranthes grandiflora,* and more important, since we were in a hurry to reach Mexico City before dark, we decided to drive on. Anyway, it was obvious that my friend was beginning to weary of Rain Lilies and the fuss that was made over each new variety encountered. It was no secret that neither botany or horticulture aroused any more than casual interest for him. I sighed and again drove up the mountain. However I again began to think about the flower that I had just seen. True, it did resemble *Z. grandiflora,* but there was something about it that was different. Curiosity again got the best of me, and again I backed down the mountain, this time determined to get bulbs of this species at all costs. Again I stopped the car alongside the women, and I told the girl that I should like to obtain some bulbs from her. David groaned agonizingly. Again luck was with us, for the girl pointed across the road and directed my sights to a spot where a bright pink large-flowered *Zephyranthes* was blooming on the side of the mountain along the highway. She dug this one with a sickle that she carried. We then found others growing nearby and dug these, she with the point of her sickle and I with my hands. The soil was moist, gritty and loose.

We did not have any Mexican money at the time to give to these women, but we did have some papayas in the trunk of the car. We offered these to the women and they were accepted gratefully. It was obvious that we had made a good deal, and that both parties were mutually happy. David was happy that the whole transaction required no more time than it did. I was relieved too that we found them so easily without having to do any mountain climbing. We saw more of these *Zephyranthes* blooming on the mountain sides along the road for the next few miles, and we stopped and dug a few more, but since the day was lengthening into afternoon we had to hurry on if we were to reach Mexico City before dark. I never would have guessed that *Zephyranthes* would grow natively at such high altitudes in the mountains. True, our first two species were growing several hundred feet above the level of the sea, but here was a species growing some five thousand or more feet above sea level, on the sides of mountains.

Good fortune never deserted us, for in visiting the famous Ancient pyramids at San Juan Teotihuacan near Mexico City, I spotted another new species from our automobile at Tepexpan, not many miles from the

site of these ancient structures. Again I stopped the car to examine and collect. Fortunately, this time I had a knife to dig with, as the soil was very dry and hard. Surprisingly, this species was very variable in color. Here were some white ones, there grew some pink ones, and again mixed in with these would be white ones with rosy suffusions on the back-side of each segment of the corolla. The majority of these were of the latter description. Aside from the fact that some flowers were pure white while others were rose-pink, they were exactly alike. The stems were only a few inches in height, but would probably have been longer if there had been more rainfall. The dry earth in which they were blooming indicated that the precipitation that had lulled them into bloom had been scanty. These bulbs grew in open grassy fields in what were once shallow salt lakes during the Aztec civilization, but these lakes had since been drained and placed in cultivation. Very little farming was done however, as crops did not thrive on these salt flats. The flowers were chalice-shaped or crocus-like in form, but since these were collected in the afternoon, this may be of no significance, as many *Zephyranthes* assume this shape after first opening widely in the morning.

The large mountain species was of special interest to me because of its resemblance to *Zephyranthes grandiflora*. There has been a good bit of mystery surrounding the original native habitat of *Z. grandiflora,* and the fact that it rarely, if ever, sets seed. The high percentage of freak flowers (abnormal number of petals, anthers, abnormal shapes, etc.), the apparent sterility of the flower coupled with its capacity for vegetative increase, and the scanty information surrounding its original native habitat has often caused some botanists to wonder whether it is a valid species, a hybrid, or a mutation from the wild state. It has always been the wish of botanists that some one would again collect this species as it originally grew in its native habitat. Whether or not the large pink species that Mr. Jordan and I found in the mountains in the state of Hidalgo is *Z. grandiflora* in its original form, or a distinct nearly-related species remains to be determined. It is not exactly identical with *Z. grandiflora,* but the resemblances in size, color, and to some extent in the form, are suggestive of some relationship. It will be interesting to see how these different species adapt themselves to cultivation, and it is strongly hoped that they will succeed, as they are all of real merit as garden material. The large pink mountain species should be especially valuable in hybridizing. Efforts will be made to propagate these various species so that eventually they might be shared with others. In the mean time, it is hoped that other enthusiasts who should happen to visit Mexico will keep an eye cocked for these little amaryllids, for there may still be many as yet undescribed and unknown to botanists, or perhaps described and introduced, only to be lost to cultivation.

1953 REPORT ON THE TRAUB-USDA DAYLILIES

STANLEY E. SAXTON, *New York*

Continuing our 1950-1952 evaluation report given in Herbertia 1953 (Page 67), additional growth, up to Dec. 25, 1953, has brought the total number of fans to the following figures. Allowance has been made for a few divisions sent out.

	Name	*Original Planting.*	*1952*	*1953*
1.	'Clarinda'	4	22	40
2.	'Emily Dickinson'	5	20	30
3.	'Gita'	2	5	6
4.	'Golden Triangle'	2	4	5
5.	'Iowa'	2	7	10
6.	'Krishna'	1	8	15
7.	'Lemon Tulip'	2	4	9
8.	'Mary Henry'	3	13	26
9.	'Mitra'	3	8	14
10.	'Papagaio'	1	4	4
11.	'Purity'	3	12	21
12.	'Reinbeck'	2	10	11
13.	'Saffron Queen'	2	6	15
14.	'Stephen Foster'	2	2	3
15.	'Susanna'	1	3	4

Contributing Conditions: Most of these plants are still in the original clumps. In some cases [as in 'Reinbeck' and 'Krishna'] the clumps are crowded, and it is probable that more increase would have been realized if the clumps had been divided in the spring of 1953.

Summary: In general the increase compares favorably with that normally experienced under our conditions.

'Krishna' still shows the greatest percentage of increase, followed in order by: 'Clarinda'; 'Mary Henry'; 'Saffron Queen'; 'Purity'; 'Emily Dickinson'; 'Reinbeck' and 'Iowa'. We consider the remainder too slow in increase to be good commercial types under our conditions.

It is interesting to note however that 'Lemon Tulip' made better growth during the last year, as did 'Saffron Queen'. Perhaps 'Lemon Tulip' takes longer to establish. 'Stephen Foster', 'Papagaio' and Susanna' performed poorly; the last two particularly, in view of their previous growth.

As regards the flowers our favorite is still Mary Henry. 'Saffron Queen' impressed us with its medium tall colorful clump of wide petaled golden flowers. Planted in front of the taller, lighter colored flowers of 'Emily Dickinson' the combination was most pleasing. 'Clarinda' made an excellent showing. 'Golden Triangle' flowered fairly well but did not impress us as favorably as the others mentioned.

AMARYLLID NOTES

HAMILTON P. TRAUB, *California*

Percy-Lancaster Hybrids. The hybrids made by Percy-Lancaster within the genus *Zephyranthes,* and between *Zephyranthes* and *Habranthus,* have never been properly named. In connection with the preparation of the text of the manuscript of the *Amaryllidaceae* it has been

Fig. 5. The Green Orchid-flowering Amaryllis—*Amaryllis viridorchida.* Photo by Frederic Traub.

necessary to propose the following names for these hybrids:

Zephyranthes x *lancateri* Traub, *hybr. nov. (Zephyranthes brazosensis* Traub x *Z. grandiflora* Lindl.); syn.- x*Cooperanthes rosea* Percy-Lancaster, in Jour. Roy. Hort. Soc. 38: 531. 1912-1913.

Zephyranthes x *blanda* (Percy-Lancaster) Traub, *comb. nov.*

(Zephyranthes brazosensis Traub x *Z. treatiae* S. Wats.) ; syn.- x*Cooperanthes blanda* Percy-Lancaster, in Jour. Roy. Hort. Soc. 38: 531. 1912-1913.

Zephyranthes x *percyi* Traub, *hybr. nov. (Zephyranthes citrina* Baker x *Zephyranthes brazosensis* Traub) ; syn.- x*Cooperanthes* 'Percy', Percy-Lancaster, in Jour. Roy. Hort. Soc. 38: 532. 1912-1913 (type) ; x*Cooperanthes* 'Sydney', l. c. (reverse cross).

xSYDNEYA Traub, *hybr. gen.* nov. Traub *(Amaryllidaceae), Zephyranthes* Herb. x *Habranthus* Herb., syn.- x*Cooperanthes* Percy-Lancaster, in Jour. Roy. Hort. Soc. 38: 531-532. 1912-1913, in part. x*Sydneya lancasterae* Traub, *comb. nov.* (type), syn.- x*Cooperanthes lancastrae* Percy-Lancaster, in Jour. Roy. Hort. Soc. 38: 531. 1912-1913 [*Zephyranthes brazosensis* Traub x *Habranthus tubispathus* (L'Herit.) Traub] ; x*Cooperanthes* 'Alipore Beauty' Percy-Lancaster, l. c. p. 532; x*Cooperanthes bella* Percy-Lancaster, l. c. p. 531; x*Cooperanthes* 'Mary', Percy-Lancaster, l. c. p. 532.

x*Sydneya india* Traub, *nom. nov.* (syn.- x*Cooperanthes* 'Sunset', Percy-Lancaster, l. c. p. 531 *(Zephyranthes brazosensis* Traub X *Habranthus andersonii* Herb. x. Lindl.).

Amaryllis viridorchida. This species was described in Plant Life *7:* 31—33, fig. 3. 1951. The only photograph of this species available at that time was not up to the high standard required for an adequate illustration. To make good this deficiency, an excellent portrait of the species made by Frederic Traub in the fall of 1953 is reproduced in Figure 5.

All attempts to set seeds on *Amaryllis viridorchida* by self-pollination have failed so far. Thus it has not been possible to obtain increase for distribution. Attempts will be made to obtain seeds by sibling pollination.

Crinum species with reddish leaves. Mr. & Mrs. Corbet have brought back a most interesting *Crinum* species from Hawaii where it is reported to be common in cultivation. This is a tall growing species with leaves that are deeply tinged reddish over the green background, especially in leaves of large blooming-size plants. This species cannot be confused with *Crinum erythrophyllum* Herb., which is a dwarf and prostrate plant, native to Burma. An attempt will be made to identify the tall reddish-leaved species for the next Herbertia; at any rate, a picture of the plant will be included in the next issue.

REGISTRATION OF NEW AMARYLLID CLONES

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

This information is published to avoid duplication of names, and to provide a space for recording brief descriptions of new Amaryllid clones. Names should be as short as possible—one word is sufficient. It is suggested that in no case should more than two words be used. *The descriptions must be prepared in the form as shown in the entries below, and must be typewritten and doubled-spaced.* The descriptive terms used should be in harmony with those given in the "Descriptive Catalog of Hemerocallis Clones, 1893-1948" by Norton, Sauntz and Ballard.

There is close liaison between the AMERICAN PLANT LIFE SOCIETY and the HEMEROCALLIS SOCIETY regarding the registration of new *xHemerocallis* clones. By cooperative arrangement with the HEMEROCALLIS SOCIETY, beginning with the 1951 HERBERTIA edition, descriptions of only such *xHemerocallis* clones for which the registration fee has been paid to Registrar, Mr. Harry I. Tuggle, P. O. Box 1108, Martinsville, Va., will be registered, and numbered (example: 3322-R). The number "3322" indicating the number of the clone and the "R," the information that it is registered. The registration fee is required *only* in the case of *xHemerocallis* clones, and *not* for other amaryllids which are registered free of charge by the AMERICAN PLANT LIFE SOCIETY. It should be noted that in a free country such as ours, registration is *entirely voluntary,* and does not replace the right of anyone to publish names with descriptions in recognized publication media elsewhere and thus obtain priority under the generally recognized INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE and the INTERNATIONAL CODE OF NOMENCLATURE FOR CULTIVATED PLANTS (1953) which cover all plant names.

Correspondence regarding new amaryllid clones, including *Hemerocallis,* to appear in HERBERTIA should be addressed to Prof. J. B. S. Norton, 4922 40th Place, Hyattsville, Maryland, *enclosing self-addressed, stamped envelope, if reply is expected.*

For obvious reasons, there is a limit to the number of descriptions included from any one member in any one issue. Not more than five brief descriptions of clones under each generic heading will be published from any one member in any one issue of HERBERTIA. Descriptions of clones in excess of five brief descriptions, up to a total of 25, will be entered if the space required for each is limited to one line. In this case use should be made of the standard abbreviations already mentioned.

THE AMERICAN PLANT LIFE SOCIETY numbers the clones known to be published, including those registered and not registered, in various publication media. It is thus an easy matter to report the approximate number of named clones as of any date. Such a report will be made as of July 1 in each year. On July 1, 1953, a total of 4458 hybrid *Hemerocallis* clones had been named.

xCRINODONNA CLONE

xCrinodonna corsii clone 'Lon Delkin', Traub, **cl. nov.**

This hybrid of unknown origin is similar to x*Crinodonna corsii* clone 'Fred Howard' (syn.-***Amacrinum howardii),*** but the pedicels are a little longer, and the flowers are a little smaller and of a more perfect form, the umbel is up to 9-flowered. This hybrid is closest to x*Crinodonna corsii* clone 'Dorothy Hannibal' (see Plant Life 8: 85-86. 1952) which is however 18-flowered. Thus this hybrid is most likely a cross between *Crinum moorei* and *Brunsvigia rosea* var. *minor.*

x*Crinodonna corsii* clone LON DELKIN was obtained by Mr. Alonzo C. Delkin, of Arcadia, Calif., from Mr. Tom Shimoda, of Monrovia, Calif., in 1943, who had collected it in a field in the City of Los Angeles many years ago before the population had expanded to its present proportions. The species has been appropriately named for Mr. Delkin who is an outstanding amateur horticulturist and amaryllidiarian. One of his specialties is Crinum species, hybrid Crinums and xCrinodonnas.

HYBRID HEMEROCALLIS CLONES

Introduced by Stanlay E. Saxton, Saratoga Springs, New York:

'Aloha'. Cool pastel pink bitone. Ivory petals flushed light pink. Cream toned sepals shaded a lighter pink. Large gracefully recurved flower on 50″ stems. Midseason. [4419-R]

'Big Time'. Exceptionally large bright orange-scarlet blend. The petals are golden yellow flushed scarlet which is deeper toward the petal edges. The sepals are more uniformly light scarlet. All segments are recurved. Stems about 40″. Flowering late midseason. [4420-R]

'Bishop'. Large very deep maroon purple flower. The sepals are a lighter shade giving the effect of a bitone. Tall, showy and very brilliant in effect. 55″. Midseason. [4421-R]

'Corduroy'. Medium size flower in shades of mahogany and tan. There is a delicate gold hairline edge around all segments as well as gold midribs. The sepals recurve while the broad petals flare and twist at the ends. 38″. Midseason. (No. 2710-R)

'Soft Light'. Large compact ruffled flower of mimosa yellow having a light flush of gold near the throat. Tends to throw double and semi-double flowers when established. 48″ stems. Late midseason. [4422-R]

AMARYLLID GENERA AND SPECIES

HAROLD N. MOLDENKE

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

Sternbergia caucasica Willd., in Ges. Nat. Freunde, Berlin Mag. *2:* 27. 1808. Leaves linear-lanceolate, rather erect; segments of the corolla ovate. A perennial growing in the Caucasus Mountains.

Hymenocallis eulae Shinners, in Field & Lab. 19: 103. 1951. Related to *H. liriosma,* but blooming after the withering of the leaves, and the tube of the perianth longer, 8—12 cm. long.

Paramongaia weberbaueri Velarde, in Lilloa: 491-492. 1949. Leaves 6—8, borne in a distichous fashion, glaucous, up to 77 cm. long and 5 cm. wide; scape up to 55 cm. long, 1-flowered or very rarely 2-flowered; flowers short-pedunculate, large, very beautiful, lemon-colored very sweetly fragrant; tube of the perigonium about 10 cm. long, the tepals plainly in two ranks, those of the outer whorl being elliptic-lanceolate and to 9 cm. long and 3.7 cm. wide, those of the inner whorl being ovate-cuneate, obtuse at the apex, and up to 8.5 cm. long and 4.7 cm. wide; the staminal corona showy, about 8.5 cm. long, 2 cm. wide at the base and 7.5 cm. wide at the mouth; free portions of the filaments about 11 mm. long, arising from a spot between 1 and 2 cm. below the mouth of the staminal corona; ovary 3-angled and 3-celled, 1.8—3 cm. long, 1—1.3 cm. in diameter; style about 19 cm. long and 2 mm. in diameter, ending in a peltate and 3-lobed stigma; capsule 3.7 cm. long and 2.8 cm. in diameter; seeds applanate, winged, 12 mm. long and 9 mm. wide; embryo terete, about 5 mm. long and 1 mm. in diameter. Found on the slopes called Lomas on the upper Paramonga (Pacar, Lupin) and Huarmey.

Paramongaia Velarde, in Lilloa: 489. 1949. Tube of the perigonium elongate, curved, narrowed toward the base, gradually widened to the apex, but with the sides of the same thickness throughout; tepals of almost the same length [=subequal—HNM], conspicuously 2-ranked, mucronate, those of the inner whorl sometimes obtuse at the apex and at other times with a form like that of the ones in the outer whorl; staminal corona large, almost the same length as the tepals, funnel-form, its mouth 6-lobed, the lobes short but broad, truncate and dentate or sometimes also 2-lobed, on the inside with 6 green longitudinal lines for about 2/3 of its length from the base to the mouth and indicating the part of the filaments adnate to the corona; the free portion of the filaments arising at the apex of the green coronal lines, about 1/5 as long as they are, and sharply bent from their base toward the inside of the staminal corona; anthers dorsifixed, introrse, yellow; ovary 3-celled, the ovules very numerous in each cell, flat, inserted perpendicularly to the placenta in two series; style filiform, completely free for its entire length, without any blade-like expansions, almost cylindric; stigma peltate and 3-lobed; capsule more or less isodiametric or somewhat elliptic, plainly 3-angled; seeds numerous, almost as many as the ovules, flattened, winged, more or less reniform, pale-brown, the wing either oblong like the body of the seed or sometimes broader; scape variable in length, compressed, elliptic in cross-section, 1- (or rarely 2-) flowered at its apex; peduncle very short; bracts oblong-triangular, membranous, marcescent at the time of anthesis; leaves linear-carinate; bulb tunicate, more or less globose, producing buds in the axils of the outer coats.

Hieronymiella Pax, in Bot. Jahrb. 11: 327. 1890. Perigonium funnel-form, its tube cylindric, very long, the lobes recurved-spreading, much shorter than the tube; stamens attached to the throat, shorter than the perigonium; filaments subequal, elongate, winged to the apex, the

wings protracted at their apex into teeth that are about the same length as the anthers; anthers linear-oblong, dorsifixed near the base; ovary 3-celled; style filiform, shorter than the perigonium; stigma trifid, the lobes recurved; ovules very numerous in each cell, in 2 series; flowers many, borne in pseudo-umbellate inflorescences, erect, short-pedicellate, almost subsessile; outer involucral bracts 2, lanceolate, quickly marcescent.

Hieronymiella clidanthoides Pax, in Bot. Jahrb. 11: 327. 1890. Leaves narrowly linear, glaucescent, 3 mm. wide; scape lofty, 3 mm. in diameter, 12—20 cm. tall; involucral bracts long-acuminate, pale, 7—8 cm. long, almost 1 cm. wide at the base; inflorescence 4- or 5-flowered; pedicels 5—10 mm. long; perigonium yellow, its tube not ampliate, about 10 cm. long and 3 mm. in diameter, its lobes oblong-lanceolate, acuminate, 4 cm. long and 6—8 mm. wide; filaments winged, 15 mm. long, the teeth triangular, acuminate; anthers 6—8 mm. long, the teeth 6—7 mm. long; style 12 cm. long, surpassing the stamens; ovary 1.5—2 cm. long. Argentina: on the plateau of Nascimientos, prov. Catamarca, collected by Lorentz in January, 1872.

Eustephia argentina Pax, in Bot. Jahrb. 11: 328. 1890. Leaves linear, obtuse, 20—30 cm. long, 5—6 mm. wide, apparently subglaucescent; scape lofty, to 20 cm. tall; bracts 2, rose-colored, lanceolate, 6—8 cm. long, the inner ones membranous, pale, setaceous, and much smaller; inflorescence many-flowered, in pseudo-umbels, the flowers 12 or more, longly and unequally pedicellate, nodding, subsecund; pedicels very unequal, 3—12 cm. long; perigonium scarlet, its tube very short, to 3 cm. long and 1.5 cm. in diameter, its segments oblong-obovate, to 6 mm. wide, the 3 outer ones acute, the 3 inner ones very obtuse, shallowly emarginate, apiculate; stamens slightly surpassing the perigonium, the filaments attached to the segments of the perigonium, only slightly connate to each other at their very base, dilated up to two-thirds their length, one-dentate on both sides above the middle, the tooth obtuse; anthers versatile; ovary triangular; style filiform, scarcely 3 cm. long, subequaling the stamens; stigma 3-lobed; capsule 3-angled; immature seeds with a black testa, shiny. Argentina: very frequent in higher localities, Cuesta de la Negrilla and Cuesta del Durazno, prov. Catamarca, collected by Schickendantz in November and December, 1873.

Eustephia marginata Pax, in Bot. Jahrb. 11: 328. 1890. Bulb brown, ovoid, 4 cm. in diameter, elongated into a neck; leaves narrowly linear, coriaceous, narrowly white-margined, glaucous, to 30 cm. or more long, scarcely 5 mm. wide, scabrous along the margin; scape lofty, almost 12 cm. tall; involucral bracts all quickly marcescent, pale, the outer ones 8 cm. long, longer than the pedicels; inflorescence many-flowered, in pseudo-umbels, the flowers about 12, unequally pedicellate, nodding, produced at the same time as the leaves, funnel-form; pedicels 3—6 cm. long; perigonium 3.5 cm. long, 1.5 cm. in diameter, rose-colored, its tube very short, its outer segments oblong-obovate, 6 mm. wide, and mucronulate, its inner segments narrower and very obtuse; stamens slightly surpassing the perigonium; filaments attached to the segments of the perigonium, scarcely connate to each other at their very base, dilated to two-

thirds their length, one-dentate on both sides above the middle, the tooth acute; anthers versatile; ovary triangular; style filiform, 4 cm. long, exserted, surpassing the stamens; stigma capitate, small. Argentina: Sierra Famatina, La Incrucijada (Encruicijada), at 2500 to 3000 meters altitude, collected by G. Hieronymus and G. Niederlein on January 21 and February 2, 1879.

Crocopsis Pax, in Bot. Jahrb. 11: 324. 1890. Perigonium funnelform, straight, its tube very long, ampliate into a throat above, its lobes subequal, erect-patent above; stamens attached in the throat, equal, included, erect; filaments dilated toward the base, connate to each other; anthers linear, dorsifixed; ovary 3-celled; style filiform, straight; stigma capitate; ovules numerous in each cell, in two series; bulb tunicate, elongated into a neck; leaves linear; scape produced underground; flower solitary, sessile in a tubular spathaceous bract that is bifid at its apex.

Crocopsis fulgens Pax, in Bot. Jahrb. 11: 324. 1890. Entire plant dwarf, with the habit of a *Crocus* or *Colchicum;* bulb brown, 2—3 cm. in diameter; scape hidden in the neck of the bulb; leaves (not completely developed) 3—4 cm. long, 2 mm. wide, subglaucous, narrowly linear, recurved, shorter than the flowers; spathe subequaling the tube of the perigonium, which is slender, 4—4.5 cm. long, scarcely 2 mm. wide at the base but almost 4 cm. wide at the throat, its lobes obovate, almost 2 cm. long, 5—6 mm. wide, fire-red, narrowed toward the base, the outer ones apiculate, the inner ones obtuse; stamens slightly shorter than the perigonium; filaments 4.5 cm. long, 2—3 mm. wide at the base; style equaling the filaments; ovary oblong, triangular. Peru: between Tacore and Tomarape, at 4200 meters altitude, collected by Stuebel in October, 1876.

Zephyranthes hieronymii Pax, in Bot. Jahrb. 11: 324. 1890. In the affinity of *Z. candida* (Lindl.) Herb.; lofty; bulb protracted conspicuously into a neck; leaves synanthous, narrowly linear, almost equaling the scape; spathe split laterally almost to the base, not bifid; flower erect, very short-pedicellate; perigonium white, somewhat pinkish outside, small, its tube very short, the segments narrowly oblong, subobtuse; alternate filaments shorter; style equaling the filaments; stigma capitate, 3-lobed; capsule medium-sized; bulb brown, 1—1.5 cm. in diameter, the neck 6—9 cm. long; leaves 12—16 cm. long, 1 mm. wide; scape slender, 10—15 cm. tall; spathe 1.5—2.5 cm. long, membranous, somewhat pinkish outside; flower subsessile or very shortly pedicellate; pedicel 1—2 mm. long; segments of the perigonium 5—10 mm. long, the tube short; filaments included, the longer ones about equaling the middle of the perigonium; style equaling the longer filaments, slender; stigma thick; capsule 3-lobed, 3-sulcate, 5—7.5 mm. in diameter. Collected in meadows, Concepcion del Uruguay (Dr. Lorentz 878) and in wet meadows in Uruguay, June, 1874 (Arechavaleta 2584).

3. GENETICS AND BREEDING

THE McCULLOCH HYBRID AMARYLLIS STRAIN

EDITH B. STROUT, *California*

Some time back, I read a report in Herbertia by G. K. Cowlishaw of New South Wales, Australia concerning the culture of Amaryllis in Australia. He stated that the "strains of Messrs. P. V. McCulloch of Warrawee and E. McCulloch of Mosman in New South Wales are the

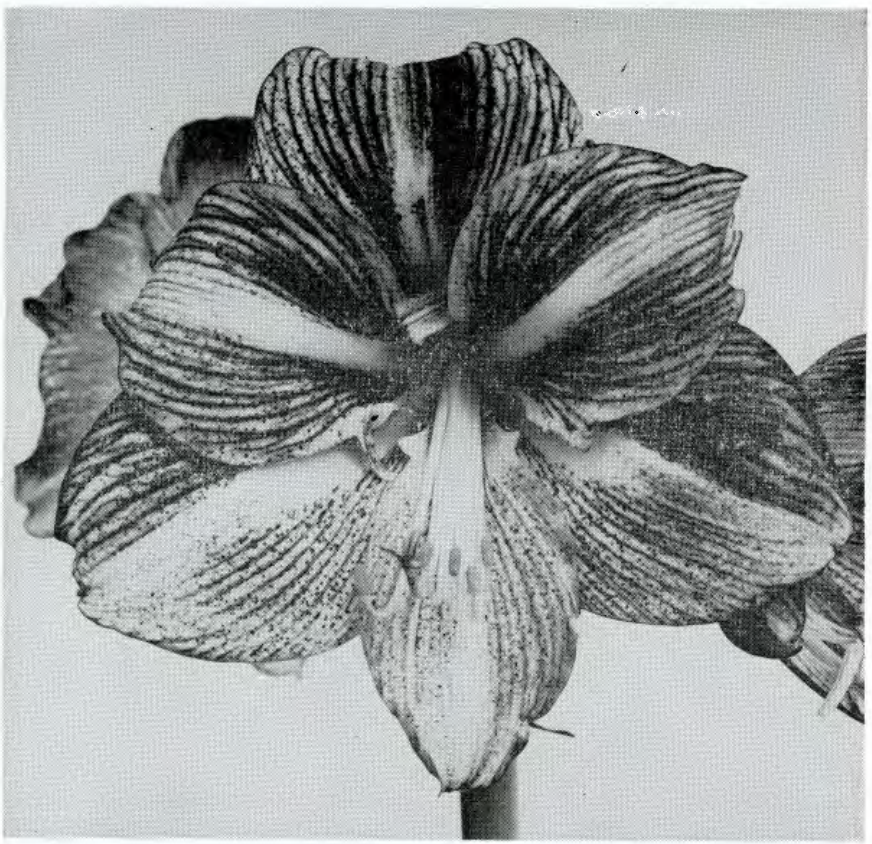

Fig. 6. Seedling McCulloch Hybrid Amaryllis (D-5b); 8-inch bloom, white keel and background, striped crimson, copiously dotted with crimson. Photo by Mrs. Edith B. Strout.

best in the world. These strains are more or less intermingled, though the latter possesses the greater range of color, and are the result of many years of careful cross breeding and selection. The commencement of the strain was from plants of the once famous Bradley collection, in its day

as outstanding as are those of the McCullochs today. Bradley was a very keen hybridist specializing in Amaryllidaceae, and he raised some very beautiful flowers. In the Amaryllis he aimed at large regular flowers with equal perianth segments, clear colors and well reflexed petals.

"On Bradley's death Mr. P. V. McCulloch took up the work from where he left off, and gradually by patient work and always following the ideals laid down by Mr. Bradley, achieved the wonderful strain he possesses today. His nephew, Mr. E. McCulloch, who always took a keen interest in these plants, and the work of his uncle, during the past ten years or so, has made a good collection of plants, all seedlings of either P. V. McCulloch's raising or his own.

"The flowers of these strains are in the main of a deep self crimson for it was this color for which both Bradley and McCulloch bred, most of these possess a dark red eye and do not show one particle of green."

This was fuel to the fire of my enthusiasm in my search for a deep red self, so I started inquiries, writing direct to Mr. E. McCulloch in Mosman, Australia. The result of this was some very interesting correspondence from which I learned a great deal and this information I'd like to pass on to other fanciers.

Mr. McCulloch seemed surprised that anyone in America should have heard of him and said that Mr. Cowlishaw had exaggerated. "I would be very much surprised if both Holford and de Rothschild in England hadn't better stuff and we have never raised a bloom 14 inches across unless perhaps if it was pressed out, the largest of our flowers measured 11½ inches and it is a very shapely flower. I have some of what I call pastel shades and pinks which I think are quite new and very fine good form and wide bottom petal, and the flowers are a good eight to ten inches in diameter.

"Our (stock) is built up from bulbs obtained from Holland and England and from the late H. H. B. Bradley about thirty years ago and we have simply crossed the flowers we fancied working on the theory that form followed the mother flower and using the lower or lip petal of the male flower."

In his letters, Mr. McCulloch mentioned many times several points regarding hybridization. He believed in these most emphatically, though his views on using pollen from the stamen above the lower petal * is in disagreement with the generally accepted genetic principles. Since he did all his hybridizing by applying these two points, and had such fine success by using them, others may be interested in hearing his opinions:—

"There are two points I wish to emphasize as regards hybridizing, two fundamentals which I have proved most conclusively over a period

*McCulloch's claim is erroneous because the pollen grains have all arisen from the same parental tissue. Thus, barring mutations, the pollen from all six stamens is the same. We know that mutations occur in Amaryllis only very rarely, and if mutations should occur the chances of this happening in any of the six stamens would be equal. Mrs. Strout writes that one of her correspondents has informed her that McCulloch's "hypothesis" was published in the Journal of the Royal Horticultural Society some years back. It has apparently been ignored.—**Editor**

of 30 years. In hybridizing, the *form* will follow the mother flower and the best results are got by using the pollen from the lower or lip petal. I could not believe that using the pollen from the weakest petal could be right until I proved it again and again. I am sure our best results came about by our concentrating on this. My informant in the first place was the late H. H. B. Bradley who did so much here in the early days of the development of amaryllis.

Fig. 7. Seedling McCulloch Hybrid Amaryllis—chartreuse green segs, white keels and cardinal stripes on both sides of keel. Photo by Mrs. Edith B. Strout.

"If you consider it, this in no way interferes with the Mendel theory. It still works out at 50%, 25% and 25% only the results of the improvement are far greater. . . . If you will broadcast my information through your Journal I am sure some of your growers would derive benefit from my experience unless, of course, my information is stale news.

"... Mr. P. V. McCulloch and I have about five thousand bulbs between us and have no room to grow any more and because the bulbs have been growing in the same soil all these years, they are not doing what they should, therefore we would be very glad to have some of our stock grown in your country. ... If you care to try the experiment I am only too glad to help you out."

"In a letter of November 30th, 1944, Mr. McCulloch said "the hybridizations I have made for you are coming along well and I think I will have a fair variety of seeds for you though as you requested self reds will predominate. ... I would suggest if we send you too many seed to grow yourself you might have some friends who would grow the surplus."

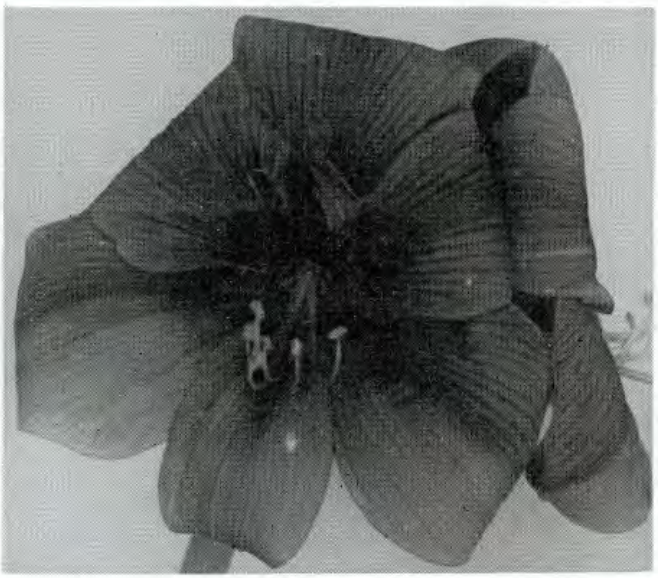

Fig. 8. Bulb from originator, McCulloch Hybrid Amaryllis (D-5b)—flowers with segs recurved. Photo by Mrs. Edith B. Strout.

In May of 1945 I received ten large amaryllis bulbs and 19 packets of seed. As I could not use all of the seed, I planted about 100 and sent a similar amount to Mr. Hermon Brown, distributing the balance to members of the Amaryllis Round Robins.

In a later letter Mr. McCulloch stated "you will be sorry to learn that as far as Amaryllis are concerned I am finished. My bulbs developed a virus and in spite of all I could do, hormones, change of soil, etc. I have lost the lot, some 2000 bulbs. The strain is not quite lost as a Dr. Stayner here had started to build up a small collection using my bulbs and pollen; also a few bulbs I took to Kew Gardens, London, in 1935, I hear have done quite well." Naturally, as soon as I received

this news, I sent back seed of the McCulloch bulbs, some selfed, some crossed, some crossed with Holland pollen. Unfortunately Mr. McCulloch did not get the opportunity to see these flower, for in November of 1951 he died of a heart attack.

THE McCULLOCH HYBRIDS

Due to unfavorable conditions here, a change of residence, and just carelessness, I have lost some of the ten original bulbs sent me. The seedlings have grown slowly and few have flowered for me, but I've certainly been pleased with those that have bloomed.

Three of the original bulbs that have bloomed for me have been red selfs. The first one had 2 scapes, with 4 bells each, with flowers 9½

Fig. 9. McCulloch Hybrid Amaryllis; left, clone from originator, 9½ inch bloom, "Cherry striped." Right, seedling "stripe on Mosman pink", 8½ inch bloom, pink with deeper pink or red picotee lines on all edges. Photos by Mrs. Edith B. Strout.

inches across with outer petals 4 inches wide. Scarlet with a definite purple overcast. The texture was quite smooth with just a little of the "seersucker" effect seen so often in large flowers. The second one was also a scarlet, with large petals but these were very recurved so the effect was only like that of a 7-inch flower. Another 8½-inch red self (Vermilion R. H. S. 18) had a very deep iridescent star. All of these were the same color on the outside and the face of the flower.

Some of the original bulbs received from McCulloch, and seedlings are illustrated in Plate 5, lower right, and Figs. 6, 7, 8 and 9.

One of my favorites is what I call "Cherry striped." (See Fig. 9, left). This is a 9½-inch bloom, with keels and throat chartreuse green,

with cherry red (RHS 722) stripes or patches on both sides of keels nearly to the edges, but the edges are white. The red stripes on the lower petals are Geranium Lake (RHS 20/1). This I happen to like very much but McCulloch described it as being too rugged, as it always had been for him.

When I received the bulbs and seed from Mr. McCulloch he said "You should get much better blooms from the seeds than the bulbs when they eventually flower. The bulbs are fairly old stock and the seeds are crosses of the newer ones which have not yet increased in numbers." So it was with great impatience that I waited for them to bloom.

But my seedlings have had too many set backs to do well, though some of the Round Robin members have had theirs bloom. An offset of one was given me which has an 8" blossom, white keels from throat about half the length of the petals, heavily striped with crimson (RHS 22) and overlaid with lots of crimson dots. The outside of petals also heavily dotted. (See Fig. 6).

Another seedling sounds like one that should be thrown out, but I personally found it so unusual and charming I fell in love with it. It had chartreuse green petals (RHS 663/1), white keels, Pea Green (RHS 61/1) throat, Cardinal red (RHS 822/2) stripes both sides of keel on upper three petals, about half way out, then red stripes fade into red dots, sprinkled on petals but stopping before the edges are reached. Each "spur" at tips of petals is also cardinal red, even on the lower petal. Backs of petals are brown-green, heavily speckled with red dots on upper petal. The cardinal stripes appear more rose than they actually are, but the contrast with the chartreuse green and the spot of red at tips of petals makes it a striking blossom. (See Fig. 7).

But my favorite seedling was from a group labeled "Stripe on Mosman Pink" (see Fig. 9, right). This was a 8½-inch bloom with outer petals 4¼ inches wide and the lower petal a full 2 inches, and was what Mr. McCulloch called "the squared jawed type". It was one of his last developments and he expected to get some good results from this type by using it as a male parent. The flower has a white ground, spotted with red dots, light red stripes on both sides of keel on upper three petals, but pink from keel to edges, flushed pink on lower inner petals. There is a red picotee line on edges of all petals, as if the Master Engraver wanted to emphasize the beautiful symmetry of this bloom. This one blossom alone was worth waiting years to see.

THE McCULLOCH AMARYLLIS HYBRIDS

POLLY ANDERSON, *California*

In 1949, the first of the seedlings of the Australian hybridizer, McCulloch, bloomed. These seed were sent through the Amaryllis Robins by Edith Strout, who corresponded with McCulloch.

This first one was a huge very odd giant, with twisted petal tips and strongly ridged petals. The petals began their ruffling from the rigid,

greenish white, thick rib. Background color was white but it was so thickly striped and dotted that the appearance was of a red flower with white ribs. The tips were folded and twisted, the edges curled, giving the flower the general shape of a tall triangle. Stamens and pistil were extra long, white, stippled red, and the stigma was edged in red. The leaves were the widest of any amaryllis I grow and rather short, 2½″ by 10″ long. Four flowers were in bloom at once. This has been named, 'Cannae Butterfly', by Dr. Traub, and serves as the first illustration (Fig. 1) of the Orchid-flowering Division (D-6) of Hybrid Amaryllis.

The second seedling to bloom was the darkest red I've ever seen and a pure self, even on the reverse side. The rounded sepals were 3½″ at their widest point, the petals 2¼, both with pointed tips. There was a white beard or fringe masking the tube, but otherwise no other color in the throat, not even a darker eye zone. The extra long stamens and half-inch longer pistil were the same deep red. The second time this flower bloomed it was even larger with 4″ sepals and 3½″ petals.

The third seedling was also a pure red, about two shades lighter than the other red, and two sizes smaller, but with the same rounded petal with pointed tips, a 6½-inch flower, sepals 2¾″ and petals 1¾″. As with all the other McCulloch seedlings the stamens and pistil were the same color as the flower, and exceedingly long. The two reds were a bit smoother flowers than the two with white ground color, but in general all 4 seedlings were what I would call rough, coarse flowers, but nonetheless beautiful.

In 1952 the fourth seedling bloomed, a near white with a hairline of red around the edges of all segments. The top two petals and sepal had wide ribs of white, heavily striped with red on either side, growing lighter as the stripes radiated outward. The lower two sepals were striped above the rib but not below, and the lowest petal was pure white with red edges. As the flower aged the red color seemed to intensify and spread, making the picotee edge much more distinct on the lower segments but blending with the red striping on the upper segments giving the flower the effect of top 2/3rds red and bottom third white with red edges.

WANTED: DAYLILY INHERITANCE DATA

R. W. Ballard, *Maryland*

Daylily breeders no doubt often wish that they had some definite rules which would guarantee the results which they vainly seek. There are certain reasons why such rules can not be laid down. It is, perhaps, sufficient to indicate that most of the modern varieties are the result of many crossings and re-crossings, and their genetic make-up is unknown. Some breeders have attempted by in-breeding to reduce their stock to pure lines. This entails a tremendous amount of work and it is questionable whether the results secured are justified.

On the other hand it would seem that certain broad assumptions might be established by securing accurate records of performance in the ordinary crossing of varieties. Some workers may have already accomplished this end through long experience and close observation. If this be true, the information does not seem to be readily available to all concerned.

It is generally assumed that yellows crossed by yellows will produce yellows and that reds crossed by reds are most likely to produce reds. Have these results been justified by your experience? It is most intriguing to observe the large number of shades of yellow, orange, red and other colors which show up in the daylily. Then when one considers the large number of blends and distinct color patterns, we have a most bewildering palette of colors to deal with. Can any semblance of order come out of this chaotic situation?

Perhaps the assembling of information already in the hands of experienced breeders might throw some light on these problems. In lieu of this, certain definite problems could be subjected to a concerted attack and the results made available to breeders in general.

As a suggestion of the type of questions which might yield valuable data include such things as these; in crossing yellows with reds, will one color dominate the other or is the result more likely to be a blend? What results when an early flowering variety is crossed with a late bloomer? Most of the late bloomers are inclined to have small or medium sized flowers. Can the large flowers of the midseason sorts be combined with the small flowers of the late bloomers and thus build up a group of late summer and early fall varieties with large flowers? How can this best be accomplished?

The writer's work with daylily breeding has so far been largely a hit or miss matter. Varieties which seemed to have desirable qualities have been combined but no accurate check on the results secured has been made. To further complicate matters, often mixed pollen has been used in crosses in order to increase the resulting variations.

One of the main lines of the work has been the development of late blooming sorts with larger flowers and a greater range of colors. Considerable progress has been made in this direction. Some attempt has been made to preserve pollen from the better mid-season bloomers to use on the later blooming sorts. A zinc chloride dessicator has been used for this purpose. Some success has been attained but through faulty technique or otherwise, the pollen has not remained viable as long as could be desired.

To date a fairly satisfactory stock of breeding material has been developed out of which, it is hoped, may come distinct advances in this field. One seedling has established a record of beginning to bloom the last July and continuing to flower until the middle of September.

The past season a substantial number of crosses have been made designed to answer some of the questions herein proposed. It is planned to carry these crosses through to the blooming stage to determine whether the underlying assumptions have been justified.

It would seem to be a worth while project for all breeders of daylilies to aid in the assembling of breeding results to the end that more definite guidance to the best methods for progress towards the development of this adaptable flower may be available.

EARLY BLOOMING NARCISSUS

J. S. Cooley, *Maryland*

With the first warm days of late winter or early spring we eagerly anticipate the first narcissus flowers. The only early narcissus variety our grandparents had was 'Golden Spur' which is very inferior to modern varieties. Also it does not persist well in adverse conditions. The narcissus breeders in the regions having a climate somewhat similar to ours (near Washington, D. C.) would no doubt find it very interesting to try to breed a variety that is early and yet highly resistant to cold. Most of the early varieties have some serious objection, some do not persist well from one season to the next. Others are satisfactory some seasons, but in other years the flowers are injured by the cold.

The most satisfactory early variety for me has been 'February Gold'. It blooms earlier than 'The First' and earlier than 'Obvallaris' and almost as early as the species *N. minor*. It has a rich color and persists well and multiplies well. It is more resistant to cold than any other variety we have tried. Last spring 'February Gold' and 'The First' were growing in a similar exposure. The flowers of 'February Gold' that were open at the time of a cold spell were not killed by the freezing temperature, whereas the flowers or rather the necks of the flowers of 'The First' were killed.

The breeding work that has been done in crossing horticultural varieties with species has yielded splendid results. Further work in this direction would no doubt result in early varieties of merit.

One of the objectives in my breeding work has been a good early blooming variety. Among the early blooming seedlings there is one that for the two years that it has bloomed has been earlier than any other narcissus on our grounds. We are hoping that further tests will indicate that it has merit.

UNEQUALLY YOKED NARCISSUS HYBRIDS

W. R. Ballard, *Maryland*

What an exciting time it is when the new narcissus seedlings begin to bloom! Each recurrent morning is awaited with eager expectation! This gorgeous newcomer will surely be a winner and that beauty is not to be sneezed at. However, with the passing of first impressions, critical inspection starts and then the thrill of achievement begins to fade. What is the trouble?

Analysis of hundreds of seedling blooms reveals that too often the perianth is the offender. Linked with that wonderful white trumpet of

exquisite texture is a thin, irregular perianth with half the size needed to balance the superb tube.

As contrasted with the trumpet or cup, the perianth seems sadly lacking in versatility. Narcissus breeders are generally willing to settle for a symmetrically formed perianth with even color, smooth surface and good proportions. On the other hand, what variety in size, form, color and texture in trumpet and cup can be confidently expected! What a range in size from the small dainty cup to the huge trumpets! In form there is the flat saucer shape, the long straight tube and the wide flaring trumpet. The tube may be smooth or fluted, the margin plain or variously frilled or lacinated. Occasionally most unusual forms unexpectedly appear. Two seedlings in my garden last year showed up with from two to three flat circular disc-like excrescences on the sides of the tubes. Whether this is a permanent manifestation or simply a seasonal disturbance remains to be seen.

Even in color, the cups and trumpets are away out in front. Recent years have shown truly remarkable advancement in the range of color. Perhaps the most notable has been the appearance of the pink shades. However, apricots, buffs and reds are showing up. Whites, creams and all sorts of variations in yellow and orange are available. Some of the daintiest combinations show delicate green tints. Color in the perianth seems to be limited largely to white, yellow and orange, although in some of the newer varieties, apricots and shades of pink and red seem to be spreading out from the cups or trumpets.

In general the cups and trumpets seem to have much greater substance than that found in the perianth. This may be inherent in the nature of the flower. However, some perianths are much better in this respect than others and the use of the better forms in breeding undoubtedly leads to improvements in the substance of the perianth, even though it may never equal that found in the best cups or trumpets.

It has been interesting to note that visitors to my garden go into raptures over some seedling with a large imposing trumpet, even though the perianth may be so poor that the seedling has already been marked for discard. In evaluating new contenders for public favor, it would seem that the breeder of new varieties, must still keep in mind that a good perianth is an essential factor in determining merit.

THE 'ANNE DODSON' DAYLILY

The writer had the good fortune of seeing on May 10 the new 'Anne Dodson' Daylily which was produced by Mr. Quinn Buck, Arcadia, Calif. The flowers are full and a bright rosy-bronzy pastel; fragrant; setsegs 1½″ wide; petsegs 1⅝″ wide; plant robust; foliage somewhat erect, 25″ high; scapes 36″ tall, and bear 12—20 flowers each; season early in Calif. It was named for Mrs. Anne Dodson Buck, the mother of E. Quinn Buck.—*Hamilton P. Traub.*

4. AMARYLLID CULTURE

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

PROBLEMS IN EVALUATING AND MERCHANDISING AMARYLLIS

THOMAS R. MANLEY, *Vermont*

The Royal Dutch Amaryllis may have been familiar to a few American amaryllis connoisseurs prior to 1946. To the average grower of amaryllis they were unknown and unobtainable as the necessity of vegetative propagation made their increase slow and expensive. Several Dutch firms were offering seedlings typed according to color, two of these firms were offering named varieties that were vegetatively propagated. It was evident these hybrids were superior to most existing amaryllis available on the world market. Their huge flat florets in a wide range of clean colors were destined to rank among the finest available today.

Valleevue Test Garden under the sponsorship of the Garden Center of Cleveland and Western Reserve University was testing many types of plants. It became evident to Arnold Davis, Garden Center Director and the author that this new amaryllis would make an ideal pot plant for the window gardener and provide the greenhouse gardener choice plants equal to any found in the finest conservatories.

In 1949 we contacted H. De Graaff & Son, Lisse, Holland, to obtain the Van Meeuwen Superiora Strain and Ludwig & Company, Hillegom, Holland, for the Ludwig Strain for comparison strain tests. We were informed by a leading Dutch concern that another excellent strain existed, those produced by W. S. Warmenhoven of Lisse, Holland, whose clones could be obtained through P. J. Komen, Anna Paulowna, Holland.

Ludwig & Company due to the hybridizing genius of C. Ludwig over the past thirty-five years have produced many noteworthy clones. Noted for excellent pure white clones this firm now possesses some of the excellent varieties in a wide range of colors ranging from deep red through salmon to rose and pink. They publish the finest amaryllis catalogue available today with many excellent photographs of their choice named varieties.

W. S. Warmenhoven, Zonnewende, Hillegom, was one of the first firms to propagate the amaryllis vegetatively using the technique developed by Miss Ida Luyten at Wageningen in 1926. Possessing some of the finest seedlings and named varieties in existence they have carefully propagated these varieties for the world market. Warmenhoven varieties range in color from purest white to deepest wine red. All are characterized by huge flat florets of great substance and unique form.

H. De Graaff & Son, Lisse, Holland has an excellent strain of scarlet, red and white amaryllis which they originally sold under color. Their

excellent seedlings, vegetatively propagated, are very large and all are flat in appearance, many measure ten inches or more in diameter. This firm was the first to offer the prepared amaryllis for Christmas forcing on the American market. Specially treated bulbs produce huge red or white flowers for Christmas when potted early in November. They also market an excellent intermediate-statured, smaller-flowered strain, these are hybrids of *Amaryllis striata* (Syn.—*Amaryllis rutila),* have been named the Graceful strain. They produce up to four scapes with four to six florets per scape. Florets are about four inches in diameter, flat in appearance with thin scapes that are in proportion to the smaller florets.

The initial project was to study and evaluate these strains to determine which might be superior. As the clones bloomed it became apparent that another approach to the testing program must be made, that of evaluating named clones rather than strains. Similarity in color and form of clones with different names was apparent. Many were so nearly alike it was impossible to distinguish one clone from another. Duplication in names of clones existed adding to the confusion of marketing this new flower. Finally the proper cultural techniques for the novice grower had to be developed and presented in a brief and practical manner.

It was quite apparent that much competition existed among the producers of these strains of amaryllis. Voluminous correspondence was necessary to explain the objects desired in presenting these new hybrid amaryllis as a choice pot plant before the American public. Name duplications had to be eliminated, clones must be true to name, names must be short and descriptive and the stock must be of the highest quality, capable of producing several scapes of bloom.

Splendid cooperation from the Dutch growers soon eliminated the name duplications and descriptive names are being used rather than names of personalities of little interest to the grower and more often a detriment to the sale of the clone. As an example, one of the finest gladiolus produced in Holland was a failure on the American market because it was named for a political personage unpopular to the American public. Many growers renamed it, grew and exhibited it in that manner but it soon lost favor as cataloguers dropped it when sales were not large enough to merit its propagation. Clones similar in color and form were excluded from further propagation once the best of these was known. Thus we have endeavored to establish a well controlled introductory program among the Dutch amaryllis growers.

In 1950 it was decided that an introductory display must be made to acquaint the public with Dutch amaryllis. Arnold Davis decided that The Garden Center would place a five hundred foot display in the 1950 Cleveland Flower Show. It was necessary to have two hundred, seven inch pots, of amaryllis available for the show. These were supplied by the three Dutch firms whose varieties were on test at Valleevue.

The display was a great success. It highlighted the entire show. People were enthralled with the beauty, size and grandeur of this new flower. The Dutch amaryllis were rapidly made a part of the American

flower lover's repertoire. Representatives of the Dutch firms for whom we were growing amaryllis were present and were impressed with the public appeal of their flowers. Plans were made for increased production and higher standards of quality.

With the public acceptance of the amaryllis as a pot plant for the home other problems arose. One was that of shipping the bulbs to America during the winter in such a manner as to keep them from freezing since they are very susceptible to temperatures below thirty-four degrees fahrenheit. Those packed in sawdust or excelsior and shipped in tight wooden cases, heated during the long shipping period. This resulted in excessive growth of the scape causing it to bend and often produced malformed florets. Open boxes caused the bulbs to chill or freeze in transit.

Many cases of bulbs were chilled without apparent injury to the stock which was sold by the unsuspecting retailer without knowledge that the chilled bulbs would not bloom satisfactorily. Many customers were disappointed.

Several seasons of experimentation, using many kinds of packing materials and containers have resulted in two acceptable methods of packing. Warmenhoven amaryllis are shipped by P. J. Komen Company in heavy wooden crates. These crates are made of half-inch tongue and groove lumber glued at the seams forming a warm tight container which is lined with several heavy layers of felt paper. The bulbs packed in sawdust or wood shavings arrive in good condition. Some sweating was observed on an early shipment in late November partially due to the freshly cured bulbs.

A similar shipment by Ludwig & Company packed in the same type container with a coarse vermiculite as a packing material arrived in excellent condition. The high absorptive power of the vermiculite lessened the danger of sweating due to greater water absorption and better aeration provided by less compaction of the coarse vermiculite. It appears that vermiculite is superior to wood shavings for packing these bulbs for ocean shipment in air tight containers.

Bulb size has presented another problem to the prospective buyer. The initial shipments were made in jumbo sizes 32″/and up in circumference as there were reserve stocks of bulbs three or more years old. These bulbs were of tremendous size and capable of producing three or more scapes in many instances. The initial demand soon exhausted all of these bulbs and facilities in Holland were taxed to produce enough top size 28″/32″ circum. bulbs for sale. Reduction in size materially reduces the output of the bulbs—due to their smaller size they produce fewer scapes with fewer flowers. Top size bulbs usually produce two scapes with four or more florets per scape. At present these represent the largest size available in named clones.

Large bulbs, No. 1, 26″/28″ circum., produce one scape, occasionally two, with four florets per scape. This is the size commonly sold by most American cataloguers. Avoid disappointment and accept no smaller size bulb unless you are an experienced grower and realize the potentialities of the size of the bulb you purchase.

Misrepresentation by some of our large seed businesses has seriously hurt the Dutch amaryllis. A check of our national flower shows reveals that one will find on display plants or cut scapes of Dutch amaryllis in bloom which are supposed to represent the bulbs on sale, yet the bulbs available for sale will be American field grown amaryllis which are not capable of producing scapes or florets comparable with the Dutch amaryllis.

The lack of cultural information in regard to growing amaryllis as a pot plant has retarded sales. Much misinformation is passed to purchasers of amaryllis by incompetent salesmen. Recently at a national flower show I heard ridiculous claims made by a salesman of a large eastern firm. It was evident he knew nothing of their culture. The purchaser of those bulbs was destined to be disappointed due to ignorance on the part of a would be horticulturist. We need a good pamphlet or book on amaryllis culture, prepared by an amaryllis authority. Two books on Amaryllis are now in preparation, one by Dr. Hamilton P. Traub, and the other by Miss Peggy Schulz, and both will be published as soon as possible. Amaryllis culture is rapidly changing as new hybrids demand more precise cultural techniques. Field grown hybrids were rugged small flowered types that could withstand poor soils, lack of water and considerably more cold weather than the complexly bred Dutch and American hybrids which are less tolerant to adverse conditions.

The use of the Amaryllis as a florist flower fits into the rigid forcing schedule of crop rotations of the average commercial greenhouse. For this purpose the amaryllis is ideal requiring bench space only sixty days. Cultural techniques for forcing for particular dates where commercial or exhibition requirements must be met, require not only knowledge of good cultural practices but that of the physiology of each variety grown, its response to heat, humidity and water. These hybrids promise a new flower that can be used as a pot plant and as a cut flower. An ever changing cultural program is under way as research continues revealing the flexibility of the amaryllis.

Few people realize the potential value of the amaryllis as a cut flower. Scapes cut when the buds have fully elongated may be held in the average florist's refrigerated show cases or store rooms for a week without opening. The scapes packed in moist cloth not placed in water will remain fresh and will open when they are placed in a warm seventy degree room. Undeveloped buds will elongate and bloom. Open florets have a great water holding capacity. They will remain fresh out of water for several days making them an ideal flower for funeral sprays and large arrangements. Careful merchandizing, plus high quality bulbs will make the amaryllis one of our most popular flowers.

FORCING AMARYLLIS FOR EXHIBITION PURPOSES

THOMAS R. MANLEY, *Vermont*

The culture developed by the Valleevue Trial Garden staff for forcing amaryllis for exhibition purposes was the result of long years of greenhouse experience in growing exhibition ornamentals by Arnold Davis and the results of experimental research by the author. Once we realized the great flexibility of the amaryllis to environmental conditions we developed a cultural technique which would give us the maximum number of different clones in bloom on a specific date.

Our supply of these clones was always limited thus we relied on our skill to bloom nearly every plant on the date of the show. Our stock never exceeded two hundred fifty plants of show clones, our display required from two hundred to two hundred twenty-five plants.

During the first season we observed that clones responded to growth and could be classified in three categories; *early,* those which produced scapes about two to three weeks ahead of the average blooming time of other varieties, Ludwig's 'Early White' and several other Ludwig clones were in this group as were some of the Van Meeuwen Superiora reds; *midseason,* when the majority of the clones bloomed; and *late,* those which bloomed two to four weeks after the midseason clones, several Ludwig clones were in this group, 'Ludwig's Dazzler'.

For show purposes we endeavored to work with the early and midseason clones which we could control. It was virtually impossible to force the late clones into bloom as they were too slow in producing a scape. To add to the novelty of forcing clones for a certain date was the lack of uniformity within a clone to forcing after they were forced several seasons. It was observed that after two or three seasons of intensive forcing the bulbs were exhausted regardless of the cultural practices used in rejuvenating the stock.

The bulbs were planted early in December in six or seven inch pots depending on the size of the bulbs. The soil mixture used was one part composted cow manure not over one year old, one part coarse bank sand, one part coarsely shredded compost and one part heavy clay loam. The pH of the soil was 6.2. It tested medium in nitrogen, high in phosphorous and potassium. Lime was added to the compost to assure a high calcium level.

Each pot had a layer of crushed crockery in the bottom to assure good drainage. To the soil mixture was added about one tablespoonful of steamed bone meal per pot. The bulbs were planted one to a pot with one-half of the bulb above the soil level. The soil was moistened and the pots placed on a bench where the bottom heat was seventy degrees to hasten rooting. The greenhouse temperature was held at sixty degrees. Frequent check on root development was made. Clones which showed slow or no root development were removed from the pot and soaked in one hundred degree water for one hour. They were then repotted and given a starter solution containing dilute indole—3—butyric acid to hasten root growth. Once the bulbs showed evidence of sufficient root

development water was withheld except to moisten the soil once a week and the house temperature was lowered to fifty degrees.

Bulbs which were held over were repotted in December removing only dry soil which fell away from the roots when they were knocked out of the pots to see if any aphids were feeding on the root system, a frequent occurrence when the pots were plunged in the soil during the summer. When aphids were present they were killed by parathion spray or dust and the infected root area removed. Once repotted the soil was moistened, and the pots were then placed in a cool greenhouse along with the recently acquired bulbs that were rooted.

Sixty days prior to the opening date of the show all pots were placed in a seventy degree house and watered with warm ninety degree water. During the next four weeks observations of the scape development were made, early clones which showed development in advance of the others were moved to a cool house temperature of fifty degrees or if the scape continued to elongate the temperature was dropped to forty degrees to retard its elongation till the other clones had reached that stage of growth.

It was observed that once the scape began to elongate it could be controlled with temperature. However its response to temperature prior to the emergence of the bud from the bulb was a matter of uncertainty. Bulbs of early clones stored at forty degrees for several weeks were slow to respond to growth. Lower temperatures made growth responses less accurate and in some cases the scapes failed to elongate due to the chilling effects of cold storage. Storage temperatures should not go below fifty degrees for best results.

It is quite a task keeping scape development equal on a collection of amaryllis. Each bulb has its own response. Bulbs of the same size and variety will react differently. We forced as many as sixty different varieties at a time and were fortunate enough to have all of them in bloom for the show.

Thirty days before the show, bulbs that have not produced scapes should be placed in a warmer house. We were fortunate in having a small propagating house in which we could raise the temperature to one hundred and ten degrees. Bulbs which were sluggish in beginning to develop scapes were placed in this house at ninety degrees until they began to show rapid growth. Slowly responding bulbs remained in this house until they were in bloom.

Growth on the main crop was kept under control by regulating the temperature which averaged sixty to seventy degrees. Leaf growth was best when the cooler temperature was maintained. Some clones produced abundant leaf growth while others did not until the scape had elongated and the florets open. Those producing leaf growth accompanying scape formation are most desirable.

The scapes should be about eighteen to thirty-six inches long by the end of the seventh week. It is desirable to have a range of heights for greater versatility in arranging the plants in the display. Jumbo bulbs usually produced two scapes for the show, one which we endeavored to have open at the beginning of the show, and the other to open during

the show. Plants which were developed too fast were placed in the cool house while those which developed slowly remained in the warm house.

The final week prior to the show was one of continuous moving of plants from one house to the other depending on the advancement of the plants. Those with open flowers were held at forty degrees; those with separated buds were carried at fifty degrees; while those with scapes slowly elongating were given an extreme forcing treatment. Pots were placed in the propagating house temperature of one hundred degrees. A Binks humidifier provided continuous moisture which was directed toward the walk so that there was no accumulation of water on the plants. During the night five hundred watt flood lights kept the light intensity high. This treatment brought the most sluggish plant into bloom.

The day prior to movement of the plants to the show was one devoted to hardening the plants by placing all those with open florets in a cool forty degree house. Each scape was supported with a green bamboo stake which was securely tied with eight inch twistems. Every open floret had the anthers removed before they had shed any pollen. The partially open bud is the ideal stage for anther removal. Florets that were not pollinated remained fresh several days longer than those that were fertilized. The unsightliness of pollen on the floret was also eliminated by early emasculation.

Each plant was wrapped in wax paper to protect the florets in transit from rubbing and excessive movement. The tendency of the floret, due to its mode of attachment, to snap off is one of the great problems in transporting amaryllis in bloom. A waxed paper covering over the floret and attached to the scape and its supporting stake solved this problem. We lost very few florets in transit by eliminating as much movement as possible.

The entire plant was wrapped in newspapers the thickness depending upon the temperature, thick enough to insure safety from freezing. The pots were packed in a closed truck and transported to the show.

Arnold Davis designed the display and secured a desirable number of suitable accessories to make it unique and of great audience appeal. Forced shrubs and well formed evergreens were used as a background for the displays. Needless to say these displays highlighted the show.

After the show, the plants were returned to the greenhouse, the scapes were removed and they were given a period of rest. This rest period was to help recover from the extreme forcing by enabling root development to continue. Temperatures were held at fifty-five to sixty degrees and water was supplied when needed and a shade thrown over the plants on bright sunny days. This treatment continued during the month of April and early May or until the pots could be plunged outside when the danger of frost was past.

Pots were plunged to the rim in a trench which had twelve inches of fresh cow manure and straw beneath them. Rotted manure was placed around the pots to hold the moisture and fertilizer which was applied to the manure once a month. Overhead sprinkling system provided water regularly during the summer. The plants grew well all summer produc-

ing ten to fourteen leaves. Pots were moved to the greenhouse early in October and dried off and held at fifty degrees temperature until they were repotted and made ready for forcing.

It is suggested that bulbs be forced every other season for exhibition purpose. After two seasons of continuous forcing the bulb cannot be relied on for exhibition quality flowers. Under normal greenhouse or window culture with adequate care of the plant after it has bloomed one can have quality flowers each season for years. Many of my seven year old bulbs are producing as well as they did the first time they were forced. The amaryllis is one of our most desirable pot plants. Its wide range of adaptability to environmental conditions makes it ideal for the estate greenhouse or apartment window.

GROWING AMARYLLIDS IN ILLINOIS

ARMYN SPIES, *Illinois*

Living in a colder climate than is suitable to the amaryllids outdoors, I must by necessity raise most of them in pots the year around. That means putting them out in the spring after frost and getting them in before the first killing frost in the fall. Some of the amaryllids such as *Hymenocallis* (subg. *Ismene)*, crinums and zephyranthes can be planted in the open ground in the spring to bloom there during the summer. Others of the rarer types are planted in pots and nail kegs for ease in storing over winter and also to preserve the root system as much as possible so these rarer sorts get an early start.

I use about the same soil mixture for all the amaryllis, except the haemanthus, which gets a slightly more acid condition. To this mixture, which is on the sandy side, is added a little complete fertilizer, about a four-inch potful to a bushel, and also a half cup of superphosphate.

The hybrid amaryllis are left in the pots all year around. The soil in them is changed but once each two years. In the summer, they are put on the ground in rows, and coarse sawdust or shavings are heaped up around them until the brim of the pot is just covered. This will act as a mulch and prevent the soil from becoming too dry between waterings. This past summer broke all records for heat and lack of humidity in the air and I found it necessary to provide a light shade for them to keep the sun from burning the leaves. Several thicknesses of cheesecloth suspended high over the leaves, will help keep the sun from burning and at the same time, provide enough light and air circulation. The pots are watered as they need it, and once every two weeks, the pots are filled with a complete water soluble type fertilizer. The foliage is also sprayed about once every two weeks with the same solution. About every month or six weeks, the pots are given about a tablespoonful of an organic fertilizer, high in potash, to a six inch pot, and it is worked into the soil about an inch or so with a fork. When frost threatens, the pots are moved into the greenhouse and allowed to keep growing until such time as the leaves yellow and indications are that the bulb wants a rest, at that time they are taken into the cellar and allowed to rest. During

the rest period, no water is given except an occasional watering to keep the roots from drying too much. When the bud scape shows, or the leaves start to push up, the bulbs are brought into the light and allowed to start growth again. Before I had the facilities of a greenhouse, I used to bring the bulbs indoors to the window garden, or to a heated shed until the bulb ripened off. At that time, the remaining foliage was cut off and the potted bulbs were stored for the winter. (See Plate 5, lower left, and Fig. 10, for Amaryllis illustrations.)

Fig. 10. Dutch Hybrid Amaryllis (D-5a)—'Queen Superiora' (van Meeuwen), March 21, 1952; Flower rich red, darker throat. Photo by Armyn Spies.

Crinums are very nice pot subjects. The foliage is quite handsome whether the bulb is in bloom or not. Most of them grow quite large, and require a large pot or a nail keg. The larger bulbs usually put out two or three scapes under such culture. Other crinums are planted in the open ground when it is warm and danger of frost is over and allowed to bloom there. They are mulched with sawdust, and foliage-fed once every two weeks and also given a side dressing of an organic fertilizer high in potash. They require large amounts of water, and during the

drouth of this past summer suffered a little because I was not able to give them water at all times. They are dug, tops cut off, and stored in the basement over winter in lugs of dry peat moss.

Haemanthus (see Fig. 11) are very interesting amaryllids and also have foliage which looks good when plants are not in bloom. These stay in the pots all of the time and are grown in the greenhouse or the lath house under partial shade.

As each one seems to have its own cycle, it is allowed to rest under completely dry conditions, whenever indications show that a rest is near. Most of them bloom before the leaves show, or with the first leaves, but the *H. albiflos* is kept green all the time, and blooms with full foliage. *Haemanthus coccineus* is a particular favorite of mine—the bud is a

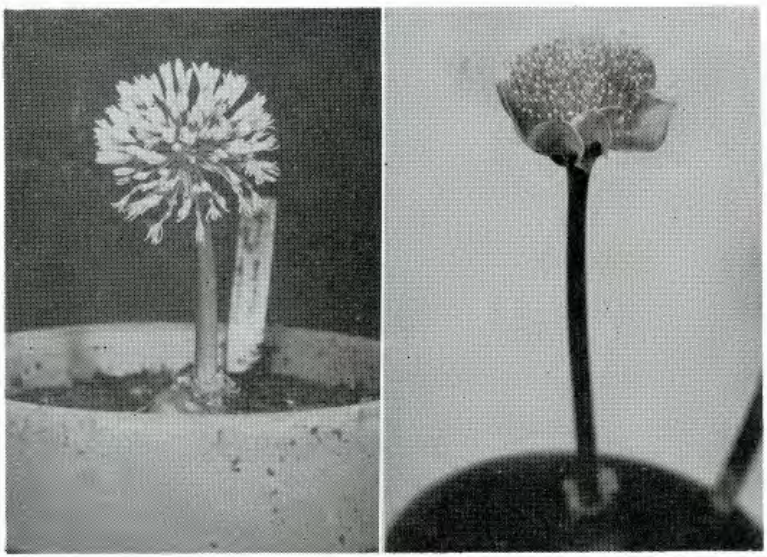

Fig. 11. Left, *Haemanthus carneus* (pink), and right, *Haemanthus coccineus*. Photo by Armyn Spies.

bright orange from the time it emerges from the bulb until it is in full bloom. The stem, as in most haemanthus, is green with brownish spots making the whole plant quite attractive.

Hymenocallis of the subgenus Ismene also get about the same treatment as do the crinums and zephyranthes that are grown in the open ground, except 'Sulphur Queen'. It is usually potted up and allowed to bloom either in the greenhouse or in the window garden to bring out the yellow color. In full sun, it fades out almost completely. In the winter, the bulbs are stored in lugs one deep and surrounded with peat moss. They are stored next to the furnace, so they are completely warm over the winter. It is at this time, that the bud forms inside the bulb and a warm temperature is required for this process.

A few *Hymenocallis occidentalis* are grown by me in pots although I suppose down South, they are regarded somewhat as weeds. They come into bloom while the weather outside is still cold, and add a tropical touch to the greenhouse. After blooming and warmer weather arrives, they are planted in the open ground also.

x*Crinodonnas* (syn.—x*Amarcrinum)* are treated in much the same manner as the pot grown crinums, but usually remain green all year. They become large plants in time, especially if the offsets are allowed to grow, and require much room. The delicate pink coloring of the blooms is worth all the trouble one must go to to find room for them in the winter.

Clivias are easy to raise in this climate and are well worth a place in anyones window garden or greenhouse. During the summer they can be put under shady trees or in the shrubbery and in a normal rainy year will require but little care. The pots can be sunk to the rim in the soil. When frost is near, the pots are stored in a light, but not sunny window, and allowed to rest. The plant needs a low temperature at this resting period and it is not hard to find such a place here in the winter. Between 40 and 50 at this time is ideal. No water is given them except for an occasional cup or so every few weeks to keep them from drying completely. The bud usually emerges around the turn of the year at that time, they are given more water and a little more heat.

FOSLER & KAMP'S "DAYLILIES FOR EVERY GARDEN"

As we go to press, the excellent Illinois Circular 716 on "Daylilies for Every Garden", by Profs. G. M. Fosler and J. R. Kamp, arrived. This is a very valuable, up-to-date presentation of the subject that will be welcomed by all. Copies may be ordered from the Agric. Information Office, 110 Mumford Hall, Urbana, Illinois.

CRINUM MOOREI FORMS

L. S. HANNIBAL, *California*

After having collected variations of *Crinum moorei* Hook., for fifteen years it is quite apparent that there are two types producing viable seed to be found in English, Australian and Californian gardens. Despite the hundreds of seedlings grown yearly each type rigidly retains its own form. Intermediate types between the two seemingly do not exist, although crosses attempted in 1952 by the writer may disclose otherwise.

Crinum moorei var. *minor* is the smallest of the lot. It is partially summer deciduous. The bulb, foliage, scape, and floral parts are 60-70% the size of the more popular larger type of plant. Color of the blossoms of both "minor" and the larger type plant are RHS Phlox Pink (625/3) when grown in part shade.

Crinum moorei clone 'Frank Leach' (See Herbertia Vol. 10, P. 70, 1943, & Vol. 11, P. 305, 1944) should not be confused with the above forms. This clone, which is sterile, is 30% larger in all parts than the type species. The distinctive identification is that the flower tube is bent sharply just above the ovary and again just below the throat. The major length of the tube is straight. The flowers are much lighter than the (625/3) hue.

At present the writer is growing several bulblets of a little known type reported to be *C. moorei alba.* The seedling plants are not of sufficient size to permit flowering, but pigmentation on the radicle disclosed that they were not true albinos. Identification in relation to the others above is as yet unestablished.

Since identification of the *C. moorei* type, "minor", and the 'Frank Leach' clone are best identified by flower parts these are tabulated as follows:

Flower Part:	*C. moorei minor*	*C. moorei* (type)	clone 'Frank Leach'
Scape length	18-24″	24-30″	30-48″
Pedicel length	1-1½″	2¼-2½″	3½-4″
Tube length	2½″	4-4½″	5-5½″
Petal length	2½″	3″	4″
Tube curvature	uniformly curved	bow curve	bent as noted

GROWING AMARYLLIS

Mrs. W. D. Morton, Jr., *Louisiana*

In Amaryllis, the world of flower lovers have the most beautiful and spectacular bulb flower of Spring. A bulb which can be grown by any amateur or professional horticulturist, trained gardener, or hobby plantsman. There is perhaps no more universal spring bulb flower. It has size, shape and form, and above all, color. Amaryllis is one of the easiest bulbs to grow and keep in good condition, year after year. There is no limit to the Amaryllis bulb's life. Under proper culture, it renews itself annually, and barring accidents, it might live a thousand years.

October is the time to begin thinking about your Spring Amaryllis. Begin by preparing the beds with the proper soil. Any fertile soil, particularly the Camellia soil prepared by the nurseryman, with good drainage, and a fair proportion of humus, will give excellent results. Amaryllis do not like hard packed ground.

In November the bulbs begin to arrive. The Holland Bulbs are generally later, but they have been in cold storage, and as soon as they are put in the warm ground, begin growing immediately, and often bloom before they put on any foliage. In the South the open ground is best, and the plants stand the cold much better than those planted in pots. After planting the bulb one-quarter of it out of the ground, it will grow well, stand the heat and drought of the long summers, and in addition, will withstand winter cold.

In December you may add a little bone meal, or 5-10-5, working well into the ground, and then water well. There is very little to be done to Amaryllis through the colder months. If the cold kills the leaves, it is well to pull the leaves off, so the sour juice from the leaves will not run back into the bulb. Keep the bulbs well watered all through the winter, and water freely when they begin to bloom. Sometimes a second, and probably a third flower, will spring up from the bulb. When the bloom has faded, the stalk may be cut off at once, or allowed to remain and ripen seeds, if desired. You may propagate from seeds, off sets, or by cuttage. The first being the general method with all growers, and the way new hybrids are made. Offsets formed on the mature bulbs may be set out separately, and grown on to blooming size. Until the cuttage methods for Amaryllis were worked out in the last few years, offsets were the only way to increase stock of a clone, and this made the development of named clones a long and tedious affair. The seeds, offsets and cuttings may be planted in the same kind of soil that the Amaryllis bulbs are planted in.

During February give another feeding of bone meal or 5-10-5, and in March and April you will be rewarded with nice Amaryllis blooms (see Plate 9.). Seeds should be planted in flats, and kept damp but not too wet until they come up, which will be between three and four weeks. When they are four or five inches tall, reset in the yard, where they will grow faster, than if left in the crowded flats. Cuttage in Amaryllis

bulbs means to cut the large bulbs into two, three or four quarters, roll in sulphur and plant. The cut pieces will take root and grow well.

Dutch Hybrid Amaryllis (D-5b)—'Daintiness' (Warmenhoven), pink-flowered, as grown and photographed by Mrs. W. D. Morton, Jr.
Plate 9

Water freely while Amaryllis are in bloom, but don't neglect your Amaryllis once the flowers have faded. The bulb will be somewhat

emaciated by that time, and will require watering and feeding to rebuild its strength and to prepare it for bloom in another year. After flowering, the bulb should not be dried off. Widespread, but erroneous advice on this point has probably caused more bloom failure than any other single factor. The normal habit of Amaryllis is to make leaf growth right after flowering. Simultaneously with the development of leaves, the bud expands, and buds for the next season's flowers are formed within. You may discover the approximate number of stems developing in the bulb, by counting the number of leaves. In the axis of every fourth leaf, a primordial flower develops. Drying off at this period, would naturally hinder the production of foliage, and check the formation of buds. Therefore, continue to water your bulbs after they have bloomed. With certain strains, summertime flowers are not unusual. Protect your small seedlings the first winter; after that they will do well in the open ground. They will also do well in pots, but are less trouble growing in the ground. If you desire growing Amaryllis in pots, soak your pot from 12 to 24 hours in water, to make sure they are saturated thoroughly, and be sure of good drainage, by putting a half-inch layer of crushed crockery, stone or gravel in the bottom. Over this place your soil. Have your pot several inches wider all around the bulb.

The most interesting part of growing Amaryllis, is pollinating while the plants are in bloom. About the third day, the pistil is open and ready to receive the pollen. Place the pollen from the anthers on the stigma, then tie a small bag or wax paper around the bloom, so that insects will not bring in unwanted pollen.

If a few essentials are observed, Amaryllis are so easy to grow. Good bulbs are of first importance. The demand for named Amaryllis is steadily growing in New Orleans, and we are striving to make Amaryllis one of the most outstanding flowers in the South.

During July, August and part of September Amaryllis are dormant; they are having their rest period. In the South, it is not necessary to take them out of the ground, for a drying-off period, and they may be left in the ground.

Amaryllis growers have made wonderful strides in developing new solid colors and now have bulb treatments that insure bloom in December for Christmas when planted in November.

From the time the seeds germinate in the seed beds, the seedlings are subject to a certain degree of molestation by their natural enemies. Mole crickets are often common in the seed beds, and may cause considerable mechanical injury by burrowing around in the soil and cutting off the roots. Sowbugs are apt to be present, and they damage the young plant by eating off the tips of leaves. These crustaceans continue to feed upon the plants throughout the summer. They crawl up the leaves and feed on the tips. Weeds may become troublesome in the seedbeds. The most bothersome weed is the chickweed. It produces a viny type growth which may completely cover the young Amaryllis, and shut off the light. The most troublesome weed in the Amaryllis beds is a plant known as Wandering Jew. It thrives in rich damp soil so favorable to Amaryllis. It is a vigorous vine like plant. This weed has the tendency to overgrow

Amaryllis and shut off the light. As the plant grows older they become subject to the attack of an imperfect fungus known as *Stagnospora Curtisii,* which produces a condition commonly known as Red Blotch.

Larvae of a moth sometimes appears on the leaves in the spring. They are voracious feeders, and in a short time, eat up most of the leaves on a plant. Moles seems to have a strong affinity for Amaryllis beds, where earthworms thrive in great abundance. They cause a great deal of damage by burrowing among the bulbs destroying the roots of the plant. All of the enemies of Amaryllis may be counteracted by standard, approved methods. In spite of the numerous difficulties, the Amaryllis keeps on growing and blooming. So long as the soil conditions are kept favorable, the plant continues to thrive.

THE CAMMACKS AND THEIR AMARYLLIS

WYNDHAM HAYWARD, *Florida*

The Cammacks of Maitland, Florida are responsible for the creation and development of the Cammack Strain of Hybrid Amaryllis, the only strain in America offering home-grown named clones vegetatively propagated. Ida Luyten in Holland had first recorded a method of vegetative propagation for Amaryllis in the 20's and this was later re-published with elaborations in the early issues of Herbertia, the yearbook of the American Amaryllis Society, now affiliated with the American Plant Life Society. The Cammacks use a method based on the cuttage methods later recorded by I. W. Heaton and Dr. Hamilton P. Traub.

The Cammacks themselves are William and R. Seymour, father and son, a sturdy, practical pair of horticulturists and experimenters, from solid and substantial midwestern stock, who turned to Florida soil to make a living a quarter century ago. The elder Cammack and his late wife, mother of Ralph Seymour, came to Florida with their family in 1925, following their retirement after 17 years service as medical missionaries for the Congregational Church in the Southwest African field (Angola).

William Cammack, a native of Salem, Iowa, who now plans to retire this coming season from the Amaryllis business, after a quarter century, because of advancing years, has the happy gratification of having established the first commercial line of American vegetatively propagated (by cuttage) Amaryllis to obtain a nation-wide acceptance. As a matter of fact their Amaryllis have found their way to England, Canada and other countries in large numbers.

In recent years, since Ralph Seymour's return from several years service in World War II with the U. S. Army, the Cammack farm has been divided between the elder Cammack's Amaryllis cultures and the son's Gloriosa Lily plantings. The Gloriosa Lily business is taking over the picture for the younger Cammack, as he has specialized in the field and developed a strain which is widely known and in demand for cut flowers and tuber sales.

The Cammacks grew their original Amaryllis stock from top quality Mead Strain bulbs obtained from various sources in the late 20's and early 30's. They bought seed of Mead strain bulbs from the Rockett Bulb Farm, near Oviedo, from Bender Amaryllis interests, from the I. W. Heaton Farm, Frank Vasku, and others among the early growers of the Mead Strain Amaryllis in Central Florida. Maitland is a short distance north of Orlando and Winter Park, Florida.

As their stock increased, the Cammacks began to take an interest in the vegetative propagation methods which had first been used in Florida by I. W. Heaton, who introduced the orange-red clone 'President Roosevelt' in 1933, first shown at the 1934 Amaryllis Show in Orlando, and other varieties. They continued this vegetation propagation in their plantings until by the present time they have a list of nearly two dozen named varieties and selected types to offer their customers and the wholesale bulb trade. In recent years they have sold some of the named varieties by the hundreds to Northern dealers.

As explained by R. S. Cammack, the named varieties are propagated by cuttage in August each year. As high as 60 and as few as 2 or nothing have been obtained in various years as the progeny of a single bulb when cut up. The cuttings are sprouted in beds of peat and sand, sunk in the ground under lath or moss shade houses. The cutting medium is used year after year with careful sterilization between each planting.

Small bulbs produced from the cuttings are set out, usually under some form of moss shade house (Spanish moss on wires overhead) in the spring, and allowed to grow two or three seasons with careful weeding, cultivating and fertilizing. The Cammacks have found that conscientious sterilization of the soil in Amaryllis beds with DD, methyl bromide, or other fumigant is decidedly helpful in the production of healthy, sound Amaryllis bulbs in the shortest time. The possibility of nematode pests attacking the roots of Amaryllis in unsterilized soil is still under investigation by USDA workers and the question is an open one at this time. At any rate, the Cammacks report healthier, more vigorous roots and bulbs in treated soil.

The Cammacks have been propagating Amaryllis vegetatively since 1936, and their current list of named clones, largely in the decorative class, but with a few which are described as exhibition types, includes such interesting and attractive items as 'Salmon Queen', 'Princess Elizabeth', 'Margaret Rose', 'Maiden's Blush', 'Giant Near White', 'Wings of Snow', 'Florida Beauty', 'Cammack's Star', 'Fire King', 'Harvest Moon', 'Tartan', 'Mrs. I. W. Heaton' and 'Dark Red Bennet'.

William Cammack intends to sell out most of his bulbs and planting stock on withdrawing from business this season, and will retain only sufficient small size planting stock to enable him to re-establish himself in the business in a few years time if he finds a favorable opportunity at his new location. The son, R. Seymour Cammack, intends to devote his time to Gloriosa growing exclusively. Amaryllis growing is hard work and like all farming, replete with various risks of weather and insect pests.

The Cammack soil is a dark, Orlando Fine Sandy Loam type, on the dry side, but the Cammacks have a large lake, (Lake Hope) close at hand and irrigation is practised as needed with pump and motor from the lake water. Intensive use of commercial fertilizers is the practice. The father and son declare their aim in establishing the Cammack strain was to produce a vigorous, attractive line of hardy Amaryllis types in named clones which would be good as an outdoor strain and satisfactory for indoor culture except for top competition at the best flower shows. And even there, as at New Orleans and elsewhere the Cammack varieties when shown at their best have come away with ribbons.

"We think we have as good an outdoor strain of hybrid Amaryllis as there exists today," the Cammacks joined in telling this reporter. Most of their bulbs are dug in November and December for their wholesale and retail trade. Much of the latter is by mail to states all over the country.

THE SANGSTER HYBRID AMARYLLIS

WYNDHAM HAYWARD, *Florida*

The king of field-grown Amaryllis today in the United States, and doubtless in the entire world, is a serious, conscientious and hard-working nurseryman and bulb grower named B. M. Sangster, who supplies from his acreage in the Conway section, Southeast of Orlando, Florida, some millions of the commercial Mead Strain hybrid Amaryllis bulbs annually to the jobbers and wholesalers of the American horticultural trade.

Mr. Sangster lives with his family in a beautiful area of rolling orange groves near the famous Lake Conway, about five miles from the Center of Orlando, a thriving city of some 55,000 people in the heart of the upper citrus country of Florida. The Sangster Amaryllis bulb cultures are closely tied in with his citrus grove development and management (see Fig. 12) through the 25 years since he first began to raise them.

Originally from the state of Georgia to the North, Mr. Sangster settled in the area where his farm now lies more than a quarter of a century ago. At first it was pure economy of effort that led him to grow his Amaryllis bulbs between the rows of trees in his young citrus groves. Later it developed into a consistent and efficient cultural procedure.

The land on which the Sangster groves and bulb plantings are grown is known as Orlando fine Sandy Loam, a rich, dark, farming type of soil, unusual in the Central Florida area, where so much of the common field land is the thin high-pine types of the Norfolk Sandy Loams. In low areas this grows good truck gardens and in the medium, and upper types of the soil, the growth of citrus trees is favored in the Conway area. There are thousands of acres of valuable young and bearing groves in the region about Mr. Sangster's farm.

He and his family operate some 100 acres of grove of all ages at this time. When it is realized that this grove land has a value of $1,000 per acre and upward, it can be seen that with his millions of Amaryllis bulbs annually, Mr. Sangster is in the big business brackets. In addition to his grove and bulb cultures, Mr. Sangster and his family operate a citrus nursery growing 15,000 to 20,000 young trees at all times.

The Sangster Amaryllis stock is descended in the main from 1,600 bulbs which he personally purchased from the late T. L. Mead, pioneer

Fig. 12. Portion of Sangster young citrus grove near Orlando, Florida, inter planted with Hybrid Amaryllis.

Florida horticulturist (see autobiography in 1935 Herbertia) at Oviedo, Fla. Mr. Mead, who died in 1937, introduced the hybrid Amaryllis to the American bulb trade and was the founder of the so-called Mead Strain, most largely grown today under field conditions in Florida. This is a strain produced by millions of bulbs, mostly of decorative types of bloom, and having few exhibition types among its seedlings. It originated in the early decades of this century from fine European Amaryllis stock imported by the late Henry Nehrling of Gotha, Fla., another celebrated Florida plantsman of his time, from whom Mr. Mead obtained his start of Amaryllis stock.

These 1,600 bulbs were purchased for around $500, Mr. Sangster recalls, and were used as seed stock to enlarge his planting. Offsets were also carefully saved and grown on. For a number of years every effort was made to increase the Sangster stock in numbers to meet the trade demand, which was and is enormous. The Mead strain bulbs, usually in 2½ inch size or varying from 2¼ to 3 inches, according to the class of trade, are sold by the millions in department stores, seed stores, florists shops, chain stores, etc., mostly in the dry or dormant state during November, December to March. By that time most of them are beginning to show buds and must be planted.

When his stock reached large size, hundreds of thousands of bulbs, grown from seedlings and offsets, Mr. Sangster began to devote more time to the scientific study of his cultures and the quality of bulbs and flowers they produced. There were several factors which required constant study and attention. First was production,—the growing of a sound, healthy, vigorous and hard bulb, able to stand the hard knocks of shipment and weeks of storage in warehouse and on store counters. The bulb should be 2½ inches in diameter at least, although a certain trade will take a slightly smaller bulb where price is a major factor. Bulbs from 2 to 2½ inches in diameter will usually bloom, especially in the Mead Strain. Bulbs 2½ to 3 inches in diameter are regarded as sure bloomers. Dozens may be cut open in the Sangster bins without finding a blind one.

Under field conditions in Florida, growers have always found it difficult to produce a three inch bulb. The problem is easier for the Dutch growers with greenhouse beds under constant care. Mr. Sangster's bulbs remain in the full sun in the open air during the long Florida summer from March to mid-October with no protection from the elements. It is a matter of the survival of the fittest. No weaklings survive, which is not true in the Dutch cultures.

Growing Amaryllis in rows in the middles of the citrus groves requires more than hand cultivation. For years Mr. Sangster has used mule-drawn cultivators and weeders, but mechanization is now taking over and one of the two mules has been replaced by a tractor. For most of his field labor Mr. Sangster hires high school boys by special arrangement with the local schools—youngsters who are sincere, careful workers, and anxious to earn a few dollars every week for work after school hours and on Saturdays.

With these crews, whom he trains through the years, Mr. Sangster plants his Amaryllis in March, six inches apart in the row and the rows far enough apart for the necessary cultivation. The ground is in good condition by reason of the care taken to prepare it for planting the young citrus trees. He treats the land with basic slag to counteract the prevailing heavy acidity of Central Florida soils, but prefers to leave the pH at 5.5 to 6.5, just short of neutral. For fertilization he has worked out his own system of applications of castor pomace and mixed commercial fertilizers. He is a firm believer in the value of castor pomace as an organic fertilizer for Amaryllis.

For the production of his new stock, Mr. Sangster maintains a wire shade house partially covered with Spanish moss where he grows his seedlings, several thousand, every year, near his home, and has an open air bed nearby of several hundred selected type parent bulbs, some of them the original bulbs he purchased a quarter of a century ago from Mr. Mead. The seedlings are grown for one season from April and May planting in the shade house and are lifted and set out in the field the next March. He eliminates every seedling which has not made good growth in the year's time, anything below ¾ to 1 inch being destroyed.

In replanting his offsets from the bulbs in the field, Mr. Sangster also has made a serious effort to eliminate the offsets of small bulbs, to increase the size of bulbs in the field grown stock from year to year. The last two or three seasons, he has raised the crop of 3 inch bulbs to 30 per cent of the whole. The value of the bulbs increases with the diameter up to 3½ inch. Four-inch bulbs would theoretically be ideal but transportation costs and other difficulties enter the picture at such large sizes.

Mr. Sangster's bulbs include few exhibition types but a wide range of varying colors from dark reds to whites with slight red and pink markings. They are forced by florists for pot plants and cut flowers and sold over the nation by millions to bring a touch of color into the lives of Northern peoples during the spring when cold weather still stays outside.

In recent years Mr. Sangster has purchased Dutch Amaryllis of the Ludwig Strain and other strains to employ in hybridizing with his seed stock to raise the level of bloom quality in his Mead Strain bulbs. The effects are beginning to show in his latest field plantings.

Harvest time comes in the Sangster acres in mid-October. With his crews the bulbs are ploughed out and lifted into a waiting truck, by the hundreds, tops, offsets and all. The truck carries them to the bulb shed near his home. There women workers cut off the tops and most of the roots of all bulbs, which are sorted into the various commercial sizes, and the planting stock or smaller slabs and offsets set aside for storage until spring. With good work, the crews can handle an acre or two a day. At the present time he is growing about 50 acres of Amaryllis annually.

He finds that symbiotic culture of Amaryllis and citrus pays off with better bulbs and bigger citrus trees for the few years that he employs the middles between the tree rows for the bulbs. After three or four years, the trees have made such growth that he has to move on to new and younger acreage where the trees are smaller. This involves a steady program of citrus land clearing and grove planting, which becomes automatic, so to speak.

So when you go to your "dime store" or your seed store for a casual Amaryllis bulb for a friend, give a thought to B. M. Sangster laboring among his citrus trees in Central Florida. He worked hard to create that bulb for you.

OUTDOOR AMARYLLIS CULTURE IN LOUISIANA

Jo N. Evans, *Louisiana*

"It can't be done." That was all that I needed to make me want to try growing the Dutch hybrid amaryllis as a garden flower. (I have no set-up to grow pot plants). I have been growing, as garden flowers, local seedlings of the hybrid Amaryllis for many years and have had no trouble with them.

The first group of the Dutch clones planted out were 'Fidelity', 'Invincible', 'Doris Lillian', 'Roselind', 'Ludwig's Scarlet', "Ludwig's Dark Red," 'Snow Queen' and 'Mount Tacoma'.

These bulbs were sent to me in January and the buds were already showing, I held them in a cool place out of the ground as long as possible. I planted them, the last of January, in very rich soil and mulched them well with cypress leaves. However, they came into bloom the last of February, some on stems that were too short and some with what is commonly called "fire disease". They were beautiful despite these difficulties.

Knowing that I would have to hold the bulbs dormant all winter the next season, I kept them growing as much as possible all summer. After the cold weather was over I took the mulch of leaves from around them and mulched them heavily with old barnlot fertilizer mixed with a heavy application of cottonseed meal. The bulbs are growing under cypress trees where they have filtered sun, they are kept moist and about three times during the summer the mulch of fertilizer was renewed and an application of 8-8-8 was mixed with it.

This all adds up to a few simple facts—plenty of food, plenty of moisture and protection from extreme sun. The bulbs grow and the leaves are from 27 inches to 36 inches long. With the first heavy frost we cover them about 12 inches deep in cypress leaves and let the amaryllis leaves freeze down.

The bulbs are now left undisturbed for the entire winter. Two years ago our temperature went to zero for three nights and did not come to 32 degrees for a week. Every winter we have one or two times that the temperature drops to 16 degrees.

I do not uncover the bulbs until the buds are about four inches tall under the mulch, then I just pull the mulch back a little and leave the protection around the bulb.

The second year they had little or no "fire disease", or "red rust", and had long stems. They were a sensation in the garden. Each year I add more of the named clones to my collection.

My pure white hybrid amaryllis have performed just as well as any of the others and it is amazing what they can take in the way of spring storms and cold without being damaged, when well protected as I have described.

GROWING AMARYLLIDS IN SOUTHWESTERN ARIZONA

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Bulbs are particularly suitable for gardening conditions in the arid alkaline southwestern part of the United States. Of the three "families" whose bulbs are most widely grown by gardeners in our region (the amaryllis, iris, and lily families) I believe it is safe to say that the bulbs of the amaryllis family are, on the whole, the most satisfactory.

The relentless sun, blistering winds, and heavy alkaline salts in the soil, are hazards which are more successfully met by bulbs than by other plant forms. In my garden and in those of my neighbors the white akali produces a hard crust which must frequently be manually scraped from the soil surface. Good drainage is almost universal as there is no layer of rock or hardpan near the surface. In either the heavy clay type of soil common to our river bottoms or the sandy soil of the mesas, the alkali may be scraped off the top or leached out by heavy watering so that bulbs which are planted beneath the treacherous soil surface escape the alkali, sun, and wind.

Since flower-growing is new to the southwestern lands reclaimed from the desert and because of my project of supplying sets of color slides to garden clubs all over the world, I have tried to grow, for purposes of report and photography, as many kinds of flowers as I could obtain and handle. While it is true that my major hybridizing efforts have been concentrated on one member of the lily family (hemerocallis) and one of the iris family (spuria iris), it is also a fact that I have probably had more increase and less failures with bulbs of the amaryllis family than with those of the other groups. I am a little like Tom Craig (of whom Peg Debagh has said, "if a dandelion blooms, the master hybridizers it") in that every flower presents a breeding challenge, and I am raising seedling amaryllis and daffodils, too.

Growing flowers in a land reputedly closer to the devil's abode than any other part of this country has taught me to respect the importance of regional performance. Our temperatures in the Yuma Valley are like those of southern Florida and the Rio Grande Valley of Texas, but our climate is unique in that we have more hours of sunshine and less humidity. The average sunshine for each year is OVER ninety per cent of possible, while the average mean humidity is just under forty!

I do not grow plants or seedlings in pots or pans, as it is too difficult to prevent the accumulation of alkaline salts or to provide adequate humidity. All of the following reports, therefore, are based on my experience in growing plants out of doors in the ground with no artificial protection from heat or cold.

AMARYLLIS. Through the kindness of several friends, I have been privileged to grow a number of the new Dutch hybrids, McCann's doubles, and some select American strains. The first year's flowers tend

to have shorter stems than are seen on specimens grown in pots in the north because of our early hot weather. There is the usual sparcity of bloom the second year, and the eventual increase or loss, depending on how the variety "takes" to our regional conditions.

Because plants rarely have a rest in our climate (as there are some kinds of flowers in every bed that grow at all times of the year and from which water and food cannot be withheld) I thought I might improve the flowering habit by digging the amaryllis bulbs when the weather got relatively cool in the fall. The bulbs were placed in cardboard milk cartons in the lath house and allowed to dry out for about two months. I could not see any difference in the performance of bulbs so lifted and those allowed to grow all year.

Both McCann's doubles and the California strains from various sources are more vigorous than the Dutch hybrids, and their flowers are certainly large and brilliant enough to satisfy any gardener. Nevertheless, the open forms, enormous size, and intriguing color combinations of the Dutch hybrids are so fascinating that they warrant the extra attention they demand.

My preference in all flowers is for the singles rather than the doubles, for next to the color, I think the center of the flower is its most important visual feature. However, the McCann double amaryllis excite the greatest comment from garden visitors.

Amaryllis set seed easily and profusely. Whether refrigerated all summer or stored in cartons and subjected to summer heat, the seeds germinate readily if I plant them in sufficient peat moss to prevent their being "pickled" in our alkali.

ALSTROEMERIA. My only purchased tubers came from Tom Craig some years ago—the striking green-and-red *A. pulchella* of Brazil. I remember asking Mrs. Craig if she thought I could really grow them, and she replied that they would do alright for me if I found a place "they liked". I must have found such a place, for I now have three large clumps that require checking back several times a year.

The pastel types commonly called "peruvian lilies" I raised from seed sent me by Mr. Frank Leach of Diablo, California. Had I known they preferred the altitude of the Andes I might never have attempted to grow them, but of several places I planted the seed, they took a liking to the shade under a lime tree and continue to grow lustily each winter from their summer-dormant tubers.

AGAVE. Need I comment on how agave takes to the desert? The one "century-plant" I permitted in the garden bloomed after crowding many other things for about ten years. As the flower rose to its thirty-odd feet of height one could almost see it grow. It was an engineering feat of no small proportion to remove the "corpse" from the center of a crowded garden. Getting rid of its offsets was an annual task of some magnitude, too.

BRUNSVIGIA. *Brunsvigia rosea* (Cape Belladonna) does extremely well in the southwest. I am usually in other parts of the nation when they are in bloom, but my caretakers are always greatly impressed by the enormous pink "lilies" that suddenly appear in various parts of the

garden, and I sometimes return early enough in September to see the last of their glory.

CRINUMS. Surely there is no less exacting flower than the crinum, for our region, at least. Massive clumps in the poorest soil in my garden get practically no care except an occasional support for a flower-heavy stalk. Without the support, the flowers just lie on the ground and keep on blooming all summer, anyway. Best of friends are 'Cecil Houdyshel' and 'Ellen Bousanquet' who take turn about each year putting on the heaviest bloom. *Crinum* Moorei is least vigorous, and the two *Crinum* x *powellii* are quite satisfactory, if less showy than the other two "friends".

CYRTANTHUS. I can report moderate success with cyrtanthus, but my small planting shows no sign of intense vigor. *Cyrtanthus mc-Kenii* is doing well and shows signs of increase but *C. lutescens* does not seem too happy.

DAFFODIL. Thanks especially to Jan DeGraaff, and Peter de Jager, Jr., I have had the opportunity of testing a great number of daffodils.

The paper-white narcissus and "Chinese Sacred Lily", grown always in the garden, start blooming in November and continue until after 'Tunis' starts the "big show" in late January. Despite our early and intense heat, there are always some daffodil blooms until I leave for the summer, even well into July.

All classes do quite well, but there are variations in the performance of named hybrids. The least vigorous classes are the double, poeticus, and miniature rockery types.

Of many varieties tested, the following are worthy of special comment for growing conditions in the southwest: 'Tunis' (leedsii) The earliest of the hybrids. 'February Gold' (cyclamineous hybrid) early, vigorous, colorful. 'Diotima' (trumpet) the largest daffodil flower I have bloomed. 'Actaea' (poeticus) its bright red eye makes it most showy. 'Trevithian' (jonquil hybrid) twelve bulbs gave eight weeks of continuous fresh bloom. 'Quiriness' (large cup) Largest and showiest of yellow cups. 'Silver Chimes' (triandrus hybrid) is more vigorous though not as lovely as 'Shot Silk', but not as vigorous as 'Moonshine'. 'Winter Pride' (cluster) most vigorous and showy of tazettas. 'Snow Sprite' (double) small for its class, but to me the most attractive and vigorous double. 'Moulin Rouge' (double) deepest color of any doubles I grow. 'Mrs. E. H. Krelage' (trumpet) largest and whitest of white trumpets for me. 'Alasnam' (trumpet) the best-performing yellow trumpet. 'Yellow Cloud' (trumpet) a yellow trumpet that is my favorite because the trumpet looks UP instead of out or down.

Other varieties which have been outstanding and are recommended for the southwest are: 'Love Nest', 'Burgomaster Gouvernor', 'Toronto', 'Flower Record', 'Gertie Millar', 'Aranjuez', 'Mrs. R. O. Backhouse', 'Ben Hur', 'Geranium', 'Lanarth', 'Mrs. Nettie O'Melveny', 'Nova Scotia', 'Mount Hood', 'Rustom Pasha'.

EUCHARIS. I have not yet succeeded with eucharis, but two plantings are still alive.

GALANTHUS. My snowdrops have come misnamed, but since we have more exciting flowers in bloom the year around there is not a great need for these tiny white "heralds of spring".

HYMENOCALLIS. A giant white-flowered species which has been in cultivation in the Yuma Valley since I came here over twenty years ago does better than the species of the subgenus *Ismene* for me. It produces massive clumps of handsome bright green foliage which remain fresh all twelve months of the year, measuring even in January over three feet in length. The flowers appear in late June and July and have a diameter of eight inches.

IXIOLIRION. I am growing some of these bulbs for the first time this season. Apparently they will prove satisfactory.

LEUCOJUM. The snowflakes are very satisfactory, increasing well, requiring no care, and blooming over a long period each spring.

LYCORIS. I am always away when the lycoris bloom in my garden. They do not thrive for me as they do for some of my neighbors, but the persistence of bulbs and foliage of *L. radiata* and others leads me to believe that they probably do well in this region.

NERINE. I take nearly as much pride in boasting that I HAVE bloomed nerines in my garden as I do from my one success with *Iris alata*. The nerines have practically disappeared now, however—both the fine hybrids from the Reinelt-Bauman (etc.) California strain and the imported species. My most recent failure was with *N. filifolia*.

PANCRATIUM. I have two plantings of *P. maritimum* and the one in full sun is by far the most vigorous. This lovely pure white flower is one of my greatest favorites and I hope some day I will have sufficient increase to provide a stunning display.

SPREKELIA. *Sprekelia formosissima* never fails to draw cries of delight when exhibited at flower shows. It grows well but flowers less for me than for my neighbors.

ZEPHYRANTHES. With the possible exception of some of the daffodils, the fairy lilies seem to be the happiest amaryllids in my garden. The yellow ones are the least vigorous. The pink- and rose-toned ones multiply readily and bloom as often as one stops and starts the water. The white species do best of all as regards increase, but do not bloom as frequently as the pink- and rose-toned flowers.

CONCLUSIONS: The conclusions to be drawn from my experience in growing amaryllids in the southwest are—

(1) Most members of the amaryllis family are excellent garden subjects in this region.

(2) They are relatively unknown and untried by the average southwestern gardener and nurseryman.

(3) It is to be hoped that there will soon be more widespread use of amaryllids and other plant forms suitable to the climate of this region and less futile effort to succeed with material better adapted to colder areas. Typical of common garden errors here is to plant roses budded on "cold-hardy" rootstocks rather than the vigorous but cold-tender stocks which are needed for local success.

THE USE OF SPAGHNUM IN AMARYLLIS CULTURE

WYNDHAM HAYWARD, *Florida*

The use of common sphagnum moss as a component of potting soil for growing Hybrid Amaryllis bulbs is reported in this paper because of the remarkable results observed from its use over a period of two years in the way of restored vigor, thrifty growth, size of bulb produced and thrifty root development.

The report is preliminary to further studies, and all rights to the procedure as herein described, subject to future patent procedure or other protective action, are reserved. As a simple progress report, the paper is expected to have interest for research workers and others engaged in the growing of Hybrid Amaryllis and other bulbs, as well as possible application in home and commercial cultures.

One of the great problems in the home and commercial cultures of both hybrid and Amaryllis species is that of the proper composition of the growing medium, its need for porosity and looseness of the particles for proper root growth. This is besides the necessity for proper requirements of moisture, temperature and fertilization.

In an early article in Herbertia, Vol. 4, 1937, the writer reported growing Hybrid Amaryllis bulbs in non-drained cultures of pure peat moss, a very porous medium, with reasonable success and good rooting. In recent years there has been an increase in the study of the apparent anti-biotic effects of sphagnum moss when used in plant culture. Leaflet No. 243 of the U. S. Department of Agriculture, entitled "Sphagnum Moss for Seed Germination" 1944, discusses the growing of seedlings in sphagnum moss, stressing freedom from loss by attacks of damping-off fungus during the growing period.

This paper, by V. T. Stoutemyer, A. W. Close and Claude Hope of the Division of Plant Exploration and Introduction, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA, states that "excellent growth for an indefinite period has been obtained with plants transplanted in sphagnum and watered occasionally with nutrient solutions."

The present experiment may be described as an extension of that procedure. Cecil Houdyshel, in an article, "Want to Know About Amaryllis" in the November 1953 Flower Grower Magazine, describes a common procedure among Amaryllis growers, amateur and commercial, that of planting a stubborn Amaryllis bulb in "pure sphagnum moss, more acid than peat," to make them grow and root. "They grew at once," he reports. He recommends more study of this rooting situation.

The Stoutemyer et al bulletin reports that "the acid-reaction of the sphagnum may be a factor in control" of damping-off fungus, "but it does not explain the results entirely, as severe dampening-off has often been found under identical conditions with soil mixtures having the same reaction."

The present investigation began two years ago when the writer planted several dozen Dutch hybrid Amaryllis in gallon cans with ade-

quate drainage to stand the Florida summer rains. A one-inch layer of Spanish moss fibre was placed in the bottom of the pots, a 2-inch layer of sphagnum moss was packed into the can on top of the Spanish moss fibre, the bulb set was then in the center on top of this, and the container was filled in around the bulb with coarse white building sand in some cases and with the usual potting soil for Amaryllis in others. Those with the pure sand were fed occasionally with a balanced nutrient solution (Hy-Gro). The compost was 1/3 sandy loam, 1/3 sand and 1/3 leaf mold with some rotted manure added, plus a small quantity of commercial 5-7-5 fertilizer.

Rooting of the bulbs was strikingly excellent in the cases of the sphagnum and sand cultures, and reasonably good in the cases where the usual potting soil was employed. Only fair results had been obtained previously with the rooting and growth of the Dutch hybrids in outdoor cultures using the customary potting soil or compost entirely, in well drained pots or cans. On the basis of the results obtained with the sphagnum and sand, it was presumed that part of the trouble lay in poor drainage, as the heavy summer rainfall in Florida puddles the usual potting soil in ordinary pots in Amaryllis cultures, in spite of careful drainage precautions. Possibly this deprives the roots of air or oxygen for proper growth.

At any rate, a second and more comprehensive trial was run in the spring of 1953, using more than 200 left-over Dutch hybrid Amaryllis of the excellent Ludwig and Warmenhoven strains, bulbs that are prevailingly found difficult to root well and re-establish in thrifty fashion after their first potting. These left-over bulbs included no choice specimens, but were all the odds and ends of hundreds of imported bulbs, small sizes, odd shapes, bulbs which had been injured by cold and damp enroute from Europe, etc.

A special compost was made of approximately half coarse white building sand, from lakes, and half milled sphagnum moss, finely pulverized by the manufacturer of this special type in Wisconsin for seed culture. The proportions were about 50-50 by volume. The sphagnum was well packed into the measuring pails during mixing. To this when well mixed were added small portions of wood charcoal chips, of minute size, such as are used in chicken feeds, small portions of finely sifted leaf mold from piles of rotted oak leaves, containing no earth or soil, and a small amount of the common dried, pulverized and sterilized stockyards cow manure (Wizard Brand) available at all fertilizer stores.

No definite quantities of these added materials can be released at this time, as the matter is still under study for further experiments. But in almost all cases, or at least 95 per cent of the Amaryllis bulbs in the experiment, made good growth—of roots, leaves and bulbs during the summer in the lath house. Some bulbs produced as many as 14 large long leaves, which were held firmly erect, until they died away in the Fall. Many bulbs doubled in size, and virtually all that were in unfavorable condition when planted, developed good root systems and foliage. The pure whites, as expected, made the slowest and least leaf

and bulb growth, but mostly made good root systems. These remain on the bulb for weeks after removing the bulbs from the cans. All bulbs were potted as previously indicated in gallon tin cans, obtained from restaurants and schools, carefully cleaned. Four to six drainage holes were punched in the sides of the cans with a beer can opener.

There was occasional feeding, about once a month, with some nutrient solution (Hy-Gro), but no particular effort was made to perform this with regular and conscientious precision. The weather in Central Florida in the summer, 1953 was warm and humid, with heavy rainfall, some 20 inches being recorded during August, about 10 inches each in July and September, or slightly more. A few times the bulbs were watered by hand with a hose when dry, but not consistently. The pots were weeded carefully when any weeds grew. Toward close of the experiment they were shown to Prof. Alex Laurie, emeritus Professor of Floriculture at the University of Ohio, now in business at Eustis, Fla., who expressed his amazement at the foliage, bulb and root growth. He has agreed to cooperate with the writer in checking the results of further experiments.

PESTS OF AMARYLLIS AND THEIR CONTROL

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The known information on pests attacking amaryllis was published twenty years ago in the first Yearbook of the American Amaryllis Society. It seems appropriate to bring the information on the amaryllis pests up to date for the benefit of both old and new members of the Society.

Amaryllis plants are attacked by a number of pests, including both insects and mites. The plants grown in the fields or gardens may be damaged by different pests than those grown in the greenhouse or conservatory. Reddish spots and streaks on the leaves and flower stems appear after the feeding of certain insects and mites. The flowers, bulbs, and roots may also be damaged.

Insects and mites causing spotting of leaves and bulbs: Reddening of the leaves and bulb scales of amaryllis usually follows injuries caused by the feeding of insects with sucking mouth parts or by mites.

In both greenhouse and field several species of thrips, including the banded greenhouse thrips *(Hercinothrips femoralis* (Reut.)), the greenhouse thrips *(Heliothrips haemorrhoidalis* (Bouché)), the flower thrips *(Frankliniella tritici* (Fitch)), and the gladiolus thrips *(Taeniothrips simplex* (Mor.)), feed on the leaves and flower stems by puncturing or rasping the surface cells and sucking up the juices. The adults are slender-bodied insects about 1/16 inch long and light brown to nearly black; the larvae are orange to pale yellow. The gladiolus thrips, which is differentiated from the others by the cream-colored band across the middle, apparently feeds, to only a slight extent on the foliage, but

causes such severe injury to the bud that the flower opens imperfectly. These thrips may be controlled by weekly applications of dust containing 5 percent DDT or similar mixtures of chlordane or dieldrin.

Some insects puncture the tissue and suck out the juice from beneath the surface, and the reddened areas may be more localized. In the field the potato aphid *(Macrosiphum solanifolii* (Ashm.)) sometimes colonizes on young leaves and buds. In the greenhouse the citrus mealybug *(Pseudococcus citri* (Risso)) and the grape mealybug *(P. maritimus* Ehrh.) are often found in cotton masses, particularly in the crevices between the leaf bases and on the bulbs. A third mealybug, *Trionymus lounsburyi* Brain, has been found on amaryllis in Pennsylvania and California, and a fourth, *T. amaryllidis* (Bch.), occurs in Persia. The hemispherical scale *(Saissetia hemisphaerica* (Targ.)) and the soft scale *(Coccus hesperidum* L.) are sometimes found on the foliage and on other parts of greenhouse-grown amaryllis.

The aphids and the younger stages of mealybugs and scale insects may be controlled with a spray containing 1¼ teaspoonfuls of nicotine sulfate and 2 tablespoonfuls of soap chips in 1 gallon of water. For more effective control of the mealybugs and scales a spray containing 2 teaspoonfuls of 50-percent emulsifiable malathion in 1 gallon of water may be used in the greenhouse or field. If malathion is to be used on house plants, they should be taken outdoors for spraying.

The two-spotted spider mite *(Tetranychus bimaculatus* Harvey) pierces the epidermis of the leaf and draws out the liquid contents of the cells. Areas so injured at first become pale, but later turn rusty red, much as when injured by thrips. These oval eight-legged mites are yellow or red with two brown spots, and about 1/50 inch long. They usually congregate in large numbers. Their shining round eggs are found in depressions on the underside of leaves, generally covered with protecting webs.

Spider mites are controlled with the malathion spray suggested for use against scales and mealybugs. Where only spider mites are present, or for plants in the home, a miticide such as Aramite or DMC is preferable. Aramite in a 15-percent wettable powder should be used at the rate of 2 pounds per 100 gallons or 4 teaspoonfuls per gallon, and DMC in a 25-percent emulsifiable liquid at 1 pint per 100 gallons or 1 teaspoonful per gallon.

The bulb scale mite *(Tarsonemus laticeps* Halb.), a common pest of narcissus, was first recognized in 1929 as a pest of amaryllis in certain greenhouses in Germany. The microscopic mites are white when young but caramel-colored as adults. Infestations of this mite are indicated by the appearance of reddish spots or streaks on the leaves as they emerge from the neck of the bulb. The reddish lesions elongate as the leaves grow, and may attain several inches in length. The reddening also extends into the bulb, where great numbers of the mites and their eggs may be found. The mite population usually remains at a low level on plants grown in the field, and their presence may not be recognized. They do not increase markedly on the bulbs in dry storage, but do move from

bulb to bulb. When the bulbs are brought into the warm humid greenhouse, the population increases rapidly.

Sprays are ineffective against these mites because of their protected locations within the bulbs. Immersing the harvested bulbs in water for 60 minutes at 110° F. will destroy the mites. After this treatment the bulbs should be allowed to cool gradually before they are planted.

The bulb mite *(Rhizoglyphus echinopus* (F. & R.)) and a related species, *R. solani* Oud., frequently occur on many kinds of bulbs, including amaryllis, but may be barely seen with the naked eye. These pearly white mites are found burrowing into the roots, scales, and stems of plants that are yellow and sticky. They attack only weakened or rotting bulbs.

Bulb mites may be destroyed by the hot water treatment described for bulb scale mites. Since this pest is not known to damage healthy bulbs and plants, it will practically disappear if defective amaryllis bulbs and plants are destroyed.

Insects devouring foliage and flowers: In the southeastern part of the United States grasshoppers, particularly the eastern lubber grasshopper *(Romalea microptera* (Beauv.)), feed on the foliage and exposed bulbs of amaryllis. Individual plantings may be protected if surrounded by a trench with straight sides dug to about 1 foot in depth. Treating infested plantings and surrounding vegetation with a 5-percent chlordane dust will destroy this pest.

In Florida the blister beetle *Epicauta strigosa* (Gyll.) feeds on amaryllis flowers. This insect and related forms injure many crops. These blister beetles are recognized by their slender bodies and black coloration, sometimes striped with gray or yellow. They appear suddenly in large numbers in midsummer, cause severe damage for a short time, and then disappear just as suddenly. To control blister beetles apply a dust containing 5 percent of DDT.

Certain brownish or grayish velvety caterpillars belonging to the cutworm family feed on field-grown amaryllis. *Xanthopastis timais* (Cram.), known as the Spanish moth or convict caterpillar, devours the foliage. This insect occurs from Maine to Brazil and is common in our Southeastern States. The egg, larval, and pupal stages last 5, 25, and 50 days, respectively, and the adults live 8 to 10 days. Eggs are laid in large groups on the lower leaf surface, and the larvae are gregarious. The insect pupates in the soil. In Brazil it seriously injures leaves and bulbs of amaryllis. It also attacks *Pancratium, Eucharis, Fittonia,* and many other ornamentals.

In Australia, Formosa, and some other parts of the Far East, caterpillars of *Brithys crini* (Fabr.), *Noctua dominica* (Cram.), and *Calogramma festiva* (Don.) damage the leaves of amaryllis, lilies, crinum, narcissus, and *Rohdea japonica. B. crini* spends the winter as *pupae* in the soil, and the adults emerge the following spring. In Germany the privet sphinx *(Sphinx ligustri* L.), a large, light-green caterpillar striped with violet and white and attaining a length of 4 inches, devours the foliage of amaryllis.

In Brazil efforts to control the convict caterpillars with lead arsenate, 3 pounds in 100 gallons of water, were unsatisfactory, but good results were obtained when 2 pounds of paris green was added to the spray. A 5-percent DDT dust will control this caterpillar as well as others of this type.

Insect burrowing in the bulbs: Larvae of the narcissus bulb fly *(Lampetia equestris* (F.)), long known in Europe as a pest of narcissus and for shorter times in North America and New Zealand, also attack amaryllis, as well as *Habranthus, Vallota, Eurycles,* lilies, *Galtonia,* and Scilla. The yellow and black adults, which resemble bumble bees, emerge in the spring and lay eggs at the base of the foliage. The hatching larvae descend to the bulbs, enter between the leaf bases, and feed near the center of the bulbs. The mature larvae overwinter in the bulbs and leave them early the following spring to pupate in the soil. Bulbs dug in the fall for indoor culture may contain the large, legless, maggot-like larvae. Infested bulbs usually "give" to pressure of the hand, or the leaf base is found to contain an entrance hole. Foliage of infested plants becomes sickly, and the entire bulb may disintegrate.

For many years the only control for bulb flies was to immerse infested bulbs in hot water, as for the bulb scale mite. Now the bulbs may be protected from infestation by soaking them for 10 minutes in water containing 2 tablespoonfuls of a 25-percent heptachlor or aldrin emulsifiable concentrate per gallon. The residues of these insecticides remain on the bulbs over winter and destroy the young larvae as they attempt to enter the treated bulbs.

The lesser bulb fly *(Eumerus tuberculatus* Rond.) and the related species *strigatus* (Fall.) are widespread in America and Europe. Their size approximates that of the house fly, and both adults and larvae are considerably smaller than those of the narcissus bulb fly. The adults are black with a metallic luster. The larvae occur in large numbers in a single bulb. They seem to prefer bulbs weakened by the narcissus bulb fly, mites, or disease. Heavily infested bulbs usually disintegrate, but those containing only a few larvae may be detected only by pressure with the hands. Because these flies seek out only weak or injured bulbs for oviposition, no control measures seem warranted other than to plant only vigorous, healthy bulbs.

In Africa and Europe, large fleshy, whitish grubs of the weevil *Brachycerus* sp. have been found hollowing out the interior of amaryllis and other bulbs. No methods for its control are known.

Preventive measures: As many of the pests affecting amaryllis also attack other bulbous crops, the amaryllis plantings should be segregated as much as possible; also sites recently used for such crops should be avoided. Weeds serve as food for thrips, grasshoppers, cutworms, and spider mites; therefore, the plantings and surrounding areas should be kept free of weeds. Good culture to maintain vigorous growth and the elimination of weak or diseased plants and bulbs will reduce infestations of several of the pests.

Precautions in the use of insecticides: In handling insecticides, avoid extended contact with the skin or inhalation of the fumes. If parts

of the body become wet with spray solutions, wash thoroughly with soap and water, and change clothing. Follow the manufacturer's directions in the use of all insecticides.

THE BROAD MITE OF AMARYLLIS

C. Lloyd Burlingham, *Florida*

The broad mite, thought to have been introduced into this country from Europe, is so small that often it can be seen only under the microscope. It lives in the base of the bulb, though sometimes encountered between the layers of the bulb. The growth of the bulb is slowly retarded, and the root system eventually killed. A mature bulb is sometimes destroyed in eighteen months.

Some symptoms indicating the presence of mites are red streaks on the base of the bulb, an excess of red fire on the stem of the flower stalk, twisting or abnormal bending of the flower stalk or leaf, or anemic looking blossoms. An even more definite sign is dark discoloration at the base of the bulb, which usually is moist, and in advanced stages, slimy. It is believed the reddish spots and streaks on the leaves, often known as red rust, are result of broad mites. In fact, some enthusiasts claim that almost any abnormality of growth of leaf, spathe, or blossom is due to the mite.

Roy Howard (Mass.) used a 40% nicotine oleate solution obtained from the Perry seed store in Boston. Three teaspoonfuls of the nicotine oleate solution were mixed with one gallon of water, to make the proportion 1:400, and the bulb was soaked for ten minutes at 122 degrees Fahr. After treatment any foliage on the bulb promptly died. In the spring the bulb may then be set in the garden, or in the winter it may be repotted and placed where it can get bottom heat and good sun, but not too much water. Some difficulty may be expected in rooting, and potting the bulb temporarily in damp spagnum moss may be advised. Mr. Howard in every case saved the bulb, though there was some retardation of growth.

Durward G. Merritt (S. C.) mixed 25 grams of sodium selenate with three gallons of water, and sprinkled it on 1800 quart tins containing year old amaryllis seedlings as well as on some mature Dutch amaryllis. He then sprinkled five gallons of water to wash the chemical from the leaves. As the tins were closely set, he believes little of the sodium selenate was lost between the tins. He used a slightly stronger solution on a few bulbs, which promptly lost their foliage. He believes now that it might have been better to apply the solution directly to the soil rather than to the leaves. It should be borne in mind that this was a single treatment, and it might be damaging or even fatal to repeat too soon. There is some difference of opinion whether a single treatment is satisfactory, or several successive treatments of a weaker solution, are better. Mr. Merritt was not treating specifically for mites, but he found no visible live suckling insects on his amaryllis for three months after treatment.

Armyn Spies (Ill.) uses a course of three treatments. He loosely fills the larger half of a five-grain gelatin capsule (obtainable from any drug store) with sodium selenate and mixes it in a gallon of water. Metal containers should not be used for the solution, but glass or glazed pottery. For African violets or other plants more delicate than the amaryllis, six quarts of water should be used with the contents of the capsule. The solution should not be used when the soil is dry and in need of water, but when already moist. Excessive amounts should not be used otherwise too much will run out of the bottom of the pot. Three treatments are given two weeks apart, and then no further treatment will be required for any purpose for at least three months. Mr. Spies believes that, using this strength of solution, a month will be required to kill all mites.

It is understood that Mr. Klein of the amaryllis section of the Garfield Park Conservatory, Chicago, is experimenting with the use of sodium selenate in combating the broad mite, and it is to be hoped that other qualified persons will also experiment to determine the extent of the incidence of the broad mite in amaryllis in this country, just what abnormalities of foliage, spathe and blossom may properly be ascribed to the mite, and the best method of combating it.

EXPERIENCES IN THE PROPAGATION OF DUTCH AMARYLLIS

JOHN T. WEISNER, *Florida*

About six years ago, the writer became interested in growing hybrid amaryllis. His principal interest was in the development of self-colored flowers of the Mead strain. In the next three years (from the first batch of seedlings) several fair reds and three near white amaryllis were developed. However, nearly all interest in the Mead strain was lost on sight of the first Dutch amaryllis. After seeing the Dutch blooms the writer's dominant desire was the acquisition of some of these magnificent flowers. This interest in the Dutch strain developed to such an extent that he just had to have several of the Dutch bulbs. However, upon inquiry as to the best place to purchase Dutch stock, the answers repeatedly were Dutch amaryllis were fine, but they are green-house plants and will not live in Florida. However, against this advice, about 100 bulbs were purchased. From this first year's stock the author decided that he would propagate some of the bulbs in the same manner which had been used in propagating the Mead strain. Also, in September of 1951, approximately 150 Ludwig strain seeds were imported and planted. In August of the same year, one Dutch white bulb (unnamed seedling) was cut and the following spring the cuttings and the young seedlings from the imported seed were transplanted into a bed made especially to grow these young Dutch bulbs. September of this year, two years after the cuttings and seeds were planted, the majority of these bulbs have grown to blooming size, that is, 2¾″ in diameter and above. Some bulbs have reached 4″ in diameter. Needless to say, the writer is quite proud of

the fine growth that these bulbs have made. From all appearances, they have grown just as well as any of the Mead strain amaryllis, a few of which were also planted at the same time and in the same beds.

In August of 1952, quite a few of the named Dutch bulbs were cut for propagation, some of these were 'Doris Lillian', 'Albino', 'Red Sparkle', 'Margaret Truman', 'Ludwig's Dazzler', 'Bordeaux', 'Moreno', 'Red Master', and others. During the following spring, (April 1953), these bulblets were transplanted into prepared beds. It was noticed the bulblets from several of these bulbs were more vigorous and seemed to grow much more rapidly than others. 'Red Master', 'Doris Lillian'. 'Ludwig's Dazzler', and a purchased seedling which was labeled No. 10 seemed to be growing more rapidly than the others. During the latter part of September of this year (one year after cutting the bulbs), inspection and measurements of the diameter of some of these bulbs showed that approximately 90% of the 'Doris Lillian' bulbs were 2¾″ in diameter and up, some of the bulbs going to 3¼ and one 3½″ in diameter. The 'Red Master' bulbs were running from 2½ to 3″ in diameter and the 'Ludwig's Dazzler' were running from 2¼ to 2½″ in diameter. Likewise, bulbs from Seedling No. 10 were running from 2¼ to 2¾″ in diameter.

Since the author feels that he has had fairly good success in growing the Dutch amaryllis and since it has been found that they grow equally as well as the Mead strain amaryllis and since some of his friends and presumably others, have had difficulty in growing amaryllis, the writer believes it might be interesting to relate the methods he uses in growing his cuttings, seedlings, and mature bulbs.

In order to receive partial shade for the young bulblets, it was decided to plant them under the edge of some oak trees. However, it was recognized that roots from the trees would offer too much competition for the young bulbs. To keep the shade and eliminate the roots, special beds were constructed.

In preparing the beds for the growing of the bulbs from cuttings the following method was used: A thin concrete slab (tilted for drainage) was poured on top of the ground. This concrete slab was poured approximately one inch thick. Six-inch boards were used to form the sides around the slab. In this prepared receptacle, the amaryllis bed was made in the following manner: Compost from rotted oak leaves and garden sand (sand it is, for our place is an old sand dune) were mixed together. To this bed, which is approximately 12′ long and 7′ wide were added the following: Approximately two pounds of murate of potash, five pounds of super phosphate, four pounds of fish meal, and fifteen pounds of dolomite. These were all thoroughly mixed with the compost and sand giving a depth of approximately five inches. This material was allowed to stand about a month before the bulblets were planted. The soil was again turned, leveled, packed, and the bulblets planted eight inches on center, in rows eight inches apart. Growing this close together one does not have too much trouble in keeping the grass down after the bulbs have started growing. The bulb roots soon form a dense mass which makes it almost impossible to give too much water because

excess water goes through the soil, hits the concrete slab, and either goes on through the concrete or follows the incline down and runs out. Any other excess water is rapidly taken up by the plants and evaporated, provided, of course, one does not have continuous rain for several weeks at a time. To date, using this method, there has been no extensive root rot even though this fall we went through a period of rainy weather which lasted six weeks.

One bed of amaryllis seedlings two years of age had shown extremely poor growth. Upon inspection it was found that the bulbs had not made a good root system. This bed was one that had been prepared several years prior for young camellia seedlings. The soil consisted of pond muck of a heavy black sticky type that held water well. In order to determine, if possible, why some bulbs grew well and others did not, soil samples were taken and analyzed as follows:

Sample Number	Organic Matter	Texture	pH	Lbs./A. CaO	Lbs./A. MgO	Lbs./A. P_2O_5	Lbs./A. K_2O	Nitrates
1	Medium	Fine Sand	6.52	4760+	1990+	515	120	Low
2	Medium	Fine Sand	5.37	3920	1800	595	516	High
3	Medium	Fine Sand	6.56	4760+	1990+	641	480	Very High
4	Medium	Fine Sand	7.10	4760+	1990+	665	156	Med. High
5	Medium	Fine Sand	6.52	4760+	1990+	665	204	Medium
6	Medium	Fine Sand	6.85	4760+	1990+	641	318	Medium

The compounds of calcium, magnesium, phosphorus, potassium, and nitrates were analyzed in pounds per acre. (lbs./A.). To get the parts per million, divide the pounds by two.

Samples No. 1 and No. 2 are from the old camellia bed. These amaryllis (two years old) showed the poorest growth.

Sample No. 3 was from the bed containing cuttings of 'Albino' and Seedling No. 10.

Sample No. 4 was from the bed containing 'Doris Lillian', 'Red Master', and 'Bordeaux'.

Samples No. 5 and No. 6 contained the cuttings of the white seedling and the 150 bulbs grown from the Ludwig seed planted in September of 1951.

The best proportional growth shown by any of the seedlings or cutting bulbs was from the beds represented by Sample No. 4. As mentioned before, after one year of growth, 'Doris Lillian' bulbs ran from 2¾ to 3½″ in size. 'Red Master' ran up to 3″ and 'Bordeaux' up to 2½″. In Bed No. 4 the soil was found to be slightly on the alkaline side, plenty of calcium, magnesium, high in phosporous, medium-high in nitrates, yet one of the lowest (represented) in potassium. Other samples ran high in the above-mentioned minerals, but the bed represented by Sample No. 4 was the only soil containing a pH rating on the alkaline side.

Sample No. 2 was from the bed representing the poorest bulb growth, here is found the pond muck holding much water and the lowest pH rating.

Other seedlings were planted in the ground without any preparation other than a broadcasting of fertilizer composed of fish meal, murate of potash, dolomite, and super phosphate in the same proportion as was

used to prepare the abovementioned beds. This fertilizer was worked into the ground and the young seedlings planted eight inches on center in rows twelve inches apart. These seedlings did not grow as rapidly as those in prepared beds. However, during this year's growth some of the 'Red Master', 'Moreno', and 'Albino' seedlings reached 2½" and a few 2¾" in diameter by September (seed from the 1952 crop).

The reader will notice that no mention has been made of flowers from these cuttings and seedlings. That is due to the fact that this article is being written during the month of December and these bulbs have not had an opportunity to bloom.

All mature bulbs, which were originally purchased, whether potted or grown in the ground have continued to do well, grow, and multiply. When potting the bulbs or planting them in the ground the same fertilizer mixture was used; namely: fish meal, murate of potash, super phosphate, and dolomite. These bulbs were potted in five-quart oil cans which had their tops removed, holes punched in the bottom (using a beer can opener) and then dipped in hot asphalt tar to give the cans a protective coating. This tar coating enables one to use these metal cans for several years. In the writer's opinion, the cans are better than pots for the metal pots do not allow excessive water to evaporate leaving an accumulation of fertilizer salts in the sides of the container as often happens in the case when one uses clay pots. Care should be used to keep the tarred pots from the direct sun during the hot summer months as the black tar may absorb enough heat to burn the amaryllis roots. The writer sets his potted amaryllis under trees where they receive partial shade.

FORCING PRETREATED AMARYLLIS

HAMILTON P. TRAUB, *California*

In December 1953, Mr. Wyndham Hayward sent the writer a pretreated Amaryllis bulb as a 1953-54 Holiday present. This bulb had been produced by a Holland grower, and had been pretreated for early forcing. The directions that accompanied the bulb indicated that it could be brought into flower in from 6 to 8 weeks after potting. On receipt, the tip of the flower scape was barely showing in the neck of the bulb. The bulb was planted in a 6-inch clay pot, using a potting mixture of equal parts of compost and granitic sandy loam, and was brought into flower in our home that is provided with radiant heating in the floor.

(1) The potted plant was placed in a room where the floor temperature ranged from 80° to 85° F., and the air temperature from 72° to 75° F. The bulb was watered liberally from the first day—water was applied every day. Under these conditions, the scape began to elongate at once, and growth was rapid:

Dec. 4—the bulb was potted.
Dec. 18—the peduncle was 19 inches tall; leaves were 3 inches long.
Dec. 25—the first flower began to open.

(2) On December 25, the plant was taken to the living room where the floor temperature ranged from 72° to 75° F., and the air temperature from 70° to 72° F., in order to slow down growth so that the flowers would last longer. The plant was placed in sunlight near the glass wall with southern exposure.

Fig. 13. Pretreated Dutch Hybrid Amaryllis bulb forced into flower in about three weeks. Photo by Frederic Traub.

Dec. 28—the first flower fully open; the second flower almost fully open, and the third just beginning to open; peduncle 30 inches tall; leaves up to 13 inches long. (See Fig. 13).

Dec. 29 to Jan. 4—all of the flowers in prime condition.

Jan. 5—the first flower began to decline.

Jan. 6—the second flower began to decline; peduncle 32.5 inches tall; tuft to 8 leaves up to 21 inches long.

Jan. 8—the third flower began to decline.

It should be indicated that under the conditions it took about 3 weeks from potting time until the first flower began to open. Without bottom heat furnished by the radiant heating in the floor, it is doubtful if the bulb could have been forced into flower in such a short time which was about half of the minimum time (6 weeks) indicated by the Holland grower. It should also be noted that the length of the peduncle, 30 inches at first flowering, is somewhat abnormal, but the flowers were so large that there was a proper balance between the flower size and peduncle thickness and length. The flowers had a color value near Signal Red (819 RHS), and the shape was the Leopoldii (D-5b) type, less imbricated, measuring 3 inches long (side ways), and 7¼ inches across the face. The whole effect, the tall scape, the large, brilliant flowers, and the tuft of 6 leaves made a very grand showing in the living room and was the center of attraction for all the Holiday guests.

Unfortunately, there were no *Amaryllis* x *henryae* (Miniature Division) in flower and the guests could not compare the two extremes and register a preference. In most cases, after the enthusiast has grown the tall types for some years, he expresses a preference for the miniatures. However, there is room for both types. The tall types may be used as decorations placed on the floor because the extreme height makes them unsuitable for table use. The miniatures may be used in arrangements or pot plants on the living room and dining room tables, and also in the window garden.

It should be explained that the flowering time could have been lengthened if the flowers had not been crossed, and if the plant had been placed in a cooler location, 60° to 65° F., each night, and returned to the living room during the day.

It will be interesting to hear in the next Herbertia from members about their experiences in bringing pretreated Amaryllis bulbs into flower for the Holidays.

TROUBLES OF AN AMARYLLIS IMPORTER

Wyndham Hayward, *Florida*

No phase of the bulb business in America entails more worry, sweat and tears than that of the Amaryllis importer. There is no quicker path to ulcers and complete nervous prostration than a few years of dealing in the choice named clones produced by the Holland Amaryllis specialists.

Amaryllis bulbs are a perishable commodity, in fact a truly tropical plant, subject to irreparable and irremediable loss and damage from cold and dampness in transit, en route, on the docks in Holland before departure, at sea aboard some tramp steamer which brings them to New York, or on the docks in New York or Hoboken, N. J., awaiting final customs and plant quarantine examination.

Then once cleared of the customs and plant quarantine hurdles with a clean bill of health, there is the fateful transit from New York to the retail dealer's home town in this country.

Amaryllis, being a spring-flowering bulb, are harvested in the late Fall in Holland, late October or early November. Dried off a few days, the bulbs are packed in individual bags in the case of named clones, to keep them separate and distinct. Packing material may be wood shavings or more recently various grades of vermiculite or a mixture of both. These bags are of strong paper, and usually with ventilation holes for the circulation of air in transit.

Actually this is not an essential if the bulbs are thoroughly dried and "cured" for transport in Holland at the growing end before packing and shipment. All too often, however, the Holland grower or shipper is just too anxious to send the bulbs on their way across the Atlantic, and so the bulbs are not properly dried off before packing. This results in serious sweating and condensation of moisture in the bags during transit, so that on receipt the bulbs are wet and slimy, sometimes the moisture has soaked the bags so that they fall apart when lifted from the case, and the condition may be so bad that named varieties become unavoidably mixed while unpacking the cases.

In case the bulbs are shipped abroad a freight steamer with inadequate provision to keep them warm and dry en route, a serious matter, as in late November and early December there are often storms and blizzards with snow and ice on the broad Atlantic during their passage, the bulbs may be exposed to unfavorable weather conditions on the way, and frequently this may affect part of several cases. Usually the cold damage does not actually kill the bulb, but renders it unfit for immediate retail sales.

In such case the American dealer must make provision to grow the bulbs himself for a season in the effort to restore their lost tissues and size and vitality. Often such bulbs will die in a few weeks after planting. Usually they give only an unsatisfactory bloom, sometimes the bloom capacity is lost entirely for a season or two.

Of course such shipments can be insured, at a high rate, usually about 10 per cent of valuation, against loss in transit. Settlement of claims in such cases has proved, in the writers experience highly and invariably unsatisfactory and involves filing a claim through a Lloyd's Agent, a costly and difficult procedure in current operation of foreign marine insurance in the United States.

For instance, suppose part of an insured shipment of hybrid Amaryllis arrives from Holland, as they often do, with damage to the bulbs from cold and dampness en route. The procedure is to notify the nearest Lloyd's Agent within 30 days of receipt. Actually in such cases, the full extent of damage will not show up in the bulbs until five or six weeks after receipt. The bulbs may seem only superficially damaged on receipt when first unpacked, being only slightly damp and sweaty, sometimes only slightly slimy on the outside layers of the bulb tissue. But a period of three to six weeks will bring a marked change, the bulbs may turn black as they dry, and soft spots may develop at the base, indicating much more serious damage to the bulb tissue than was first apparent.

The Lloyd's Agent appoints an examiner to determine and report the percent of loss. This is at the expense of the importer, the American dealer who received the damaged bulbs. Then after paying the expense of the "survey of loss", the bulb importer pays another fat fee to the Lloyd's Agent for his part in the business. These payments must be made in advance, after having suffered the loss, and are forfeited in case the insurance underwriters in Europe decide against honoring the claim, as can happen, in the writer's experience. In the event that the European adjusters decide to honor the claim or a part of it, the payments advanced to the Lloyd's Agent in the United States are reimbursed, plus the amount of the insurance award.

Collection of the claims is an interminable matter, anywhere from two months to a year or so in the writer's experience. It remains one of the most aggravating aspects of the entire Amaryllis bulb importing trade. A complete investigation of the situation and prompt steps to improve the legal status and protect the rights of the American bulb importer under this system should be undertaken by the proper authorities.

The thought of what he would do some season if the entire shipment of Amaryllis from one of his Dutch exporters were to be frosted in transit by some misfortune, or dumped into New York harbor by some horrible port accident, as could happen and does happen to shipments in transit, is a constant nightmare to the American Amaryllis bulb dealer. The loss of the mere money value of the shipment would be only a part of the disaster, more weighty matters being the return of thousands of dollars to customers, the expenses of importing, duty, insurance, advertising, circulars and catalogues, etc.

The American importer of such bulbs as tulips, hyacinths and Dutch Iris from Holland faces no such crises. These bulbs are usually of low value, $5.00 to $50.00 per 1,000 in most cases, and could readily be replaced if the entire shipment were destroyed or lost. Then too, the freighters crossing the Atlantic in September and October have balmy weather compared to the wintry storms at sea of late November and December.

A point at issue in this matter stands out—why is it not practical to ship matured "cured" Amaryllis bulbs early in November, or late in October? Then they would face much better weather conditions. In Florida, Amaryllis bulbs may be harvested the last week of October and the first week of November as mature as they will ever be during that season. Possibly in the greenhouse growing conditions prevailing in Holland this maturity comes a few weeks later.

After receipt, the Dutch Amaryllis bulbs are immediately unpacked, and if in good, dry condition may be left in their bags until sold or wanted for orders. But the better method usually is to put them in ventilated trays in a warm, dry shed, where temperatures will not go below 35 or 40 degrees F. A minimum of 55 degrees F. would be better. Under our Florida conditions there will be a few nights when the temperature in the bulb storage sheds goes down to 35 or 40 degrees, but if the bulbs are firm and dry they suffer no ill results. Amaryllis, like

caladiums and other bulbs dug at the same time of year, would be injured by freezing temperatures of even brief duration if exposed while still moist and turgid during the drying-off process.

After all these trials and tribulations of ocean and customs house and quarantine examinations, the last leg of the transit to the ultimate receiver, the retail dealer who will sell them, is also fraught with peril to the tender Amaryllis bulb. There is the untrustworthy trucker who takes them from the Plant Quarantine house in New York, who must be contended with. He may be "a bonded trucker" but he has no conscience, and no knowledge of what treatment a rare and perishable Amaryllis bulb must have.

If the trucker has a nearby warehouse in New York, he may take the bulb cases there for storage for a few days to a week before turning them over to the truck lines or express agency for shipment to Florida. The writer has had all of these things happen to his bulbs, so he knows whereof he speaks. Such matters reflect the gravest discredit upon the efficiency and proper operation of the truck lines. Last year (Nov. 1952) the writer had one shipment of Amaryllis valued at $1,400 which was 10 days in transit from the time of delivery to the truckman at the Hoboken plant quarantine house till arrival at Lakemont Gardens in Winter Park. No explanation has ever been offered, either by the customs broker who handled the shipment at New York, or the truck lines bringing it to Florida, and to this day the issue is an unpleasant mystery as a number of choice named varieties in the shipment were found to have suffered from cold and dampness on unpacking. After several months, recovery of around $200.00, about half the potential loss, was obtained from the Dutch and English insurance people, as against an insurance charge of more than $100.00 paid on receipt of the shipment and $42.00 additional in Lloyd's Agent survey expenses and fees.

So stop and think a bit before rushing into the Amaryllis importing business, as no other part of the bulb trade offers more prickly difficulties for the American retail dealer; and have sympathy for the specialist who must charge good prices for his imported Amaryllis bulbs to cover his many overhead costs and unexpected losses.

AMARYLLIS IN FLOWER ARRANGEMENTS

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Regional Vice-President, A. P. L. S.
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It cannot be said that the tall amaryllis is one of the most popular flowers for use in arrangements. Despite its real virtues for arrangement work, there are many factors militating against its use, even where it is in relatively abundant supply. Members of the other tribes of the amaryllis family enjoy wider use in decoration in proportion as they differ from the amaryllis in their characteristics of flower form and growth habit. This does not apply to the Miniature Amaryllis which are well suited for arrangements.

Arrangement showing the use of multiple elliptical forms, with McCann Double Amaryllis in the center. See text for full description. Photo by Dr. Philip G. Corliss.
Plate 10

The factors which have prevented wider use of the amaryllis itself in arrangements are:

(1) Except in favored sections of the south or west coast, it is not available to flower arrangers. When it is in bloom, it is not the usual season for flower shows or arrangement displays.

(2) Even where it is grown out of doors, the gardener hesitates to sacrifice the reward of one or more years' work for the briefer pleasure of using the flower in an arrangement.

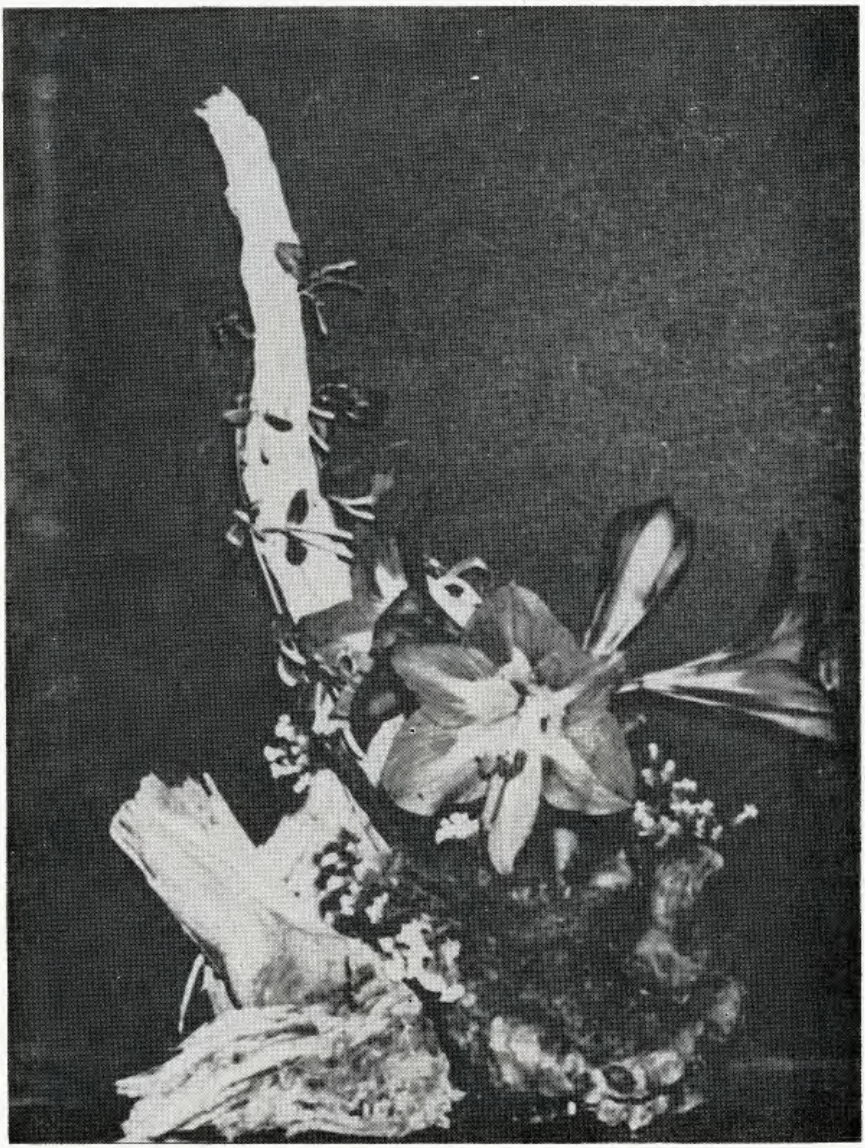
(3) The large hybrid amaryllis does not fit into the usual kind of arrangement currently popular with American women.

(4) The Japanese, in their many centuries of flower arrangement art, had not used any flowers like the amaryllis; hence they gave us no examples to follow. The Japanese are only now beginning to find ways to incorporate amaryllis, gladiolus, and other African flowers into their stylized arrangements.

The arrangement accompanying this article which exemplifies the use of multiple elliptical forms contains bronze canna leaves to make an oval background (Plate 10). The flower material all belongs to the amaryllis family. In the center is one of McCann's double amaryllis hybrids, surrounded by white crinums and pastel alstroemerias. All of these flowers were cut from my garden in Somerton (near Yuma) Arizona. The Chinese red pottery container with brass base is echoed in the brass candlesticks with Chinese red candles.

The other illustration (Plate 11) is of a shadow box arrangement featuring one stalk of the new Dutch hybrid amaryllis, 'Rose Queen'. In line with the Japanese insistence on using flowers only as they grow in nature, the amaryllis is not accompanied by green foliage but is set in driftwood on which honeysuckle twines upwards. Annual white statice, a garden companion, appears on several places behind the principal flower, to soften but not to clutter the picture.

I have been as guilty as many other Americans in using the most popular member of the amaryllis family—the daffodils—in arrangements which violate the Japanese rule of copying nature. When once understood, this principle makes arrangements which are in accord with it seem much more pleasing than the artificial semi-circles and triangles built by too many of us. Daffodils, when properly grown, like most other members of the amaryllis family, have blooms of the same variety always at almost exactly the same height. This fact should be emphasized when they are used in arrangements, and their stems should not be cut at various lengths so that they can form a crescent or triangle. Nerines and lycoris also bloom at a uniform height for the variety and in some of the color slide sets that I supply to garden clubs I have an interesting pair of arrangements of *Lycoris incarnata* in which I used the same material in a "natural" style arrangement that one of Texas' leading arrangers used in a conventional triangular form. When using amaryllids that bloom without foliage, it is consistent to use driftwood, while such wood is distinctly out of place with flowers that bloom when their foliage is most lush.



A shadow box arrangement (with frame omitted), featuring one scape of the Dutch Hybrid Amaryllis—'Rose Queen'. See text for full description. Photo by Dr. Philip G. Corliss.
Plate 11

Make-up experts have often advised women not to try to hide a feature which is not "average". Large mouths and high foreheads should be accentuated and not hidden. Dark lipstick, heavily applied, makes the large mouth distinctive. The hair pushed back instead of being chopped into bangs at a camouflage attempt is the proper treatment of the high forehead. In the same manner, characteristics of flowers which are considered by some to be a fault, may well be turned into a great advantage. The "stiffness" of the gladiolus spike, for instance, makes it more suitable for creating a strong line in an arrangement. The large size of the flower and stem of the hybrid amaryllis may be similarly turned to advantage by permitting the flower to be used in a simple but bold arrangement.

In conclusion, I feel that the amaryllis offers many attractive rewards to the venturesome flower arranger who takes advantage of its lasting freshness and uses it in a design based on its natural growth habits.

SOME ALLIUMS FROM TEXAS

Lt. Thad M. Howard, *Georgia*

Alliums are good text-book examples for the "poor little rich girls" of the garden world, for they are the recipients of an undeserved social discrimination from the uneducated gardening public. *Allium,* if you have not already guessed, is the botanical name for the common onion, the humble garlic, the succulent leek, the mildly flavored chives, shallots, and the like. But though they have won an established niche in our cooking, they deserve to share an equal lime-light as horticultural beauties in the average garden. True, most of them possess the tell-tale aroma of their edible kin, but they also possess beautifully colored flat or globular heads of flowers on long slender stems. What is even more amazing about these Cinderellas, is the fact that some of them are deliciously fragrant! Sceptics who would not think to smell the flowers of a mere "onion" will scoff at this statement, but the undeniable fact remains that some members of the large group of Alliums—more than 300 species—are pleasantly perfumed. This is particularly true of *Allium tuberosum,* the "Oriental Garlic", and of *Allium fraseri* and its variety *eulae.* Several other Alliums native to our South-western states are also fragrant.

Allium drummondii, a native of Texas, is one of the very finest bulbs for the spring border. This fragrant little Allium is quite wide-spread and variable from place to place. The type that is being offered in cultivation today is a superior form that is worthy of the bulb fancier's attention. Like many of the so-called "minor" spring-flowering bulbs, *A. drummondii* is not tall, being less than a foot in height. The bright, starry flowers are carried in loose, flat heads in clusters of a dozen or more atop stems 8″ or so tall. They may be any shade from pure white to deep rose-purple, with the intermediate shades predominating.

Unlike most other flowers, they darken in color with age, remaining

attached to the stems long after the seeds have ripened. Three or four grayish green slender leaves are produced, and these are about as long as the flower stem. Usually two or three flower stems are produced from each bulb, and these bulbs have a habit of splitting into two blooming size bulbs in early spring before blooming. The bulbs are quite tiny, being ¼-½" in diameter, with tight reticulated coats.

This "prairie onion" will grow in almost any situation, but prefers an open exposure in well-drained soil. With favorable conditions, *A. drummondii* will make a strong bid for attention in the early spring, for it is a jaunty, cocky little sprite which is capable of making a real color splash when thickly planted. This is particularly true if the planting includes selections of the full color range. The individual flowers are interesting in their variety of patterns and shades, some flowers being solidly colored, while others are white or pink with dark stripes down the center of each petal; still others are red or pink with white centers or "eyes". Even the shape of the flowers varies. So much individual variation within one species is intriguing. This little species has been called by several other names by botanists (synonyms.—*A. helleri, A. nuttallеii),* but *A. drummondii* is presently the preferred "handle" for this diminutive gem.

Western Texas has yielded another fascinating Allium—a rare-colored yellow species that is very much like *A. drummondii* in general appearance. *Allium Coryi* would be desirable for its color alone, but its tidy habits and dainty sprightliness make it a real aquisition to any collection of rare Alliums. The only known yellow Allium native to the United States, *A. Coryi* is more dependable in gardens of the South-west than the European yellow *Allium Moly,* or even *A. flava. Allium Coryi* prefers open exposures in well-drained soils. It varies in color from buff to golden yellow.

Quite unlike the first two species already described, *Allium mobilense* is taller, with globular flower heads, and bright shiny-green, rush-like leaves. It is a less variable species than *A. drummondii,* being restricted to shades of pink and lavender. The densely packed umbels resemble pink puff balls when observed from a distance. This species loves adequate moisture during the growing season, but it must also have good drainage. Well grown specimens of *A. mobilense* may be up to 18" tall with over a hundred flowers in the umbels. Except for its alliaceous odor, it makes a wonderful cut flower.

A closely related species, *Allium zenobiaea* is very similar to *A. mobilense,* but is more robust and flowers later in the spring. It is often a foot and a half tall, with up to 175 flowers in the umbel. It blooms several weeks after *A. mobilense* has completed its blooming season, and continues for several weeks into the early summer, with pale mauve flowers in place of the pink ones of *A. mobilense.* The robust stateliness of *A. zenobiaea* has caused some botanists to regard it as "the queen of the Texas wild onions". When viewed at its best, it is indeed a majestic "onion". Both *A. mobilense* and *A. zenobiaea* prefer full sun or slight shade, and sandy, well drained soils, with a neutral or slightly acid pH reaction.

All of these Alliums are wonderful for cut flowers for those who do not mind handling the cut stems, which will invariably release their volatile odor. For those who are squeamish in such matters, let them remain uncut in the garden, as they will not "smell" if they are not bruised. The cut ends of the stems will not cause any trouble after they are submerged in water, and the water is changed once. After seeing an arrangement of *Allium mobilense* win first prize at a flower show, the writer is convinced that the lowly onion is certainly capable of traveling in the company of some of the "highly bred" horticultural monstrosities that are termed "beautiful" merely because of their gargantuan and often insipid form. In contrast with other plants, "highly bred" onions are EATEN, while the ornamental forms are unchanged from their native state, only awaiting the gardener who can distinguish natural beauty from the semi-artificiality of the inflated frothy flowers so often seen in today's gardens. There are many Alliums to choose from in many colors, sizes, shapes, or growing seasons. Why not try a few?

[PLANT LIFE LIBRARY, continued from page 17.]

FLOWERS OF THE SOUTH—NATIVE AND EXOTIC, by Wilhelmina F. Greene and Hugo L. Blomquist. Univ. of North Carolina Press, Chapel Hill, N. C. 1953. pp. 208. Illus. $5.00.

This very attractive, profusely illustrated book is the cooperative work of Mrs. Wilhelmina F. Greene, the talented floral artist of Winter Park, Florida, who made the original paintings and drawings, and Dr. Hugo L. Blomquist, botanist at the University of North Carolina, who made most of the descriptions. The book includes a representative selection of some five hundred plants out of nearly six thousand native and introduced exotic plants of the Southeastern United States from Virginia to Texas. There are reproductions of 55 colored illustrations, and some 500 black and white line drawings. The descriptions are concise, and in addition there are helpful notes on cutting, arranging and planting. It is a book that will be appreciated not only in the Southeast but also in all parts of the World where the beautiful is cherished.

[PLANT LIFE LIBRARY, continued on page 140.]

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PREFACE

The Giant Arborescent Philodendrons and the Ginger Lilies have been much neglected until recent years, but it now appears that these worthy plants are rapidly gaining in popular favor. This revival of interest in the arborescent Philodendrons is due in great measure to the efforts of two persons—Mr. Mulford B. Foster, of Orlando, Florida, who introduced new material, and Mr. David Barry, of Los Angeles, Calif., who has done much to popularize these plants in California. Mr. and Mrs. Morris Clint, of Brownsville, Texas, have also contributed by introducing a fine new species from Mexico.

The revival of interest in the Ginger Lilies is due almost entirely to the efforts of Mr. Wyndham Hayward, of Winter Park, Florida, where he has brought together the most outstanding collection of these plants in the United States.

In this number of Plant Life, in addition to the articles on the Giant Arborescent Philodendrons and the Ginger Lilies, there is an article on the genus *Nothoscordum*. This includes a description of the genus, a key to the species and the synonomy. This genus includes some very fine garden plants, including species with yellow and lavender colored flowers which are not at present in cultivation. The only species now to be had are *N. bivalve* and *N. inodorum*, both white-flowering. It is hoped that this article will stimulate interest in this group so that the yellow and lavender flowering species will be introduced from South America. The yellow-flowering species are native mainly to Uruguay, and the lavender-flowering species to Chile, Argentina, Bolivia and Peru.

The book reviews (The Plant Life Library) includes excellent new items, particularly, the book entitled, THE SECRET OF THE GREEN THUMB, by H. T. and Rebecca T. Northen, which is easily readable and is on a subject of the scientific facts about plants on which all gardening methods must be based. There are also books, illustrated in color, on wild flowers of the South, and of the United States and Canada. The roster of officers and committees, and the descriptive list of the Society's publications, completes this issue.

1531 Rodeo Road,
Arcadia, California
March 29, 1954

Hamilton P. Traub
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GIANT ARBORESCENT PHILODENDRONS

WYNDHAM HAYWARD, *Florida*

From the windows of his little studio-office in Florida, Mulford B. Foster can look out upon various specimens of a fabulous and fantastic group of plants, the non-vining, self-heading or arborescent species of Philodendrons, the wide dissemination of which in sub-tropical United States is slowly changing the landscaping effects and home grounds and park appearance as never before.

A mere fourteen years ago there were none of these "shrub" type Philodendrons in the Southern United States. A few plants, acquired at great expense from rare plant dealers and botanic gardens in Europe were found on great estates in California, mainly *Philodendron selloum* and *P. speciosum,* which were propagated very slowly by division and stem cuttings of the giant crowns.

In 1939, on his first plant exploration trip to Brazil, Foster, well known bromeliad specialist, hybridizer, landscape artist, of Orlando, Fla., "discovered" huge specimens of *Philodendron bipinnatifidum* growing in the parks of São Paulo and elsewhere in Southern Brazil. He sent back a plant or plants of this species, and another unknown species, which he calls merely "Species No. 1". Cuttings were a failure on the long trip to the United States, but small plants survived and thrived.

On subsequent trips to Brazil Foster found still more species and types of the giant self-heading Philodendrons and brought back living specimens or arranged to have seed sent him. Among the late introductions were *Philodendron undulatum,* from Paraguay, *P. eichleri* from Minas Geraes, Brazil, *P. selloum,* and another unnamed Species, No. 2, from Uruguay, found at the highest altitude of any of the types.

These all belong, botanically, so far as known, to the sub-genus *Mecenostigma* (Schott) Engler, of the genus *Philodendron.* They are mainly characterized by an arborescent type of growth. This may be more or less erect or leaning, and in the case of old plants, the leaning quality may be so exaggerated by the heavy weight of the leafy top so as to bend the stem over till it touches the ground. It will then root and grow upward again, many times with branches in all directions, so as ultimately to enable one plant to cover a circle 20 or 30 feet in diameter. Foster found such plants in São Paulo as he indicated in his article "My Flower Has A Temperature," National Horticultural Magazine, Jan. 1949.

This article remains a landmark in the history of the growing of the arborescent philodendrons in the United States. In it Foster gave a colorful account of his learning about the technique of fertilizing the blossoms of the giant *Philodendron bipinnatifidum* on his nursery grounds at Orlando, how the blooms developed heat during the process of pollination, (pollen emission) a maximum of 102 degrees F. being

His discovery made Foster the first plantsman in the Western World to solve this seed production puzzle of those great Aroids, which are among the trickiest of all plants in their flower fertilizing requirements, comparing in this to the gingers and orchids. The plants proved to have abundant seed production capacity when the flowers were properly fertilized. The seeds of these giant Philodendrons are small, those of *P. selloum* being slightly smaller than those of radishes. The seed may be sown like vegetable seeds in flats. Seedlings a foot in height with several leaves, having a retail sales value of two or three dollars, can be grown in a single year's time under good culture.

Problems of the time of receptivity of the female flowers at the base of the *Philodendron* spadix and the shedding of pollen from the male flowers above it must be solved for successful seeding of the giant non-vining Philodendrons. For the purposes of this article it is enough to say that the female flowers of one bloom are infertile to the pollen from that flower's anthers, or are past the time of receptivity when the pollen is shed. Pollen must be brought from another flower for fertilizing.

Immediately after publication of Foster's NHM article, Hugh Evans and David Barry, Jr., succeeded in fertilizing blooms of *P. selloum* and produced thousands of seed in California. These have been grown into thousands of small seedling plants of this spectacular species which have now become available in the nursery and rare plant trade for a few dollars for a specimen in a six inch pot.

Meanwhile Foster in Orlando has been busy growing seedlings of *P. bipinnatifidum, P. selloum,* and other species and hybrids. His hybrids are believed to be the first *Philodendron* hybrids ever produced in the United States, and possibly the second ever reported in horticultural annals. *P. bipinnatifidum* crossed with "Species No. 1" (unknown) gave him a fine showy hybrid which he called *Philodendron* x *fosterianum.* Another excellent cross produced *Philodendron* x *macneillianum,* which was named after the California Aroid specialist, John MacNeill.

Foster also has seedlings of *P. selloum* x "Species No. 1", and hybrids of *P. eichleri* and *P. undulatum* with other large types growing along at this time. There must be intensive evaluation and study of all the crosses and their possibilities. This is difficult when the parent forms themselves are so new to the horticultural world, at least in the United States.

These giant arborescent types of Philodendrons come from Central and Southern Brazil in the main. According to Foster he has found the wild species over a sub-tropical area a thousand miles long and some 500 miles into the interior, sometimes as near the coast as to be within sight of the ocean itself, growing on rocks, and sometimes along the banks of rivers and streams in the interior. Mostly the wild plants are found in more or less open types of woods, sometimes in higher places where they may suffer light frosts in winter.

This quality of hardiness, and general resistance to cold, in mature, established plants, has endeared them to the hearts of nurserymen and home growers in Florida and California. They can endure several degrees of frost when thoroughly dormant in winter, but of course if in

reached while the outdoor temperature surrounding the plant was 78 degrees F.
active growth tender young leaves might be severely damaged by sub-freezing temperatures.

David Barry, Jr., Los Angeles plantsman, reports that *P. selloum* has stood as low as 22 degrees F. with him on cold nights in Southern California. Foster reports temperatures as low as 25 degrees F., have not injured mature plants of *P. bipinnatifidum* and his "Species No. 1" at his nursery in Orlando. For the first few years he kept his plants inside the greenhouse for protection in winter but after placing them outside as they became too large for the greenhouse, he was pleased to note that they were definitely hardy to the usual sub-tropical winter temperatures of Central Florida where there are several light frosts most seasons.

This means that the new giant Philodendrons should prove satisfactory landscape plants over almost all of Central and South Florida and around the Gulf Coast in regions of similar moderate winter climates. In the sub-tropics in California and Texas they will likewise have their important place. Judging by the changes in recent years since their introduction it is not too much to forecast that this group of plants will prove to be the greatest addition in tropical foliage effects in these states in the coming years of any plant introduction of the present century.

In the North and outside the sub-tropics, these giant types will be valuable additions to conservatories, solariums, and indoor patios, and even in large sun-rooms when not overpotted. When kept in smaller sized pots they do not tend to grow as rapidly as otherwise. When kept in too much shade, however they are not as happy as the vining types of Philodendrons, and the foliage grows outward and flatter.

For many years there has been confusion between plants of *P. bipinnatifidum* and *P. selloum* in the botanical gardens where found. Now since blooming of *P. bipinnatifidum* and *P. selloum* in Florida and California the issue has been straightened out to some degree. The plants are fairly similar and the best that can be said is that *P. bipinnatifidum* has longer, more slender petioles and a more upward airy growth, possibly with more foliage, than the *P. selloum*. Some however, prefer *P. selloum* for its rapid growth and lush, rich, green foliage when well grown. A six inch pot size can be grown to a huge specimen four or five feet tall, in two or three years. Both species are finely cut and waved in the leaf.

P. eichleri is a giant among giants, and a single plant may have a 17-foot spread with its huge wavy-undulate indented leaves. *P. speciosum* is a show piece in itself, with entire leaves like a giant elephant ear, on long petioles. How big this species will get at maturity is still uncertain in the South or California. *P. undulatum* is a smaller type of plant, with entire leaves and more tender to cold than the others although it comes from Paraguay toward the South.

The giant Philodendron situation is still very much in a flux, as new types appear in the seedlings and new hybrids are created annually. One

new and unidentified giant arborescent species growing in the Foster planting has definite thorns a quarter of an inch or more on the rough stem, large enough to scratch the hand. This species was obtained by Foster in Bolivia.

One grower in Apopka, Florida is reported to have 100,000 plants of *Philodendron selloum* coming along from seed at this time, for sale to American florists and foliage plant specialists. No other plant introduction in history has met with such instantaneous and multiplied success. Already it is reported that the growing of these plants may soon outstrip the potential markets in some areas until the general public has been educated to their good qualities.

Fourteen species of these giant arborescent species of *Philodendron* are recognized by K. Krause in his monograph of the Philodendrons in Das Pflanzenreich, Vol. 60, 1913. With the dates of their original publication these are as follows: *P. corcovadense,* Kunth, 1844, province of Rio de Janeiro; *P. tweedianum,* Schott, 1859, Rio Parana; *P. minarum,* Engl. 1878, Minas Geraes; *P. Williamsii,* Hook, 1871, Bahia; *P. speciosum,* Schott, 1832, Minas Geraes, São Paulo and Matto Grosso; *P. braziliense,* Eng., 1878, Minas Geraes; *P. cymbispathum* Eng., 1899, Minas Geraes; *P. undulatum,* 1879, Eng., Paraguay; *P. saxicolum,* Krause, 1913, Bahia; *P. eichleri,* Eng., 1899, Minas Geraes; *P. adamantinum,* Mart., 1860, Minas Geraes, Paraguay; *P. selloum,* Koch, 1852, Minas Geraes, São Paulo and Paraguay; *P. bipinnatifidum,* Schott, 1832, Rio de Janeiro, Minas Geraes, Santa Catherina and Matto Grosso; *P. lundii,* Warm., 1867, São Paulo. These are all included under the subgenus *Meconostigma* (Schott) Eng. in Krause's monograph, pages 128-136.

Several members of the sub-genus *Euphilodendron,* which are normally epiphytic (found growing on trees) have a low self-heading form and can be grown in pots or tubs similarly to the giant arborescent group. These are smaller plants, with short internodes of the stem and thick fans of leaves, some of them with the fleshy Eichhornia-like petioles characteristic of the species *P. wendlandii* of Costa Rica. They include *P. pinnatifidum,* known to the great Vienna botanist, Jacquin, *P. melinonii, P. cannaefolium* and *P. biauriculatum.* All of these can be seen and studied in Foster's collection in Florida.

THE DELIGHTFUL GINGER LILIES

WYNDHAM HAYWARD, *Florida*

The Ginger Lilies, or members of the Ginger Family of Plants, *(Zingiberaceae)* comprise a closely allied group of tropical and subtropical tuberous rooted subjects which are beginning to find a major following among the plantsmen and garden fanciers of the lower South and similar climates. They may also be planted out in summer in the North, and stored in sand indoors during winter. They include some of the most striking foliage and flower plants of the vegetable kingdom,

some of the most beautiful and appealing, some of the most delicately and richly perfumed and some of the most aromatic and poignantly flavored of all growing things.

The world of the sub-tropics, and in fact food and drink all over the world, would be much less enjoyable without the Zingibers. They include such perfumed beauties as *Hedychium coronarium,* the famous "White Ginger" of the Himalayas and Hawaii, *Curcuma longa,* which is turmeric, *Zingiber officinalis,* the ginger of commerce (Canton Ginger), used from time immemorial as a flavoring in Chinese and other Eastern cooking, ginger ale, gingerbread and other Western cookery, and popular as candied, crystallized or preserved ginger as a sweetmeat and in condiments, chutneys, etc.

There are perhaps few staple food plants among the Zingibers, but their place is among that rare and indispensable number of spice plants which make the eating of less palatable foods more enjoyable.

Besides their gustatorial qualities for the gourmet and gourmand, the Gingers include numerous spectacular flowers so sensational that they are among the most favored of sub-tropical subjects. Among these would be mentioned Alpinias, Costus and Hedychiums, certain Curcumas, the fabulous *Phaeomeria magnifica* and *Alpinia purpurata* of Hawaii gardens, while against these giants of the flower garden, so to speak, we may place the dainty and charming Kaempferias, whose delightful flowers and perfumes are borne so lowly we must stoop down close to them to appreciate them fully.

These genera of the *Zingiberaceae* are the best known of the family in cultivation. Altogether the Zingibers include some 45 genera with 1,300 species, which makes them comparable as a family to the Palms, the *Bromeliaceae,* the *Gesneriaceae* and others. Of the amazing list of other genera and the hundreds of species in this family, only a small proportion, a minimum of a few dozen species are in cultivation, and still less in America or Hawaii.

They have long been favorites in the tropics and sub-tropics, and conversation plants in greenhouses since the days of Jaquin at Castle Schoenburn in Vienna, when some of the first were grown under glass and described.

One or two of the rare genera, as *Renealmia, Dimerocostus, Roscoea, Globba, Amomum, Cautleya,* etc., are occasionally met in choice collections.

There is a great need for the introduction of new and rare species of all the genera mentioned in this article, and many more. Some of the Hedychiums, Kaempferias, Roscoeas and Cautleyas are half-hardy and can stand the winters in mild climates where the ground does not freeze too hard, as in the South of England and around the Gulf Coast in the South. There is an excellent discussion of these half-hardy species in Col. C. H. Grey's "Hardy Bulbs", Vol. II, 1938, now unfortunately out of print, and difficult to obtain outside of libraries. He lists them under *Scitamineae,* as the family is sometimes known.

The standard monograph of the *Zingiberaceae* is by K. Schumann, in Heft 20, Das Pflanzenreich, published by A. Engler, 1903. This is a

sturdy volume of 458 pages, which will give the unsuspecting beginner some idea of the work to do in this great family before we can become even faintly satisfied with our knowledge of its rare beauties. Schumann lists 38 Hedychiums, 55 Kaempferias, 87 Amomums and 40 Aframomums, virtually all of which are part of a vast blind spot in our garden vision at the present time. He also allows 94 species of Costus, 136 of Alpinia, 16 Phaeomerias, etc. There are numerous other genera which seem simply fascinating from the botanical illustrations, but about which we know nothing from practical experience.

The Alpinias known to be in cultivation in the United States and Hawaii are only three or four, *A. speciosa* (A. nutans), *A. formosana, A. mutica, A. purpurata,* and *A. sanderae.* Of these the commonest is the almost hardy *Alpinia speciosa,* the showy Shell Lily of Florida and California, and known in Hawaii as the Pink Porcelain Lily. It has a typical ginger family foliage, long ovate leaves on a sheathing stem which may be five or six feet tall on high land, or 10 to 15 or even more feet tall on rich moist bottom or lake-bank soil. This plant is ornamental as a hedge or barrier, as a specimen clump and for large flower arrangements. The flowers are in huge terminal racemes trailing from the ends of the leaf stems, like glowing ceramic cockle-shells. The sheathing corollae are white, and the inner parts of the flower labellum and stamen, orange-red and yellow. *A. sanderae* is a rare variegated foliage form of uncertain botanical standing.

A. formosana is a more slender plant, making a good border subject with smaller and less showy erect inflorescences. It will grow 2-3 feet tall on high land, and twice that on rich soil. *A. mutica* is a smaller version of *A. speciosa* with erect raceme and similar but more modest flowers. *A. purpurata* is a showy ultra-tropical species from the far Pacific and Malaysia, popular in Hawaii but hard hit by the slightest frost, and for this reason not well established anywhere in Florida to this writer's knowledge. Slight frost has killed plants of it in pots and in the ground in protected places at Winter Park, Fla., several times. In Hawaii it grows several feet tall.

Similarly, only a small number of *Costus* species are in cultivation in the United States and Hawaii, including *C. speciosus, C. spicatus, C. igneus* (?), *C. sanguineus,* and a few more. The two best known are *Costus spicatus* from the West Indies, closely allied to *C. cylindricus,* having a large green cone of bracts with orange and yellow flowers, and the famous "Crape Ginger" of Hawaii, *C. speciosus,* with compact red terminal cones and large petunia-like white flowers with a yellowish throat. This species grows six to eight feet tall and is unusual and showy. It is tender to the slightest frost and may be cut to the ground in Central Florida during cold winters, but has been established in both high and low ground at Lakemont Gardens and elsewhere in the state. It comes up again from the roots when cut back by cold.

This is believed to be the plant listed in part as *Costus arabicus* by Linnaeus in Species Plantarum first edition of 1753, which was confused in the description with another plant. It was later described as *Banksia speciosa* by Koenig in 1783. Other species of *Costus* are rare novelties

in Southern gardens at this time. All *Costus* species are popularly known as Spiral Flags from the way the leaves rotate around the stem.

As for the Hedychiums, so dearly beloved by the Hawaiian people as Lei flowers, the name, *Hedychium,* is from the Greek, meaning "sweet snow", with reference to the initial species described, *H. coronarium,* the White Ginger. Besides *H. coronarium,* only the following are grown in the United States in any quantity,—*H.flavum,* a yellow species similar to *H. coronarium,* but of slightly taller stature; *Hedychium chrysoleucum,* also like *H. coronarium* but with yellow blotches on the white lip of the flowers, and the extravagantly lovely gold on yellow, *H. gardnerianum,* which deserves to be much better known in the lower South. *H. coronarium* is grown by the thousands in Florida where it is better known as Butterfly Lily.

The writer has small clumps established of several thyrse-type flowered species obtained from upper India including *H. thyrsiflora* and *H. aurantiacum.* The Himalaya region is rich in Hedychiums which extend up to 9,000-foot altitude in some cases. In the Lakemont Gardens collection are *H. thyrsiflora, H. aurantiacum, H. greeni,* a new red species, not listed in Schumann. Hybrids are also reported from India nurseries.

Phaeomeria magnifica is the storied Red and Pink "Torch Ginger" of Hawaii, where it has taken a strong hold on the imagination and affections of the people of all races. It is one of the most remarkable of the ginger flowers at its best, a rounded head of red or pink bracts atop a stem of several feet, rising from the ground separately from the tall leafy stem. Blooms of this are shipped to the mainland by the Hawaiian flower growers. It is very tender to frost and not well established anywhere in Florida.

Zingiber officinale, the Jamaica or Canton ginger of commerce is not a highly decorative plant, but is grown by thousands of acres in India, China, and the West Indies for the trade. The uncooked fresh rhizomes bring 50c per pound or more in the New York markets where it is a vital part of the Chinese flavoring category. The leaves are borne on stems upright, two or three feet high at most and the inflorescence is a small green clone atop a short stem, having inconspicuous flowers with a dark purple labellum.

Zingiber zerumbet is a handsome weed in tropical plantations when it grows out of place, but is a treasured ornamental in Florida where it is known as the Red Pine Cone ginger because the cone of bracts after flowering time gradually turns a beautiful, deep, crimson red. The small flowers themselves are creamy white with yellowish center when appearing out of the bracts, one or two at a time. The leaves are less stiff and more graceful and larger than those of *Z. officinale.* There is a highly decorative variegated (white and green foliage) form of this species known as *Zingiber darceyi,* that is much in demand by garden lovers north and south.

Only the Curcumas and Kaempferias remain for consideration, of the Zingibers cultivated in the United States and Hawaii. Several species of *Curcuma,* headed by *C. zedoaria,* an Indian type, are grown

for the tropical effect of their foliage and the brilliant spikes of rosy-pink and rose-purple bracts in spring. One of the largest of these spring-blooming species is believed to be *C. latifolia,* growing six to eight feet tall, and having showy cones like rose-purple pinwheels on strong 16-inch stems. It and *C. zedoaria* have showy chocolate-red stripes down the mid-rib of the upper scales of their leaves.

Two other species are also popular where known—*C. petiolata,* from India, found all over the lower South from Brownsville, Texas to Savannah, Georgia, and known there as Orchid Ginger and Hidden Lily. It is half hardy like *Hedychium coronarium,* and bears its lavender-pink cones of bracts in late summer in the center of the attractive plaited leaves. The leaves and spikes of bloom are widely used for arrangements and bouquets. The rare Burmese species *C. roscoeana,* with bright orange or terracotta colored bracts in similar spikes in late summer has been introduced by Lakemont Gardens and is becoming well distributed and much admired.

Curcumas produce drug and spice products known as zedoary and turmeric. Many of them have brilliant yellow and orange colored rhizomes with various aromatic qualities. They are a popular condiment plant in the East, and the roots of some species are used in curry powders, according to the best information.

The Kaempferias are the smallest members of the Ginger family grown in the United States and while mentioned last are by no means the least charming and delightful. They are usually grown as pot plants or border plants in shady places in the lower South, or under glass farther North. They may be dried off in winter and the roots stored in the dirt in the pots or boxes in which they were grown.

Two well known species occasionally found in deep South gardens are *K. rotunda,* a Linnaean plant which has several names, as Resurrection Plant, Tropical Crocus, etc, since it remains dormant all winter and sprouts up its flowers at ground level with surprising effectiveness in spring in warm climates. One must get down on the hands and knees to smell their lovely violetish scent when grown in the ground so it is better to grow them in pots. The bulbs or tubers will bloom repeatedly from the dry tuberous roots, like Colchicums, and they may have a prosperous trade future as a result of this. A tuber can be shipped thousands of miles, potted up and will go to blooming in a few weeks. The flowers last only a day each but are repeated every other day or so for a month in some cases. Ten to 15 blooms from a strong tuber is not uncommon.

The flowers of *K. rotunda* are white with lavender lips. The foliage, which appears after blooming is one to two feet tall, like a Maranta, prettily patterned in silvery green above, and shaded deep purple on the under side. Few plants provide more in the way of novelty and beauty for their size. Tubers can be dried off in November and replanted in March or April.

K. galang is an old plant, mentioned by Linnaeus in the Hortus Cliffortianus in 1737, in Holland, and is used as a vegetable in the diet of millions in the Far East. Dr. J. J. Occhse lists it in his "Vegetables of

the Dutch East Indies. It has charming round fleshy light green leaves, with miniature orchid-like, fleeting blooms in summer, white with purple blotches on the lips. The plants are low growing and only a few inches tall, with flowers close to the ground. The blooms repeat many days.

Another *Kaempferia* fairly well known in Florida is *K. gilbertii,* having attractive white-bordered upright leaves of dark green, and scanty purple flowers. It is an ornamental plant with variegated foliage and is a valuable pot plant as are all Kaempferias. Other lovely Kaempferias now grown in the United States are *K. involucrata,* sometimes seen under the name *K. parrishii,* which has daintily plaited light green leaves, and pink-lavender flowers in involucres atop four to six inch stems, altogether charming, and a fine pot plant. Finally there is the showy *Kaempferia atro-virens,* or at least a remarkable plant received from India under that name, but having more the appearance of *K. Roscoeana,* as illustrated in Curtis' Botanical Magazine, with two or three broad, spreading exotically patterned dark green leaves, iridescent like the "eyes" of a peacock's tail, and with inch-wide lavender-pink flowers. The blooms appear intermittently all summer. It is one of the most continuously floriferous plants known to modern ornamental horticulture and never fails to attract attention by its flowers and foliage in a collection. The tubers can be dried off in winter and stored till spring. It goes dormant naturally like the other Kaempferias in late fall. A large plant is only 8 to 10 inches across and a few inches high. It wants part to full shade, but plenty of light for best development. As the "Peacock Plant" it is becoming well known and popular in the American bulb and pot plant trade, and may sweep to new heights of popularity in the future. The root-stock consists of roundish pieces of rhizome which may be separated with fleshy roots attached for multiplying stock in the spring. It also makes seeds in the involucres while growing and blooming in the summer and the seed fall to the ground and sprout in the pots or flats where they lie. The plant answers the description of *K. roscoeana* except that the flowers of that species are specified as white, and those of this new import are distinctly lavender-rose.

NEW CODE FOR NAMING CULTIVATED PLANTS

At the 13th International Horticultural Congress, London, Sept. 1952, steps were taken toward the adoption of an International Code of Nomenclature for Cultivated Plants. The Congress formally adopted a resolution expressing its approval of the main points in a draft prepared by an International Committee, and charging the Committee with the preparation of the full text, embodying these points, for wide circulation and trial prior to submission to the next Horticultural Congress. The full text of the revised Code, prepared under the Secretaryship of Mr. William T. Stearn, was circulated early in October 1952 to all members of the Joint Committee. Their suggestions were correlated by a sub-committee, and the final version based on these decisions was published in July 1953. It is hoped that before the next Horticultural

Congress meets, the Code adopted by the horticulturists, may be approved also by the agronomists and foresters so that the endorsement of this worthy project may be made unanimous.

Mr. Stearn, the Secretary, and the other Committee members are to be congratulated on a most excellent job. All of those interested are urged to obtain a copy of the new Code. It may be had at the low price of 25 cents by writing to: Dr. G. H. M. Lawrence, Secretary, American Horticultural Council, Bailey Hortorium, Ithaca, N. Y.

The Code has been adopted as the guide in editing PLANT LIFE, including HERBERTIA, and other Society publications. In the past, fancy names for clones were printed in "capitals and small capitals", but now this has been made un-necessary by placing the names between single quotation marks. Thus the fancy name DORIS LILLIAN is now rendered as 'Doris Lillian'. This is only one case but an important indication of the usefulness of the Code since it will save much editorial time. All contributors are urged to use the single quotation marks hereafter for fancy names.—*Editor.*

THE GENUS **NOTHOSCORDUM**: DIAGNOSIS, KEY TO SPECIES, AND SYNONYMY

HAMILTON P. TRAUB, *California*

The genus *Nothoscordum* Kunth (1843) was much neglected until Beauverd (1908) described a number of new species from Uruguay and in the same paper gave a brief summary of the genus as a whole. As interpreted by Beauverd (1908), the genus included also the species that are now assigned to the genus *Ipheion* Rafin. Linnaeus described the species *Ornithogalum bivalve* L. (1753) which was later placed in the genus *Nothoscordum* by Britton (1896). When the genus *Nothoscordum* Kunth was mistakenly "conserved", the type was indicated as *N. striatum* (Jacq.) Kunth, but this is a synonym of *Nothoscordum bivalve* (L.) Britton. (1896).

Morton (Taxon 3: 21-23. 1954) has shown that the "conservation" of *Nothoscordum* Kunth was un-necessary to say the least. Of the names listed as *nomina rejicienda,—Geboscon* Rafin., *Peribola* Rafin., and *Pseudoscordum* Herb., none is eligible to replace *Nothoscordum* according to the International Code (1953). *Geboscon* Rafin., (1824) is a *nomen nudum,* and is not validly published in 1824; subgenus *Geboscon* Rafin. (1833) is a subgenus of *Allium L.,* and has no effect on the nomenclature of the genus *Nothoscordum* Kunth; *Geboscon* Rafin. 1836 (1837) is a synonym of *Allium* L.; *Peribola* Rafin. (1936) belongs to the *Nolanaceae* and has no connection with *Nothoscordum;* and *Pseudoscordum* Herb. (1837) is a *nomen prov.* et *nomen subnudum.*

Since descriptions in English are now available for all *Nothoscordum* species, the urgent needs of Plant Life readers are a diagnosis of the genus, a key to the species, and their synonymy.

Genus **NOTHOSCORDUM** Kunth

Enum. Pl. *4:* 457. 1843; Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 993. 1908, in part (excluding sect. *Uniflorum* Beauv.). Syn.—Subgenus *Geboscon* Rafin., Atl. Jour. extra number of no. 6: page 65. 1833; *Pseudoscordum* Herb., Amaryll. 11. 1837, *nom, prov. et nom. subnudum; Caloscordum* Herb., in Bot. Reg. Lond. *30:* Misc. 67. 1844; *Sowerbaea* Spreng, ex Baker, in Jour. Linn. Soc. *11:* 381. 1871, in synon.; *Hesperocles* Salisb., in Gen. Pl. Fragm. 85. 1866; *Oligosma* Salisb., l. c. 86.

DIAGNOSIS.—Bulbous perennials without an alliaceous smell; bulb spherical, globose, ovate or ovoid, with or without a neck; *leaves* filiform, sub-filiform, linear-filiform, narrowly-linear, linear, or linear-oblong, usually present at flowering time, 1—10 mm. wide; *peduncle* 1—25 cm. tall, rarely entirely hidden in the neck of the bulb, slender; *spathe* usually 2-valved, rarely 1-valved, lanceolate, oblong-lanceolate, ovate-lanceolate, ovate-acuminate or ovate; *umbel* 2-many-flowered; pedicels filiform or slender, usually unequal in length; *ovary* trilocular, 4-12 ovules per locule; *tepaltube* ranging from the bare union of the tepalsegs

at the base to the well-developed tepaltube which is usually cup-shaped; *tepalsegs* six, elliptic-lanceolate, elliptic-oblong, lanceolate, oblong-lanceolate, oblanceopate-spatulate, lanceolate-spatulate, oblong-obtuse or oval; pure white; white or whitish uninerved with dark violet, purplish, purple, or yellowish; white with yellow at base; yellow; yellow with green at base; sulfur uninerved with green; yellowish uninerved with gold; and pale lilac; *stamens* six inserted at base of tepaltube when it is very short, or inserted on the tepaltube or at its throat when it is well-developed; *filaments* linear-oblong and oblong to subulate; *anthers* linear-oblong to oblong; *style* short or rarely elongated, filiform; *stigma* deeply tricuspidate, depressed-rotund, subcapitate, conic or capitate.

TYPE SPECIES: *Nothoscordum striatum* Kunth, Enum. Pd. *4:* 459. 1843. = *Nothoscordum bivalve* (L.) Britton, in Illus. Fl. North USA. *1:* 415. 1896.

SYSTEMATIC POSITION: *Amaryllidaceae,* Tribe *Allieae,* Hutchinson (1934), near *Allium, Tristagma, Ipheion,* and *Muilla.*

DISTRIBUTION: Main area:—Argentina and Chile northward to the United States. Minor area:—Siberia, Japan and China. One species, *N. inodorum,* is widely naturalized as an escape from cultivation, and it has been cosmopolitan in distribution for many years.

KEY TO THE SPECIES OF NOTHOSCORDUM

1a. Plants inadequately described:
  2a. Flowers white with purple vein, umbel 3-4-fld., leaves narrowly linear (Chile) ..... 1. *brevispathum*
  2b. Flowers white, yellowish at base, violet mid rib, umbel 2-5-fld., leaves narrowly linear (Chile) ..... 2. Vernum
  2c. Flowers rose-colored, umbel about 10-fld., leaves 10 mm. wide (Chile) ..... 3. *nidulum*
1b. Plants adequately described:
  3a. Spathe 1-valved (subgenus *Caloscordum*):
    4a. Scape 10-25 cm. tall; tepalsegs linear-oblanceolate, united for 1/3 of its length (Siberia, Japan & China) ..... 4. *nerinflorum*
    4b. Scape shorter, tepalsegs blunt, reflexed (China) ..... 5. *tubiflorum*
  3b. Spathe 2-valved (subgenus *Eunothoscordum*):
    5a. Peduncle very short, almost lacking (1—10 mm. long):
      6a. Leaves 2-3 mm. wide (Argent.) ..... 6. *sessile*
      6b. Leaves 4-10 mm. wide (Peru) ..... 7. *fictile*
    5b. Peduncle relatively long (4-30 cm.):
      7a. Stamens as long or longer than half of tepalseg length; flowers white, tepalsegs short (about 5 mm.) (Paraguay) ..... 8. *macrantherum*
      7b. Stamens much shorter than half the length of the tepalsegs; flowers white or yellow:
        8a. Leaf sheaths included in the bulb or emerging slightly from the neck:
          9a. Bulb up to 1 cm. in diam.; umbel 1-2, rarely 3-4-fld.; tepalsegs about 1 cm. long, yellow (or white, veined brown according to Kuntze) (Uruguay) ..... 9. *bonariense*
          9b. Bulb 2-3 cm. in diam.; tepalsegs white, 10-13 mm. long, 2-5-3 mm. wide:
            10a. Bulb about 2 cm. in diam.; umbel 3-6-fld.; flowers white, veined violet; style surpassing the stamens; leaves much shorter than the scape (Uruguay) ..... 10. *gaudichaudianum*
            10b. Bulb at least 3 cm. in diam.; umbel 2-3-fld.; tepalsegs (White?) veined green; style exceeding the stamens; leaves as long as or longer than the scape (Uruguay) ..... 11. *grossibulbum*

8b. Leaf-sheaths decidedly exserted, enveloping and forming a long neck on top of bulb:
11a. Plant without leaves at flowering time; tepalsegs 6 mm. long, white, greenish-nerved (Uruguay) .....12. *nudum*
11b. Plant developing leaves before flowering:
12a. Bulb very small, spherical, less than 1 cm. in diam.; tepalsegs entirely white; leaves very short at flowering time; base of scape scabrid (Uruguay) .....13. *scabridulum*
12b. Bulb more than 1 cm. in diam.; base of scape smooth; flowers yellow, white or light lilac:
13a. Flowers yellow:
14a. Bulb up to 1.5 cm. in diam.; scape rigid, up to 15-30 cm. tall; umbel few-fld.; 6-8 ovules per locule; leaf-sheaths attenuated into a rigid limb, edges inrolled (Uruguay) .....14. *minarum*
14b. Bulb about 1 cm. in diam.. rarely less; scape 6-13 cm. tall, strongly sheathed at the base; umbel many-fld.; 5 ovules per locule; leaf-sheaths widened at the apex, truncated and abruptly contracted into the very glabrous leaf (Argent. to Mex.) 15. *gramineum*
13b. Flowers white or light lilac:
15a. Bulb longly obconic:
Scape 5-15 cm. tall; leaves 2-4 mm. wide; flowers light lilac (Chile, Argent. Bolivia & Peru) .....16. *andicola*
15b. Bulb subglobose:
16a. Flowers not fragrant:
17a. Scape 6-20 cm. tall; leaves 3-5 mm. wide; tepalsegs white, brown or green nerved (S. and N. Amer.) .....17. *bivalve*
17b. Scape 10-18 cm. tall, very rigid; leaves 3-4 mm. wide; tepalsegs whitish, only very slightly united at the base (Uruguay) .....18. *sellowianum*
16b. Flowers fragrant:
Scape somewhat rigid, 20-40 cm. tall; tepaltube about 1/3 as long as the tepalsegs; 8-12 ovules per locule; leaves up to 10 mm. wide (Cosmopolitan) .....19. *inodorum*

SPECIES NAMES AND SYNONYMY

1. NOTHOSCORDUM BREVISPATHUM R. A. Phil., Anal. Univ. Chile 93: 268. 1896; Plant Life *9:* 153. 1953.

2. NOTHOSCORDUM VERNUM R. A. Phil., Anal. Univ. Chile *93:* 267. 1896; Plant Life *9:* 153. 1953.

3. NOTHOSCORDUM NIDULANS R. A. Phil., Anal. Univ. Chile *93:* 268. 1896; Plant Life *9:* 153. 1953.

4. NOTHOSCORDUM NERINIFLORUM (Herb.) Benth. & Hook. f. Gen. *3:* 802. 1880. Syn.—*Caloscordum neriniflorum* Herbert, in Bot. Reg. Lond. *30:* Misc. 67. 1844; Lindley, Bot. Reg. Lond. *33:* pl. 5. 1847, err. *nerinifolium; Allium neriniflorum* (Herb.) Baker, in Jour. Bot. Lond. *3:* 290. 1874; Vvedensky, in Herbertia *11:* 216-217. 1944; *Allium thunbergii* Regel, in A. H. P. *3:* 234. 1875, non G. Don.

5. NOTHOSCORDUM TUBIFLORUM (Rendle) Stearn, in Kew Bull. Misc. Inf. page 107. 1931. Syn.—*Allium tubiflorum* Rendle, Jour. Bot. Lond. *xliv:* 44, pl. 476 C. 1906.

6. NOTHOSCORDUM SESSILE (R. E. Fries) Beauverd, in Bull. Herb. Boiss. ser. 2, *8:* 1005. 1908; Plant Life *8:* 147. 1952. Syn.—*Allium sessile* R. E. Fries, in Act. Soc. Sci. Upsal. ser. IV. *1:* 165. 1905.

7. NOTHOSCORDUM FICTILE Macbride, in Field Mus. Nat. Hist. Bot. Ser. *11:* 12. 1931; Plant Life *8:* 149. 1952.

8. NOTHOSCORDUM MACRANTHERUM (Kuntze) Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1005. 1908. Syn.—*Allium macrantherum* O. Kuntze, in Rev. Gen. *3:* 312-313. 1898.

9. NOTHOSCORDUM BONARIENSE (Persoon) Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1001—1002, fig. 4-G-H. 1908; Plant Life *9:* 79. 1953. Syn—*Orinthogalum bonariense* Persoon, in Syn *1:* 363. 1805; *Northoscordum poiretii* Kunth, Enum. Pl. *4:* 464. 1843; *Allium bonariense* Griseb., in Symb. ad fl. Agr. 319. 1879; *Northoscordum montevidense (montevidensis* sphalm) Beauverd, in Bull. Herb. Boiss. ser. 2. *6:* 1011. 1906.

10. NOTHOSCORDUM GAUDICHAUDIANUM Kunth, Enum. Pl. *4:* 458. 1843; Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1004, fig. 5-E-G. 1908; Plant Life *9:* 80. 1953.

11. NOTHOSCORDUM GROSSIBULBUM Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1003, fig. 5-A-D. 1908; Plant Life *9:* 166. 1953.

12. NOTHOSCORDUM NUDUM Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 998-999, fig. 3-A-C. 1908; Plant Life *9:* 165. 1953.

13. NOTHOSCORDUM SCABRIDULUM Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1000—1006, fig. 3-D-G. 1908; Plant Life *9:* 165. 1953.

14. NOTHOSCORDUM MINARUM Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 1001, fig. 3-H-M. 1908; Plant Life *9:* 165-166. 1953.

15. NOTHOSCORDUM GRAMINEUM (Sims) Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 995, 1004, fig. 4-G-H. 1908. Syn.—*Ornithogalum gramineum* Sims, in Bot. Mag. Lond. *50:* pl. 2419. 1823; *Triteleia aurea* Lindl., in Bot. Reg. Lond. *27:* 78. 1841; *Nothoscordum flavescens* Kunth, Enum. Pl. *4:* 459. 1843; Baker, Saund. Ref. Bot. *5:* Pl. 351. 1873; *Allium flavescens* Poepp. ex Kunth, Enum. Pl. *4:* 459. 1943; *Nothoscordum striatellum* Kunth, Enum. Pl. *4:* 458. 1843; *Nothoscordum philippianum* Koch et Bouche, in Ind. Sem. hort. berol. 1853; *Allium striatellum* Lindl., in Trans. Hort. Soc. Lond. *6:* 97. 1855; *Milla aurea* Baker, in Jour. Linn. Soc. *11:* 386. 1871; *Nothoscordum aureum* (Lindl.) Johnston & Parodi, in Rev. Facult. Agron. Vet. Buenos Aires *7:* 182. 1930, non N. aureum (Kellogg) Hook. f. 1871; *Bordiaea aurea* Macloskie, in Rep. Princeton Univ. Exped. Patag. *81:* 304. 1903-06.

16. NOTHOSCORDUM ANDICOLUM Kunth, Enum. Pl. *4:* 463. 1843; Plant Life *9:* 79-80. 1953. Syn.—*Milla audicola* Baker, in Jour. Linn. Soc. *11:* 381. 1871.

17. NOTHOSCORDUM BIVALVE (L.) Britton, in Illus. Fl. North. USA. *1:* 415. 1896. syn.—*Ornithogalum bivalve* L., Sp. Pl. ed. 1. 306. 1753; *Allium ornithogaloides* Walt., Fl. Carol. 121; Bosc., in Poir. Encyc. suppl. 1. 265; *Allium subbiflorum* Colla, in Pl. Rar. Chil. *4:* 13-14, pl. LII. 1836; *Nothoscordum striatum* Kunth, Enum. Pl. *4:* 459. 1843; *Nothoscordum strictum* C. Gay, Fl. Chil. *6:* 114. 1853; *Nothoscordum pulchellum* Kunth, Enum. Pl. *4:* 458. 1843; *Nothoscordum ornithogaloides* Kunth, Enum. Pl. *4:* 460. 1843; *Triteleia berteri* Kunth, Enum. Pl. *4:* 467. 1843; *Oligosma bivalvis* Salisb., in Gen. Pl. Fragm. 86. 1866; *Milla subbiflora* Baker, in Jour. Linn. Soc. *11:* 385. 1871; *Brodiaea subbiflora* Baker, in Gard. Chron. ser. 3. *20:* 459. 1896; *Brodiaea berteri*

(Kunth) Fuentes, in Bol. Mus. Nac. Chile *12:* 110. 1929; *Nothoscordum texanum* M. E. Jones, Contrib. W. Bot. No. 17. 21(1930).

18. NOTHOSCORDUM SELLOWIANUM Kunth, Enum. Pl. *4:* 460. 1843; Plant Life *9:* 78. 1953.

19. NOTHOSCORDUM INODORUM (Ait.) Nichols, in Dict. Gard. *2:* 447. Syn.—*Allium inodorum* Aiton, in Hort. Kew *1:* 427. 1789; *Allium fragrans* Ventenat, in Hort. Cels. pl. 26. 1800; *Allium euosmum* Link et Otto. Ic. Pl. Rar. Hort. Berol. *1:* 15, pl. 8. 1820; *Allium sulvia* Buch.-Ham., in Don, Prod. Fl. Nep. 53; Mem. Werner Soc. *6:* 99. 1826; *Peribola paradoxa* Raf., in Fl. Tellur. *4:* 84. 1836; *Nothoscordum fragrans* Kunth, Enum. Pl. *4:* 461. 1843; *Nothoscordum euosmum* Kunth, Enum. Pl. *4:* 460. 1843; *Nothoscordum sulvia* Kunth, Enum. Pl. *4:* 462. 1843; *Nothoscordum borbonicum* Kunth, Enum. Pl. *4:* 462. 1843; *Nothoscordum macrostemon,* Enum. Pl. *4:* 463. *Hesperocles fragrans* Salisb., in Gen. Pl. 85. 1866; 1843; *Milla macrostemon* Baker, in Jour. Linn. Soc. *11:* 381. 1871; *Sowerbaea americana* Spreng. ex Baker, Jour. Linn. Soc. *11:* 381. 1871, in synon.

DOUBTFUL AND EXCLUDED SPECIES

Nothoscordum siculum Hort.—cf. Gard. Chron. ii(1884)174 = *Nectaroscordum siculum* (Lindl.) Gren. et Godr.

Nothoscordum canescens Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 998. 1909 = *Ipheion hirtellum* (Kunth) Traub.

Nothoscordum lloydiflorum Beauverd, l. c. 998. = *Ipheion lloydiflorum* (Beauverd) Traub.

Nothoscordum mariei Leveille, in Fedde, Repert Nov. sp. *7:* 384. 1909. China.

Nothoscordum ostensii Beauverd, in Bull. Herb. Boiss. ser. 2. *8:* 996. 1909. = *Ipheion sellowianum* (Kunth) Traub.

Nothoscordum subsessile Beauverd, l. c. 997 = *Ipheion subsessile* (Beauverd) Traub.

Nothoscordum felipponei Beauverd, in Bull. Soc. Bot. Geneve. ser. 2. *13:* 267. 1921 = *Ipheion felipponei* (Beauverd) Traub.

Nothoscordum poeppigii Fuentes, in Rev. Chil. Hist. Nat. *25:* 237. 1923: *Allium poeppigii* Kunth, Enum. Pl. *4:* 456. 1843.

Nothoscordum hirtellum (Kunth) Herter, in Ind. Sem. Montev. (1928-29) = *Ipheion hirtellum* (Kunth) Traub.

Nothoscordum andinum Kunth ex Fuentes, in Rev. Chil. Hist. Nat. *25:* 238, in obs. : *Ornithogalum andinum* Kunth.

PLANT LIFE LIBRARY

THE SECRET OF THE GREEN THUMB, by Henry T. Northen and Rebecca T. Northen. Ronald Press Co., 15 East 26th St., New York 10, N. Y. Pp. 431. Illus. 1954. $5.00.

At last we have a concise, readable book by acknowledged authorities written to "give gardeners the scientific facts about plants on which all gardening methods must be based." The book is comprehensive; the topics discussed in the 21 chapters include the life story of plants; roots, stems and leaves; water relations of plants; plants at work; food for growth; light; temperature; soils and nutrition; plant hormones; seasonal phenomena; planting and propagation; flowering; plant breeding and heredity; insects and other pests; plant diseases; plants without seeds; seed plants; evolution; plant communities and conservation.

This well written, adequately illustrated and stimulating book is absolutely indispensable to every gardener, and is very highly recommended.

THE GEOGRAPHY OF THE FLOWERING PLANTS, by Ronald Good. 2nd ed. Longmans, Green & Co., 55 Fifth Ave., New York 3, N. Y. 1953. Pp. 452. Illus. $10.00.

Plant geography aims "to record, and then if possible to explain, the distribution of plants over the world's surface both in the present and the past". This thoroughly revised edition of the text on the geography of the flowering plants, first published in 1947, is a welcome addition to the plant science library. Following the stimulating introduction, the book is divided into two parts.

The first part is concerned with a purely descriptive account of the facts of distribution. The individual chapters are concerned with world geography, world floristic regions, general aspects of plant geography, distribution of plant families, genera and species, the British flora, and geological history and past distribution of flowering plants.

Part two deals with the theoretical consideration of the facts presented in the first part, and attempts to give a generalized explanation of them. The individual chapters are concerned with (a) the factors of distribution—a general review, climatic factors, edaphic factors, the dispersal of plants, changes in climate, geographical changes; (b) the theory of tolerance, and (c) conclusions. Appendix A deals with the statistics of the world's land surfaces, and Appendix B provides a list of discontinuous genera. The bibliography lists 629 references. The indices include a subject index, an index of plant names, and an index of persons and places.

This is an indispensable book for the specialist and also for plant scientists generally.

VEGETABLE AND FLOWER SEED PRODUCTION, by L. M. Hawthorn and L. H. Pollard. Blakiston Co., 575 Madison Ave., New York 22, N. Y. 1954. Pp. 626. Illus. $7.50.

This pioneering book on the "essential principles of seed production, combined with a practical discussion of the actual methods employed by

seed growers'' for seedmen, farmer-growers, seed companies' fieldmen, county agents, agricultural teachers and others, was ''designed to serve not only as a college textbook, but as a guide and a source of reference to the professional groups mentioned as well as anyone else who may have an interest in growing vegetable and flower seeds''.

The book is divided into four parts. Part I is devoted to the general organization and history of the vegetable- and flower-seed industry, together with the factors and problems directly related to the production of seeds. In Parts II and III, the methodology of growing vegetable and flower seeds is described; and Part IV is devoted to the handling of the matured seed—harvesting and milling equipment, seed storage, handling and marketing.

This concise and clearly written text fills a long felt need and will be enthusiastically welcomed.

BIOLOGICAL CONSERVATION — WITH PARTICULAR EMPHASIS ON WILDLIFE, by John D. Black. Blakiston Co., 575 Madison Ave., New York 22, N. Y. Pp. 328. Illus. 1954.

In this concise and clearly written text for the beginning student on the conservation of wildlife, including game and non-game forms of birds, mammals and fishes, ''a special effort is made to set wildlife against a proper environmental background.'' The use of educational films, and the ''lessons that the social scientist can learn from wildlife and the environment that supports wildlife'' are emphasized. The book is divided into six parts: Basic considerations—need for conservation, historical review, essentials of life, soil, water; The environment—basic ecology, standing water, running water, grasslands and wildlife, forests; Fish and other aquatic animals—game and pan fishes, rough fishes, forage fishes, reptiles and amphibians, invertebrates; Birds—upland game birds, ducks and geese, shore birds, predatory birds, songbirds and non-game birds; Mammals—fur bearers, game mammals, predatory mammals, other mammals; Solving the problem—administration of conservation. A selected and annotated bibliography (Appendix A), a fine guide (Appendix B), and the index complete this stimulating book which is highly recommended.

SOILS AND FERTILIZERS, by Firman E. Baer, 4th ed. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pl. 420. Illus. $6.00.

This completely rewritten 4th edition of a standard text on soils and fertilizers by an acknowledged authority will be enthusiastically welcomed. Although intended primarily for use in beginning courses in soils in agricultural colleges'', this book offers to all a reliable guide to a sound understanding of the principles of soil management and conservation. The topics discussed in the 27 chapters include the factors affecting plant growth; nitrogen, mineral and water requirements of crops; the origin and classification of soils; chemical composition of soils; some biological processes and physical properties of soils; soil water; soil air; soil solution; control of soil water; plowing and cultivating; organic matter; soil conservation; animal agriculture; nitrogen, phosphorus,

potassium, calcium, magnesium, sodium, and sulfur resources; trace elements; mixed fertilizers; selection and use of fertilizers; yield potentialities of crop plants; and miscellaneous topics.

This concisely and clearly written forward looking text is highly recommended for all as an easily readable and comprehensive treatise.

CHEMICAL CONTROL OF INSECTS, by T. F. West, J. E. Hardy, and J. H. Ford. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pp. 211. Illus. $3.25.

In this concise treatise the authors "have endeavored to provide a survey of the main insecticides emphasizing the more modern developments". They "compare and contrast the methods of using the main insecticides in addition to considering briefly the chemistry of the various substances." Following the introduction, the topics considered include the insect, outline of pest control, fumigation, nicotine, rotenone and related compounds, arsenical compounds, petroleum oils, coal tar derivatives, miscellaneous insecticides, soil insecticides and amendments, pyrethrum, lethane and thanite, chlorinated persistent insecticides, repellents and attractants, and weed control.

This stimulating text is recommended to all workers in the field of insect control.

PLANT ANATOMY, by Katherine Esau. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pp. 735. Illus. $9.00.

This comprehensive clearly and concisely written and adequately illustrated text on plant anatomy by an acknowledged authority has been composed primarily "for advanced students in various branches of plant science and for teachers of plant anatomy", but should also attract the less advanced students because the basic terms and concepts are explained and analyzed. In the presentation of the subject the orthodox sequence is followed, "considering first the cell and tissue types, then the arrangement of the structural elements within the plant organ." The developmental and phylogenetic aspects of the subject are considered in order to "enhance the understanding of the plant structures and their variability." The individual chapters are concerned with the plant body, the protoplast, the cell wall, the meristems and tissue differentiation, apical meristems, the vascular cambium, the epidermis, parenchyma, collenchyma, sclerenchyma, xylem, phloem, lactifers, the periderm, the stem, the leaf, the root, the flower, the fruit, and the seed.

This is without doubt a landmark in the production of plant anatomy texts, and is absolutely indispensable to all plant scientists.

GENERAL PHYSIOLOGY, by Bradley T. Scheer. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. Pp. 613. Illus. $7.00.

This stimulating text on general physiology for the advanced student offers a thorough "course in physiology which will provide an intelligible up-to-date picture of vital functions . . . offering a clear exposition of the nature and present status of the basic problems of physiology." This new book "embraces a wider range of topics than is usually found in similar texts. It gives considerable space to the general aspects of genetics, embryology, growth, cancer and aging; and emphasizes those

principles of physiology common to most organisms". The 19 chapters have been grouped under five major subdivisions—the physicochemical foundations of life, the chemical dynamics of life, the energy transformations in cells and organisms, the development of organisms, and the integration of the organism. There is an ample bibliography of 1453 references, and a subject index.

This new comprehensive text is highly recommended for the advanced student who has a grounding in general biology, general and organic chemistry, and the principles of physics, and who desires a "broad, meaningful picture of vital functions."

GENERAL BIOCHEMISTRY, by Joseph S. Fruton and Sophia Simmonds. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pp. 940. Illus. $10.00.

This fine new text on general biochemistry is intended primarily for advanced students who "wish to examine the structure of modern biochemistry from the general point of view". Attention is focused on principles, drawing illustrative data from studies with plants and microorganisms, as well as animals. Following the chapter on the scope and history of biochemistry, the book is divided into seven parts. The subjects covered include an extensive discussion of protein chemistry, the general properties of enzymes and of equilibrium rates in enzyme-catalyzed reactions, biological oxidation, intermediate metabolism of carbohydrates, lipids and nitrogen compounds; and the general aspects of metabolism. The extensive references to the literature are given as foot-notes to the text.

CYTOCHEMISTRY—A CRITICAL APPROACH, by J. F. Danielli. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pp. 139. Illus. $4.00.

This third volume in the stimulating Biological Research Series is concerned with an almost undeveloped branch of science—cytochemistry—and is very largely a record of experiments carried out by the author and associated research workers. The subject matter of the introduction includes a brief historical background, a discussion of the importance of considering the chemical, physical and biological points of view in the development of rigorous methods of investigation, and the critical consideration of a number of techniques. The main part of the book is concerned with the fields of research—fixation procedures, studies on alkaline phosphatase, the critical study of the cytochemistry of aldehydes, the cytochemistry of proteins and nucleic acids, and quantitative studies in cytochemistry. The final chapter is concerned with the future outlook in cytochemistry.

THE METABOLISM OF ALGAE, by G. E. Fogg. John Wiley & Sons, New York. 1953. Pp. 149. Illus. $2.00.

This contribution, in the valuable Methuen & Co., series of little books, concerns the subject of the algal type of metabolism as a distinct field of study. Dr. Fogg has brought "together information scattered through a variety of scientific publications into a general account of the subject which will be of interest to students of botany, microbiology and

biochemistry''. Chapter 1 is in the nature of a stimulating introduction to the subject, and this is followed by chapters on the phototrophic assimilation of carbon, the chemotrophic assimilation of carbon, autotrophic assimilation with special reference to nitrogen metabolism, heterotrophic assimilation, the products of metabolism, growth and metabolism, and a comprehensive summary and conclusions. There is a valuable biography including 309 references, and a complete subject index. This book is indispensable to those interested in biology.

GENERAL VIROLOGY, by S. E. Luria. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 1953. Pp. 427. Illus. $8.50.

In this pioneering text on general virology, intended for graduate and advanced undergraduate students, the subject is ''presented as a biological science, like botany, zoology, or general bacteriology.'' The facts and methods of virology as a whole are considered, and no attempt is made to describe the individual virus diseases. The topics considered in the 19 chapters include (1) a survey of viruses; range of existence; nomenclature and classification; (2) the detection and titration of viruses; (3) the properties of viruses outside the host; (4) the virus-host interaction; (5) viruses in nature; (6) the origin and nature of viruses, and (7) the Rickettsiae.

This stimulating text is an indispensable addition to the biological library.

A TEXTBOOK OF GENERAL BOTANY, 5th ed., by Gilbert M. Smith, E. M. Gilbert, G. S. Bryan, R. I. Evans and J. F. Stauffer. Macmillan Co., 60 5th Ave., New York. pp. 606. Illus. 1953. $6.25.

This easily readable revision of a standard text for use in connection with the first year botany course is ''designed to help the student explore and understand the world of plants so essential to man and other living things''.

The first of the 33 chapters deals with the inter-relations of plants and animals, including man. This is followed by discussions of the life cycle of a familiar plant; the structure and function of cells, nuclear and cell division; the roots, stems, buds and leaves of the plant; the nutrition and metabolism, water relations, growth and movement, classification, meiosis and the life cycle of plants; some classes of algae, the classes of fungi, lichens, the classes of bryophyta—liverworts, hornworts and mosses, the vascular plants—psilophytes, horestails, lycopods, ferns, gymnosperms and angiosperms; fruits and seeds; fossil plants; inheritance and variation; and the major regions of vegetation in North America.

As in the past, the authors have succeeded in presenting the subject with a minimum of technical jargon which is all to the good in a beginning botany course. This clearly and concisely written, adequately illustrated text is very highly recommended.

[PLANT LIFE LIBRARY, continued on page 4.]

THE AMERICAN PLANT LIFE SOCIETY

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

I. THE AMERICAN AMARYLLIS SOCIETY

[An integral branch of the APLS, and functions as a comprehensive Committee for the Advancement of the Amaryllids.]

[AMERICAN AMARYLLIS SOCIETY, continued from page 2.]

(c) REGISTRATION OF PLANT NAMES

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

Correspondence about the registration of plant names should be sent directly to Dr. Norton, *4922 40th Place, Hyattsville, Maryland,* and a self-addressed, stamped envelope should be enclosed if a reply is expected.

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FLOWER TYPES AND SCORE CARD FOR HYBRID AMARYLLIS

For classification of flower types and score card for Hybrid Amaryllis see PLANT LIFE (Herbertia) 10: 23-30. 1954.

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Mr. John E. Voight, RFD One, Box 76, Hales Corners, Wisc., in charge of Daylily Trial Garden, at The Botanical Gardens, Whitnall Park.

Mr. W. Quinn Buck, in charge of Daylily Trial Garden, Los Angeles Arboretum, 291 No. Old Ranch Road, Arcadia, Calif.

Note: Introducers of new daylily clones should send plants directly to the Trial gardens for testing. As soon as practical each trial garden will publish, in HERBERTIA, lists of the 10, 25, 50 and 100 best daylilies, on the basis of the clones tested, for the climatic region in which it is located.

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III. PUBLICATIONS OF THE AMERICAN PLANT LIFE SOCIETY

BOOKS

1. AMARYLLIDACEAE: TRIBE AMARYLLEAE, by Traub & Moldenke (including the genera Amaryllis, Lycoris, Worsleya, Lepidopharynx, Placea, Griffinia, and Ungernia; Manila covers; 194 pages, incl. 18 illustrations. $4.00 postpaid.

This is required reading for every amaryllid enthusiast.

2. DESCRIPTIVE CATALOG OF HEMEROCALLIS CLONES, 1893—1948, by Norton, Stuntz, and Ballard. A total of 2695 Hemerocallis clones are included and also an interesting foreword, and explanatory section about naming daylilies. Manila covers; 100 pages (I—X; 1—90), including a portrait of George Yeld. $1.50 postpaid.

PERIODICALS

(A) **HERBERTIA** [**First series,** 1934 to 1948, incl.], devoted exclusively to the amaryllids (Amaryllidaceae), and the workers concerned in their advancement. A complete set of these volumes is indispensable to all who are interested in the amaryllids. Libraries should note that this is the last opportunity for complete sets.

Volume 1 (1934). Dedicated to **Henry Nehrling.** Containing the biography of Henry Nehrling, and many valuable articles on amaryllis; with a portrait of Henry Nehrling and 16 other illustrations; a total of 101 pages.

Volume 2 (1935). Dedicated to **Theodore L. Mead.** Containing the autobiography of Theodore L. Mead, and many excellent articles on varieties, breeding, propagation, and culture of amaryllids; with portraits of Theodore L. Mead and David Griffith and 18 other illustrations; a total of 151 pages.

Volume 3 (1936). Dedicated to **Arthington Worsley.** Containing the autobiography of Arlington Worsley, and important articles on description, genetics and breeding, physiology of reproduction, and amaryllid culture; with 3 portraits of Arlington Worsley, one color plate, and 30 other illustrations; a total of 151 pages.

Volume 4 (1937). First British Edition. Dedicated to William Herbert. Containing the biography of William Herbert; the reprint of Herbert's essay, "On Crosses and Hybrid Intermixtures in Vegetables"; Dr. Darlington's essay, "The Early Hybridizers and the Origins of Genetics," and many important articles on description; cytology, genetics and breeding; physiology of reproduction, and amaryllid culture; with two portraits, forty-four other plates and three figures; a total of 280 pages.

Volume 5 (1938). First Netherlands Edition. Dedicated to Ernst H. Krelage. Containing the autogiography of Ernst H. Krelage; the history of amaryllid culture in Holland by Ernst H. Krelage, Dr. Uphof's important article in which the name Hippeastrum is rejected; a revision of the tribes of the Amaryllidaceae; and the species of Amaryllis; outstanding articles on forcing amaryllis by Dr. Grainger and Prof. Dr. van Slogteren; and many other articles on description, cytology, genetics

and breeding; physiology of reproduction, and amaryllid culture; with 33 plates and 2 figures; a total of 218 pages.

Volume 6 (1939). Dedicated to the Union of **South Africa,** and containing articles on South African amaryllids, including the history of botanical exploration for amaryllids in South Africa, the distribution of South African amaryllids in relation to rainfall, and a review of the genus Agapanthus by Frances M. Leighton, a review of the Genus Cyrtanthus, with many excellent line drawings, by Dr. R. A. Dyer; other articles—Zephyranthes of the West Indies by Dr. Hume; the Tribe Gilliesieae by Dr. Hutchinson; rating of daylilies for garden value by Mr. Kelso; daffodil articles by Jan de Graaff, and many other items on description, cytology, breeding, propagation, and amaryllid culture; with 44 plates and 10 figures; a total of 258 pages.

Volume 7 (1940). Dedicated to **Latin America,** and featuring articles on Latin American amaryllids; biographies of Drs. Philippi and Holmberg; report by Dr. Goodspeed on the amaryllids collected by the Univ. of Calif., Second Andean Expedition; reports on the flowering of the "Blue Amaryllis," A. procera; and many other important articles on the description, propagation, breeding, culture, harvesting and storage of amaryllids. Of special interest are the important articles on the description, breeding and culture of daylilies by noted authorities. With 45 illustrations—30 plates and 15 figures—and a total of 242 pages.

Volume 8 (1941). First Daylily Edition. The first extensive symposium on the daylily, containing biographies of George Yeld, Amos Perry, Hans Sass, and Paul Cook, and important articles on daylily evaluation, breeding, propagation and culture. Also important articles on Narcissus and other amaryllids. Thirty-eight illustrations—27 plates and 11 figures—and a total of 185 pages.

Volume 9 (1942). First Alstroemerid Edition. Dedication to Harry L. Stinson, the outstanding authority on this plant group, who contributes a summary of his work on Alstroemerid taxonomy, breeding, propagation and culture. This volume contains the autobiography of Prof. Dr. Abilio Fernandes, the Check-List of Amaryllids by Major Pam, and a review of the species of Crinum by Dr. Uphof, and also many important articles on daylilies, Narcissus, Cyrtanthus, hybrid Amaryllis, Ixiolirion and other amaryllids. Thirty-five illustrations—17 plates and 18 figures—and a total of 243 pages.

Volume 10 (1943). 10th Anniversary Edition. Dedicated to Elizabeth Lawrence, the outstanding authority on the use of amaryllids in the garden, who contributes a summary of her work in this field. This volume contains the review of Agapanthus and Tulbaghia, by Dr. Uphof; and article on Brunsvigia rosea and hybrids by Mr. Hannibal; a symposium on Narcissus breeding by Messrs. Powell, Reinelt, Berry and Reynolds; a review of amaryllid chromosomes by Dr. Flory; articles on hybrid amaryllis, daylilies, and many other important articles on amaryllids. Forty-one illustrations—12 plates and 29 text figures—and a total of 205 pages.

Volume 11 (1944). First Allieae Edition. Dedicated to Dr. Henry A. Jones, the eminent American authority on the onion. This is one of the most outstanding issues up to the present for its record making contributions on the systematics of Allium by British authorities, and on onion breeding, propagation, and culture by American authorities. It contains Mr. Airy Shaw's translation of Vvedensky's Allinus of the Soviet Union; Stern's essay on the onion in the Old World and other articles; and articles on onion breeding, propagation and culture by Dr. Jones and his colleagues. There are also important contributions on ornamental Alliums for North America, and Allieae of North America. There are excellent articles on hybrid Amaryllis, Daylilies and various other amaryllids. Forty-three illustrations—25 plates and 18 text figures—and a total of 369 pages.

Volume 12 (1945). First Educational Edition. Dedicated to Supt. R. C. Huey, a pioneer in the use of amaryllids as an educational tool. This volume contains a brief autobiography by Supt. Huey, and an article by him on the use of amaryllids in teaching plant science; the announcement by Mulford B. Foster of the reintroduction of the sweet-scented Alstroemeria caryophyllaea, and an article by Harry L. Stinson on the true Alstroemeria Ligtu. This issue also contains an article on the origin of Tapeinanthus humilis by A. & R. Fernandes; important articles on Narcissus breeding; Leucocoryne and related genera; articles on various other amaryllids, including valuable contributions on Hemerocallis description and appreciation, breeding, culture, and packing daylily plants for shipping. Twenty-four illustrations—15 plates and 10 text figures—a total of 180 pages.

Volume 13 (1946). First Narcissus Edition. Dedicated to Guy L. Wilson, the noted Narcissus breeder. This volume contains an autobiography of Mr. Wilson, an article on his breeding activities; an article on Narcissus breeding in Australia by Mr. Alston; articles by American Narcissus breeders, including Frank Reinelt, E. P. Powell, J. S. Cooley, C. W. Culpepper and W. R. Ballard; an article on the karyology of the subgenus Ajax of the genus Narcissus by A. and R. Fernandes; a list of parents of hybrid Narcissus by Arno H. Bowers; Narcissus diseases by C. J. Gould; Narcissus insects and mites by E. P. Breakey; Narcissus culture by various authors. There are also articles on other amaryllids—Hemerocallis, hybrid Amaryllis, Habranthus, Crinums, Lapagerias, Agapanthus, Hymenocallis, etc. Thirty-nine illustrations—186 pages.

Volume 14 (1947). 2nd Hemerocallis Edition. Dedicated to Ralph W. Wheeler, the noted Daylily breeder. This volume contains an autobiography of Mr. Wheeler and an article on his breeding activities; and many important articles on Hemerocallis description, evaluation, breeding, etc., from various parts of the country. There are also important articles on other amaryllis—Hybrid Amaryllis, amaryllids in the Holy Land and Mexico, starch in Alstroemeria, the Galantheae, Double Narcissus, Zephyranthes, Sternbergia, Allium, etc. Twenty-eight illustrations—206 pages.

Volume 15 (1948). 2nd South African Edition. Dedicated to Dr. R. A. Dyer. This volume contains an autobiography of Dr. Dyer and two amaryllid articles by him, and other articles on South African amaryllids. There are also important articles on Hemerocallis, Amaryllis, Crinum, Narcissus, Brodiaea Lilies, Alstroemerias and other amaryllids by various authors. Forty-one illustrations—177 pages.

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A limited number of volumes of **Plant Life,** including **Herbertia,** second series, are available, all quotations subject to prior sale.

Vol. 1 (Nos. 1—3). 1945. Symposium on **Narcissus** breeding by various authors. **First Bromeliaceae Edition.** Profusely illustrated symposium on the

bromels by Dr. Lyman B. Smith, Mulford B. and Racine Foster, David Barry, Jr., Ladislaus Cutak, and Wyndham Hayward. **25 illustrations—105 pages.**

Vol. 2 (Nos. 1—3). 1946. **Verbenaceae Edition.** Illustrated treatise on the Verbena Family by Dr. and Mrs. Moldenke, the outstanding authorities on this plant family. 9 illustrations—100 pages.

Vol. 3 (Nos. 1—3). 1947. **General Edition.** Containing an illustrated article on winter and spring flowering Gladiolus by W. M. James, and articles on the Dutch Bulb Industry by Dr. A. J. Verhage and J. F. Ch. Dix. 10 illustrations—42 pages

Vol. 4 (Nos. 1—3). 1948. **Aroid Lily Edition.** An illustrated treatise primarily on the genus Zantedeschia (Aroid Lily) containing articles by Hamilton P. Traub, A. A. Longmire, Fred M. Danks, H. M. Butterfield, Wyndham Hayward and Len Mirzwick. 11 illustrations—48 pages.

Vol. 5 (Nos. 1—4) 1949. 34 illustrations, a total of 134 pages.

Gesneriaceae Edition, with important articles on the subject by F. E. Smith, W. Hayward and the Moshers.

1949 HERBERTIA Edition, devoted exclusively to the amaryllids; the **First Australian Edition,** dedicated to Capt. C. O. Fairbairn, with biographies of Australian amaryllid pioneers, and articles on Australian amaryllids, South African amaryllids, the Pink Amaryllis, **A. belladonna** var. **Haywardii,** with illustration, hybrid Amaryllis breeding in South Australia by E. Both, Narcissus culture by Dr. Cooley, Mr. Mitsch and Mr. Ballard, and also important articles on other amaryllids.

Vol. 6 (Nos. 1—4) 1950. 47 illustrations, a total of 162 pages.

1950 HERBERTIA Edition, devoted exclusively to the amaryllids; the Hybrid Amaryllis Edition; dedicated to Mrs. Mary G. Henry, containing Mrs. Henry's autobiography; articles on Collection Amaryllids in South America by M. B. Foster; Amaryllis flower types; double Amaryllis; Amaryllis of To-morrow, by W. Hayward, and other articles on hybrid Amaryllis, Hemerocallis, Cyrtanthus, Blue Amaryllis, South African Amaryllids, Review of the genus Brunsvigia (part I) by R. A. Dyer, etc.

Caladium Edition, with articles on Caladium by W. Hayward, on Winter Jasmine by Prof. Norton, on Bartram's Ixia by W. Hayward, and Plant Life Library (book reviews), the American Plant Life Society, and Seeds and Plants Directory.

Vol. 7 (Nos. 1—4) 1951. 51 illustrations, a total of 174 pages.

1951 HERBERTIA Edition, devoted exclusively to the amaryllids; the **Latin American Amaryllid Exploration Edition,** dedicated to M. B. Foster; containing Mr. Foster's autobiography, and articles on Collecting Amaryllids in Latin America by M. B. Foster, new South American Amaryllis species and other amaryllid species, Amaryllis Exhibition at Cleveland, New Orleans Amaryllis Show, Review of the genus Brunsvigia (part II) by R. A. Dyer, Hybrid Amaryllis trials at Valleevue, by Thos. R. Manley, new pink hybrid Amaryllis, Narcissus culture by Mr. Mitsch, and Dr. Cooley; Hemerocallis culture by Mr. Lenington, Hemerocallis polyploids, and other amaryllid articles.

Gloriosa Lily Edition, with articles on the Gloriosa Lily by W. Hayward, plant growing experiences by W. Allgeyer, Western Trip by Mrs. Henry, Plant Life Library (book reviews), the American Plant Life Society, and Seeds and Plants Directory.

Vol. 8 (Nos. 1—4) 1952, with 34 illustrations, a total of 183 pages.

1952 HERBERTIA Edition, devoted exclusively to the amaryllids: the **Second Alstroemeria Edition,** dedicated to Dr. Uphof, containing an autobiography of Dr. Uphof, a review of the genus Alstroemeria by Dr. Uphof, the Amaryllis Displays at Cleveland, and New Orleans, the Orlando-Winter Park Hemerocallis show, Amaryllis evaluation by Thos. R. Manley, Dr. Thornburgh, C. E. Buck, E. Douglas, and Hermon Brown; articles on Fragrant Alstroemeria hybrids by M. B. Foster, advances in Alstroemeria culture by Harry L. Stinson, Alstroemeria articles by Prof. Bullock, Prof. Ballard, Mr. Ruckman, and E. O. Orpet. The issue also contains descriptions of a

new Amaryllis species, and a new Zephyranthes species, and articles on Zephyranthes by Mrs. Clint, on Lapiedra martinezii by Dr. Fernandes, Alliums by B. Harkness, amaryllid garden material by W. L. Hunt and Thad Howard, Narcissus culture by Mr. Mitsch, Crinum zeylanicum by Mr. Hayward, Hemerocallis by Mr. Gilmer, and Mrs. Henry, Hymenocallis by Mr. Woelfle, Amaryllid color by Mr. Hannibal, and other important articles.

Malvaceae Edition, with articles on the Perfect Mallow Marvel by E. Sam Hemming, a new Hybrid Hibiscus, by Prof. Ballard, and propagation of Hibiscus, by Dr. Hava; and a report on plant culture activity in the Southwest Region by Dr. Corliss, the Plant Life Library (book reviews), the American Plant Life Society and Seeds and Plants Directory.

Vol. 9. (Nos. 1—4) 1953, with 32 illustrations, a total of 166 pages.

1953 HERBERTIA Edition, devoted exclusively to the amaryllids; sponsored by the **American Amaryllis Society,** which is affiliated with the **American Plant Life Society.** This is the **Second Narcissus Edition,** dedicated to E. A. Bowles, containing a portrait of Mr. Bowles, and papers on Narcissus: a review of 40 years devoted to Narcissus breeding by Guy L. Wilson, an article on miniatures, naturalizing, decoratives, and a beginners' list by C. E. Quinn, fall-flowering Narcissus by L. S. Hannibal, Narcissus breeding by E. C. Powell, and W. R. Ballard, Daffodils in Piedmont, Virginia by H. I. Tuggle, old naturalized Narcissus in the South by Mrs. Evans, Daffodils in 1952 by Grant E. Mitsch, and Daffodils in northern California by H. I. Johnson.

There are also articles on other amaryllids, including reviews of Amaryllis Shows in New Orleans and Houston, papers on the evaluation of Hybrid Amaryllis by Mr. Manley and Dr. Thornburgh, an article on Allium by R. B. Freeman, Amaryllis species by Mrs. Mary G. Henry, the Orpets, and Mr. Burlingham, Hemerocallis by S. E. Saxton, George Gilmer, and W. R. Ballard, Calostemma by Mr. Chandler, Crinum scabrum by Thad M. Howard, Lycoris by Wyndham Hayward, Hymenocallis by Len Woelfle, and on other amaryllid subjects, including the description of two new Amaryllis species.

Agavaceae Edition, with articles on Dracaena and Cordyline by Mrs. Morris Clint, The Tribes and Genera of the Agavaceae, and Polianthes tuberosa by Hamilton P. Traub, Beaucarnea recurvata by Mulford B. Foster, and sections on The Plant Life Library (book reviews), the American Plant Life Society, a complete list of publications, and Seeds and Plants Directory.

Vol. 10. (Nos. 1—4) 1954, with 23 illustrations, a total of 143 pages.

1954 HERBERTIA EDITION, devoted exclusively to the Amaryllids; sponsored by the American Amaryllis Society, which is affiliated with the American Plant Life Society. This is the **Second Amaryllis Edition,** dedicated to Thomas R. Manley, M. S., and contains an autobiography of Mr. Manley and three valuable articles by Mr. Manley on the evaluation, forcing culture and merchandising of Amaryllis; articles on the Divisions of cultivated Amaryllis by H. P. Traub, evaluation of Amaryllis by Dr. Thornburgh, the McCulloch hybrid Amaryllis by Edith B. Strout and Polly Anderson, Amaryllis and other amaryllid culture by Armyn Spies, Mrs. W. D. Morton, Wyndham Hayward, Mrs. Jo. N. Evans, and Dr. Philip G. Corliss; Amaryllis insects and mites by Dr. Floyd F. Smith and C. L. Burlingham; Amaryllis propagation by John T. Weisner; Amaryllis flower arrangements by Dr. Philip G. Corliss; Hemerocallis by Prof. W. R. Ballard, S. E. Saxton, and W. Quinn Buck; Narcissus by Dr. Cooley and Prof. Ballard; Alliums and Zephyranthes by Thad M. Howard, the New Orleans and Mobile Amaryllis shows for 1953, and other interesting articles.

The **General Edition,** contains articles on the Giant Aborescent Philodendrons and the Delightful Ginger Lilies by Wyndham Hayward, the genus Nothoscordum by H. P. Traub, a note on the new Code for naming Cultivated plants, the Plant Life Library (book reviews), the American Plant Life Society, a complete list of publications, and seeds and Plants Directory.

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THE MACMILLAN WILD FLOWER BOOK, with descriptive text by C. J. Hylander; and illustrations by Edith F. Johnston. Macmillan Co., 60 Fifth Ave., New York 11, N. Y. Pp. 480, illus. 1954. $15.00.

The 230 excellent color plates presented in this outstanding book are reproduced from paintings by the well-known flower portraitist, Mrs. Edith Farrington Johnston. The more than 500 plants described by Dr. Hylander "cover the region from the East coast to the Rockies, and often beyond, and from Florida to southern Canada." In the introduction, Dr. Hylander provides an outline for the identification of plants, and at the end of the book, the publishers in collaboration with a number of botanists present a guide to the flower families described. This book is notable not only for the variety and artistic quality of the color plates, but also for their accuracy.

AMARYLLIS—and How to Grow Them, by Peggie Schulz. M. Barrows & Co., 425 Fourth Ave., New York 16, N. Y. 1954. Pp. 128. Illus. $2.95.

Most of the space in this little book is concerned with Amaryllis, but very brief sections on Clivia, Cooperia, Crinum, Eucharis, Haemanthus, Nerine, Sprekelia, Sternbergia, Vallota and Zephyranthes are also included. In the short space of 128 pages the treatment has to be necessarily limited to the barest outline. Mrs. Schulz writes in an easily readable style, and thus this book should serve to introduce the amaryllids to a still greater number of gardeners.

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