

# HERBERTIA



1941

Shull-

# **HERBERTIA**

## **VOLUME 8**

DAYLILY EDITION

EDITED BY

HAMILTON P. TRAUB

ORLANDO, FLORIDA

THE AMERICAN AMARYLLIS SOCIETY

1941

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AMERICAN AMARYLLIS SOCIETY

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This volume contains a total of thirty-eight illustrations, twenty-seven plates and eleven figures.

## INTRODUCTION

*The continuing program in *Herbertia* is satisfaction to all of us. The greater the difficulties in world affairs the more insistent is the need for courage in the daily life. There are abiding satisfactions in the growing of plants, that depend for existence on the land and the factors common to all mankind and are not disturbed by the conflicts of men.*

*Plants are endlessly diverse, and yet there are relationships among them that assemble the species into families and groups. It is good that persons can associate themselves particularly and personally with these families. The *Amaryllids* comprise an association of special interest because of similarity among themselves and yet great diversity, brilliant colors and commanding forms, and in many cases difficulties in handling that stimulate one's thoughtful endeavor. I have watched the progress of the American *Amaryllis* Society from the first and wish for it long life and many friends. We must maintain our interest in the growing of plants for the certain joy and confidence of the work.*

—L. H. Bailey.

*Bailey Hortorium,  
Sage Place, Ithaca, New York,  
November 1, 1941.*

## FOREWORD

In requesting this Foreword the editor of *Herbertia* stated that it "should be in the nature of a response from the pioneers to the younger breeders" of daylilies. The bequest of daylilies which the "pioneers" gave to horticulture is their best greetings to the "younger" breeders as well as to gardeners in general.

George Yeld in England (1892, *Apricot*, the first of his hybrids), Arthur Herrington in the United States (1899, *Florham*, his only daylily), R. Wallace and Co., in England (1900, *Luteola*; 1915, *Golden Bell*), and Willy Mueller with his uncle, Carl Ludwig Sprenger (1903, eight clones) are the early pioneers in breeding daylilies.

My own studies of the genus *Hemerocallis* began in 1912. Ten years were spent in assembling a collection of the known species and in obtaining, after several generations of selective breeding which involved 118 different progenies of hybrid seedlings, the seedlings of the first introductions. Then these were grown to full stature, compared, evaluated, and propagated over a period of five years before any of them (*Mikado*, *Wau-Bun*, and *Vesta*) were named in 1929.

At the New York Botanical Garden, the botanical and, may I say, the scientific aspects of the studies of this genus are of special concern. The horticultural selections are a by-product of the experimental studies on the extent, limits and nature of the changes in characters that appear after there has been successive hybridizations and subsequent selective breeding.

For the production of seedlings that were named previous to 1934 and not noted above there are records for the following persons:—

V. Lemoine et Fils: 1905, *Luteola Major*; 1906, *Luteola Pallens*; 1925, *Queen of May*.

Mr. Mueller, gardener at Strasbourg University: 1907, four clones reported.

Thomas Meehan: 1915, the "*Meehan Hybrids*", probably included the *Meehani Daylily*.

Dr. W. Van Fleet: the two clones, *Lovett's Lemon* and *Lovett's Orange*; probably originated about 1915 but dates of introduction are apparently not on record.

Luther Burbank: 1917, *Burbank*, *Calypso*, and *Surprise*; has also been credited with *Cygnets*.

Amos Perry: 1921, *Lady Hesketh*, the first of many introductions.

Bertrand Farr: 1924, *Ophir*, *Golconda* and *Mandarin*; 1926, *Citronella* and *Lemon Queen*.

Franklin B. Mead: 1924, credited with the production of *Hyperion*, which was first listed for sale in 1928.

Carl Betscher: 1928, *Lemona*, the first of many introductions.

Bristol Nurseries: 1930, *Dwarf Yellow*, which is not to be classed as dwarf.

H. P. Sass: 1930, *Golden West* and *Sunny West*, the first of his introductions.

Dr. H. Harold Hume: 1933, *Emily Hume*, a chance seedling.

Mrs. Thomas Nesmith: 1933, the first of her numerous introductions.

There are also about twenty-five horticultural clones presumably of hybrid seed origin that were named previous to 1934 for which there appear to be no authentic records of the originators.

As late as 1930, I visited George Yeld, Willy Mueller and Amos Perry and inspected their collections of daylilies. Actually, they had rather few daylilies; none of them had then grown many seedlings or engaged in more than incidental selective breeding after a first hybridization. But the first generations of the early hybrids were different from the parent species and were welcome additions to flower gardens. Some of these early introductions will no doubt long rate highly in the particular class to which each belongs. Mr. Yeld died in 1938. Mr. Mueller is, I believe, still proprietor of a horticultural garden in Naples but has not been especially concerned with daylilies for some years. Mr. Amos Perry, however, continues in the propagation and sale of a long list of daylilies and in the introduction of his own seedlings.

In 1934, I attempted to present in one small volume the information on the genus *Hemerocallis* which was deemed of most value and interest to botanists, gardeners, and the breeders of daylilies. In the seven years since that date there have been (1) contributions in publications to the botanical and horticultural knowledge of the genus, (2) a prolific multiplication of the "younger breeders" and in the number of horticultural clones that have appeared, and (3) a noteworthy increase in the appreciation of the values of daylilies for flower gardens.

There were 174 horticultural clones of daylilies in the list that was published in 1934. Today after only seven more years the number is perhaps three times as many. It is to be hoped that The American Amaryllis Society will formulate rules for the naming of new daylilies, provide for their registration, and each year publish the records for the new introductions.

Seven years ago the number of individuals and nursery firms that had contributed, even in a small degree, to the *actual development* of daylilies which had been introduced was certainly no more than twenty-five; and all of these of which I now have record are mentioned above. Today it seems from all reports that there may be several times that number of persons, including amateur breeders and nursery firms, who are growing seedlings. According to reports *many thousands* of seedlings have been grown in the United States in recent years. There is much merit in growing large numbers of seedlings, especially if they have for their parents plants that were produced by multiple hybridizations and selective breeding. There is greater chance for the rare recombinations of recessive hereditary factors and the new combination of complementary factors which are responsible for the expression of certain characters. There are increased chances for mutations, as, for example, a definitely pure white flower of which, I believe, none now exists in *Hemerocallis*.

But even a casual survey of the horticultural introductions of daylilies of the past few years shows that too many mediocre daylilies are being introduced. Many of these "new" daylilies closely resemble others already in the trade. There is sometimes a hurried introduction of seedlings that have not been carefully compared, tested and evaluated, or grown to mature stature, or propagated. It is obvious and imperative that the "younger" breeders produce better daylilies in the classes already developed by the "pioneers" and also that they produce distinctly new classes. A daylily that is merely good is no longer good enough.

In the evaluation of daylilies for garden culture in different parts of the United States it must be recognized that no horticultural clone or species can be expected to thrive equally well everywhere. Many with evergreen habits of growth are tender in the North; at least some of those that are dormant in winter will not live in the South. Breeders in different parts of the United States have the opportunity to engage in selective breeding to develop the different classes of flower color and form in vegetative habits best suited to the particular area.

It seems that at the present time most gardeners evaluate daylilies chiefly on the basis of their own individual preferences in respect to color of flowers. But to say that *Patricia* is better than *Theron* is only to say that among daylilies one prefers blondes to brunettes. There is no *one* best daylily. There are and will be best daylilies for each of the respective classes which are already somewhat defined especially in foliage habits and color-patterns. Also the value of any rating of daylilies depends on what particular clones happened to be involved in the comparison.

In the minds of many gardeners, horticulturists, botanists and "younger breeders" the daylilies are in a stage of infancy. But surely in the understanding of many readers of *Herbertia* the daylilies are at least in some stage of adolescence. Anyhow, the writer will rate the daylilies themselves no more advanced than adolescent; and this evaluation is made in a contemplation of what I believe their own future can be.

—A. B. Stout.

*The New York Botanical Garden,  
Bronx Park, New York City,  
November 26, 1941.*

## PREFACE

In these troublous times we should take to heart the introductory words of Dr. Bailey, the Dean of American Horticulture. We need to relax now more than ever before in order to be ready for the urgent tasks before us.

We are grateful for the inspiring Foreword by Dr. Stout of the New York Botanical Garden. He writes from long experience with daylilies, and his remarks will be of especial value to those who are just beginning daylily breeding.

Before proceeding further we must acknowledge the splendid heroism of the British. In spite of unprecedented hardships they retain a first rate morale, and possess a real sense of proportion which makes it possible for them to relax in their gardens on occasion to appreciate the beautiful things of life. It is natural therefore that we have some excellent contributions from Britain in this Edition that is dedicated by the younger daylily breeders to the pioneers in this field. We are indebted to Mr. Baker for the Memoir of George Yeld, the great Englishman whose unselfish life will remain an inspiration to all future generations. He was the first daylily breeder, and when we consider that he did not have *Hemerocallis fulva* var. *rosea* to work with, we must admit that he made real progress in daylily breeding.

The autobiography of Amos Perry fills a long felt want, and his success with daylilies is shown by the reports of his outstanding daylily display at one of the Royal Horticultural Society shows this year.

For the autobiography of Dr. Stout the reader is referred to Volume 5, HERBERTIA, 1939. It was published on the occasion of the award of the William Herbert Medal to him for his achievements in daylily breeding.

We welcome the kindly Hans Sass and the thorough Paul Cook, who have made important contributions toward the advancement of the daylily.

Mr. Shull presents some real contributions on the policy for trial gardens, daylily descriptions, inheritance in daylilies, propagation habit and the initiation of the inflorescence. Prof. Watkins of the University of Florida gives us the first comprehensive evaluation of the daylily for Northern Florida on the basis of the official score card. This is indeed a landmark. The reader will see at once that when this procedure is followed it will be possible to single out the best and discard the inferior. *The superior clones may then be classified in various ways by color classes, flowering season, foliage habit, etc.* We also are indebted to Prof. Watkins for important articles on sequence of flowering in daylilies, description of clones, and the use of daylilies in garden design.

Mr. Claar, the Chairman of the Daylily Committee, again presents very interesting reports on visits to daylily breeders in various parts of the country. Such comparative pictures are urgently needed and he is to be congratulated on his kindly and understanding personality that fits him ideally as the official ambassador of good will in the daylily field.

There are other important daylily articles by the younger breeders, and the whole array of daylily material presents the first comprehensive

symposium on the daylily. Others are to follow in future issues of HERBERTIA.

Although this issue is dedicated to the daylily, other amaryllids are not neglected for it is the editorial policy to further the advancement of all of the amaryllids. This Society is unique in that it attempts to give to the member a unified view of an entire plant family. The obvious advantage is that this plan provides an almost inexhaustible mine of interesting subjects for the amateur, and gives him an opportunity to secure experience with phylogenetic relationships among plants. However, the rich variety of material makes it necessary to classify the subject matter under the heads, (a) description, classification, and phylogeny, (b) cytology, genetics and breeding, (c) propagation, (d) culture; and still other convenient heads. The plantsman, who is really interested in growing things does not mind this. What really matters is to get the maximum amount of material published.

Mr. James writes about *Haemanthus Katherinae*, *Nothoscordum fragrans*, and the time of flower formation and chromosome numbers in *Nerine* (in collaboration with Dr. Addicott). It is fitting that the Herbert Medal for 1941 is awarded to him for his outstanding contributions toward the advancement of the amaryllids. His autobiography will be read with interest by all.

There are also reports of amaryllid shows, color photography, several important articles on *Narcissus*, including the fundamental research of Dr. Grainger of the Tolson Memorial Museum, Ravensknowle, England; the propagation of amaryllids by Mr. Close of the U. S. Department of Agriculture; hardiness of amaryllids by Mr. Fernald, and a wealth of other important articles.

Mr. Hannibal's contributions include an excellent one on "Stinson and his *Alstroemerias*", and this may be taken as a foreword to the 1942 issue that will be dedicated to the *Alstroemerids*.

We must acknowledge a debt of gratitude to Major Albert Pam, O. B. E., of Wormley Bury, Broxbourne, Herts., England, one of the Society's staunchest friends, who has assisted materially in making this daylily Edition complete. It was through his help that the articles from England arrived on time for inclusion in this issue. In the 1942 issue, we will be favored with an important article from Major Pam in the nature of a check list of amaryllids described and pictured in color in botanical works published from the end of the 18th. century to about the middle of the 19th. century. We had hoped to include it in this issue, but it did not arrive in time.

We have word from our good friend, Colonel Russell S. Wolfe, of Orangeburg, South Carolina, informing us that he has been called to active military duty.

We know that he will greatly miss his plants, but as pointed out in the introduction to the Buyers' Guide that he contributes, he knows that our American values are worth defending, and he is glad of the opportunity.

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## ERRATA

## HERBERTIA, VOL. 7, 1940

Pages 15 and 16; for "Ladislas" where it appears read "Ladislaö".

Page 42; 6th. line from top, for "*auluca*" read "*aulica*".

Page 83; 11th. line from bottom, for "INDORUM" read "INODORUM"; and for "Dist." read "Dict."

## INSTRUCTIONS FOR CONTRIBUTORS

**YEAR BOOK CORRESPONDENCE.** Correspondence regarding articles and illustrations for *Herbertia*, the Year Book of the American Amaryllis Society, is cordially invited. The annual news-letter or articles from Corresponding Members and Regional Chairmen of Trial Collections should be forwarded, if at all possible, by April of each year, or earlier, depending upon the distance, so as to reach the editor in ample time for publication. Copies of manuscripts should be retained by the authors as an insurance against loss in the mails.

**MANUSCRIPTS** should be *typewritten* if at all possible and *double spaced*; photographs should have the *name of the owner* to whom credit should be given, and the *name and size of the subject*, written on the back.

**PHOTOGRAPHS.** When making photographs of amaryllids, an effort should be made to include the whole plant—*stem*, if any, *leaves*, *scape* and *flowers*. Separate photographs of the *bulb* and *roots* are also valuable in some cases. These remarks do not apply to cut-flowers.

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 [PREFACE—Continued from page 8.]

We have word from Major E. Milne-Redhead, whom we met at Kew in the fall of 1938, informing us that he is on military duty somewhere in West Africa. He kindly remembered the Society with seeds of a native *Crinum* species.

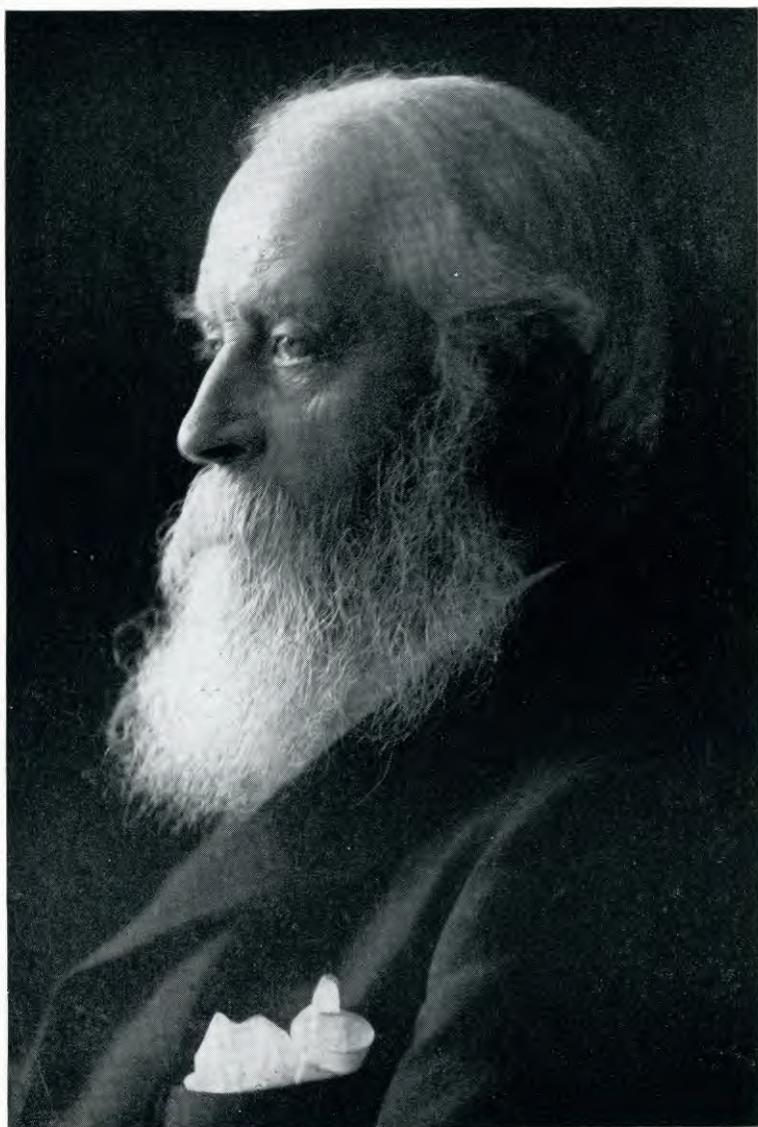
Last but not least it should be noted that daylily test gardens have been established at Cornell University, Ithaca, N. Y., Southwestern Louisiana Institute, Lafayette, La., and at Whitnall Park Arboretum, Milwaukee, Wis., County Park System. Breeders should send their introductions to these gardens for impartial evaluation.

*Beltville, Maryland,*  
*December 3, 1941.*

—*Hamilton P. Traub*

*This volume of **Herbertia**  
is dedicated, by the younger daylily breeders,  
to the pioneers in the field of daylily breeding,  
particularly to the late George Yeld,  
the first person to hybridize daylilies:  
the late Arthur Herrington, the late Karl Ludwig Sprenger,  
the late Dr. W. Van Fleet, the late Luther Burbank,  
the late B. H. Farr, the late Franklin B. Mead,  
V. Lemoine et Fils, R. Wallace & Co., Ltd., Barr & Sons,  
Willy Mueller, Dr. A. B. Stout, Amos Perry,  
Carl Betscher, H. P. Sass, Paul H. Cook.*





*George Yeld, 1845-1938*

GEORGE YELD—A MEMOIR

G. P. BAKER, *V. M. H.*

George Yeld who passed away in 1938 at the great age of 93 full of years and honour, was a remarkable man, of a type of Englishman of the classical school. (See Plate 198.)

He received his early education at Hereford Cathedral School, passing out as head boy to enter Brazenose College, Oxford, as a scholar. Here he won the great distinction in 1866 of gaining the Newdigate Prize for English verse, thus following in the footsteps of Tennyson, Southey, and Matthew Arnold. In after years, Yeld reminded one with pleasure of Matthew Arnold's kindness to him on many occasions, and not least on the day when he received the prize, for it was Matthew Arnold's privilege to make the public oration at that event.

He was destined by his Father for the law, but the instinctive leanings derived from his Mother's family towards the profession of teaching were made manifest at the beginning of his career, for soon after he had taken his degree in 1867 he went to one of our public schools, St. Peters, York. He remained on the staff there for the unprecedented period of fifty-two years, preferring, all the time, to be responsible for the teaching of the fourth form boys, for he recognized that it was amongst the junior boys that good, sound, early grounding would be the making of their careers.

He became so closely identified with the School that in the minds of many pupils who passed through his hands, it might have been said that he was the school. Headmasters might come and go, but Yeld stayed on and upheld the traditions of the School. On the completion of fifty years of service, past and present pupils presented him with a purse, and his portrait in oils to the School. The devotion of the Old Boys was admirably expressed in what had been written by those who had responded to the invitation to subscribe to the memento which was to reveal itself on St. Peter's Day. "Dear Old Yeld," they had said, "if ever there was an English gentleman training in a school it was dear old Yeld, and we will do what we can to see that the aftermath of his life is lived in affluence and peace."

In the 80's and 90's Yeld was responsible at St. Peters for the school-play, generally a comedy of Shakespeare, for which he used to write the Prologue or Epilogue in verse. Full of keenness about all he took an interest in, whether teaching, books or games; he did everything with the unfailing love of boys that made him the true schoolmaster.

He had a wonderful memory for names and faces, and it was said that on school festival days, when the old boys returned to the playing fields of their youth, he was rarely at fault in recognizing former pupils, some of whom he had not seen for a decade. With remarkable ease, the veteran master could run over the names of a hundred old Peterites, who had attained great positions in the Church, the scholastic profession, medicine, law, the Army and Navy, the Civil Service, the World of Sport

and in many other walks of life. But Yeld was more than a schoolmaster; together with his duties at St. Peters, he had other and wider interests. It was at Oxford that he got his first zest for climbing. Arnold wrote of "the cheerful silence of the fells," and these and their loftier companions, the mountains, had been to Yeld, a rich source of inspiration, upon which those who have sat at his feet have drawn freely. The unbeaten tracts of the Lake Country fells, the ranges of the Welsh mountains, the glassy peaks of the Swiss Alps, and the crags of the Eastern



*Fig. 59. The late George Yeld in his garden; photograph sent to Dr. A. B. Stout by Mr. Yeld in 1934.*

Caucasus were to him as an open book. As a mountaineer, he was in the front rank; he yearly visited the Swiss or Italian Alps, and became so knowledgeable on the mountains of the world, that he was induced to take on the editorship of the *Alpine Club Journal*, a post he held for thirty years. In games he was no mean cricketer and played for the Yorkshire gentlemen. In horticulture he became very active and intensely enthusiastic, as I shall mention later on. Up to the last he daily read his Homer and attributed this fondness to the classical learning of his youth. He enjoyed the beauty of the classics, for a knowledge of these.

he used to say, opens the door to intellectual society in which the culture of a gentleman rested.

Over a period of more than half a century Yeld was my oldest and most valued friend. I first met him in the Welsh hills and finding that we were destined for the same Inn, he soon found out who I was, and asked if I contributed the article in the *Alpine Journal* on the ascent of Mt. Ararat. On reaching the Inn he was given the room which he had ordered, but I was told I could not be accommodated. Whereupon Yeld turned to the Manager and asked if a bed for me could not be placed in his room. This then was my first acquaintance with this dear good man. The next year he invited me to join him in the Italian Alps. We had on that occasion two guides, and put in some good work, making several new ascents, which eventually qualified me for membership of the Alpine Club. Later we climbed together in Wales, Skye, the Alps of Switzerland and the Eastern Caucasus.

Yeld was the author of "Scrambles in the Eastern Graian Alps" and honorary member of all the leading mountaineering clubs of the world. He was a man of a nature entirely unselfish, pure and lofty, I have never known him to say intentionally an unkind word of a single human being.

In our gardens I can recall many pleasant hours spent in Yeld's company and owe to him more than I can say for his guidance in horticultural problems. (See Figure 59.) He was a good all-round gardener and specialised in raising and hybridising Irises and *Hemerocallis*, adding to the beauty of our gardens many new plants, and for this and other work he was awarded in 1925 the Victoria Medal of Honour of the Royal Horticultural Society. He was one of the founders of the Iris Society and its first President. Of the many Irises which he raised only a few were introduced, and of these the best were *Lord of June*, *Asia* and *Sir Michael*, and all three received the A.M. of the Horticultural Society. This last he was satisfied was worthy to represent Sir Michael Foster in floral memory.

But it is of his work on Day Lilies that I wish to write in this memoir. He and I had intended in 1925 to publish a booklet on the genus and its hybrids—but for some reason this intention was never realised. Yeld did, however, prepare a preface, of which the following extract on the garden merits of the Genus is perhaps worth quoting:

"Strange as it may seem, horticulture has become so popular that difficulty in growing a plant well is almost a recommendation in itself among enthusiastic gardeners; and yet, no doubt, there are still cultivators who are thankful to come across a bright-coloured fragrant bloom whose good nature, if not a liberal education, is yet redolent of a generous kindness. Such an one is the *Hemerocallis*. Easy to grow, easy to please, easy to see across the garden, easy to distinguish by its scent and easy to divide if you are fain to share its delights with a friend, and what true gardener fails to feel the impulse to share his treasures with his cronies, though not without a proper regard for the interests of his friends, the nurserymen?"

George Yeld began to hybridize *Hemerocallis* at Clifton Cottage, York, in 1877 with only *H. flava* and *H. fulva*; later he obtained *H. Middendorffii*, *H. Dumortieri*, and *H. graminea*. The first hybrid of *H. flava* X *H. Middendorffii* was *Apricot* which received an A.M. in 1893.

After this came crosses with *H. aurantiaca major*, which pollinated with *H. flava* produced *Corona*, A.M. 1905. He later used *H. aurantiaca* which flowered and set seed in the open which the *major* form refused to do, and this crossed with *H. Middendorffii* gave him "a nice open flower called *Aurelia*."

He then used *H. Thunbergii* (= *H. serotina*) on which to place pollen from other species and varieties; the best of the offspring was his last seedling from this parent, *Radiant*, which received an A.M. 1925. Among other varieties raised by him which he admired were *Moidore* (*flava* X *nana*), *Winsome* (1925), *Amber* (1930), *J. S. Gayner* (1931), *Sirius* (1931), *Pyrrha* and *Gramercy*, and also *Bretwalda* (1934) a golden flower, flower stalk over 3 feet; and *Sayda*, orange, both of which he highly recommended, and *Magnifico* (1935).

Yeld, who was married twice, died at Orleton, Gerrards Cross, Buckinghamshire, in a house belonging to his son Dick.

#### ADDENDA

[In response to our request for certain additional data about the late George Yeld, and a short biography of the author of the Memoir on George Yeld, Mr. G. P. Baker furnished the notes given below, received after the rest of this issue of HERBERTIA was in print.—H. P. Traubl]

Yeld was born March 23rd, 1845 and died April 2nd, 1938. His Newdigate Prize poem was called "Virgil reading the Aeneid to Augustus and Octavia".

As to myself—I was born in Constantinople Feb. 16th, 1856. It was Yeld who about 1881 led me on the Iris track—He became the first President of English Iris Society and I the second. I have done a good deal as a hybridist—especially have I tried to master the cultivation of the onco-cyclus Iris of Palestine and some years ago in 1929 with Hiatt Baker we went to Palestine and ran to earth the various varieties to learn the soils and conditions under which they grow. The result of the investigation was published in the Iris Year Book 1930. My second love was amongst Alpines and when I gave up serious climbing, I took to plant hunting amongst mountains, Alps, Turkey, Pyrenees, Atlas, Crete, Lebanon, Olympus, Greece, Rif—when Sir William Lawrence died the committee of the Alpine Garden Society insisted on my being President.

As to when I was made a V. M. H., I cannot tell without having to wade through several years of R. H. S. Journals now in the box room. I do, however, remember the President of the R. H. S. in presenting it to me, saying that I had not only discovered good and new plants, but I had also distributed them.

Three years in succession I have spent from 5 to 6 weeks each year in the hills, in Crete, with tents, cook, interpreter and mules. Good things were found and the story told in the R. H. S. Journal and in Botanical Magazine—a new tulip which Sir Daniel Hall has named *Tulipa Bakeri*. In the Atlas Mountains a new *Narcissus*, *N. Watieri* was discovered—It is figured in the Botanical Magazine—so also a Paeony from Crete. In the Rif Mountains there is another *Narcissus* species which will come to light very soon.

In the Alpine Garden Society Bulletin I contributed and illustrated an article on Small Bulbous Irises, following a very useful book by Sir Michael Foster and published by the R. H. S., now out of print.

I think I have said enough, and if Dr. Traub knows Mrs. Ethel Peckham, of the American Iris Society, she knows something of my doings.

If I had to start life again, in horticulture, it would be amongst flowering shrubs.

—G. P. BAKER.

## AMOS PERRY, F. L. S., V. M. H.

## AN AUTOBIOGRAPHY

From early boyhood I knew that horticulture was to be my vocation. The love of flowers was an inherent trait which could not be mastered and I have never felt the slightest urge to adopt any other calling. Consequently, after leaving Tottenham Grammar School my father had me apprenticed to T. S. Ware of Hale Farm Nursery, Tottenham—at that time one of the largest general nurseries in the country. Here I worked through the several departments and on completion of apprenticeship was appointed foreman to the Bulb Department. There it was that the joys and trials of growing miscellaneous rare bulbs and tubers first revealed themselves and created an interest which has never disappeared, indeed, even today I believe myself justified in claiming that my collection of these interesting subjects is one of the most complete trade collections in the country.

At this time I frequently visited Covent Garden Market and in this way met and ultimately became the best of friends with the late Mr. George Beckwith, the great carnation specialist. On his inducement I decided to leave Ware's and start in business on my own account as a carnation grower. My late father joined me and we secured 4 acres of land at Winchmore Hill and procured from Beckwith, during the early spring of 1890, 1,500 large forced plants of border carnations, old plants 5/6 ft. high in many cases with two and more hundred layers. This consignment included some 200 plants of Mrs. Frank Watts (named after the wife of one of the pioneers of the bulb growing industry in the Scilly Isles), a variety which was in great demand and considered by the market men of that day as the finest white carnation ever introduced. It was our original intention to grow carnations for the wholesale trade and we did secure the attentions of most of the larger buyers; but, after a while interest palled.

Meantime, however, we were gradually acquiring a collection of miscellaneous bulbs and rare perennials from such men as the late Max Leichtlin of Baden Baden, Louis Van Houtte of Ghent, De Graaff of Holland and Dr. Regel of St. Petersburg, a famous gardener then in control of the finest collection of plants in Europe whose friendship continued until his lamented death. About this time my father had secured a very large consignment of many thousands of plants from the Chilean Andes which had been collected by a French political refugee; this consignment included many thousands of *Placea ornata*, *Stenomessons*, and a large quantity of *Tecophilea cyanocrocus* and *T. cyanocrocus* var. *Leichtlini*; we were able to sell these extremely rare plants @ 30/-per 100 and at the same time clear a very handsome profit.

I well recall visiting Mr. De Graaf and finding several deep purple forms amongst a magnificent batch of *Delphinium cardinalis* seedlings. On witnessing my enthusiasm, my host remarked "You shall have the coloured forms—they are of no use to me. I can only sell the scarlet." It was in these gardens too that our original collection of *Helleborus*

*orientalis* originated; these "harbingers of spring" that seem at long last to be receiving the popularity they so richly deserve.

The plants so acquired became the nucleus of our present collection: I started hybridising and searching for variations in the heterogeneous forms of the type species.

In 1890 whilst on a visit to York I met that "Grand Old Man" of *Hemerocallis* fame, the late Mr. George Yeld, and our friendship continued till the time of his death. It was his enthusiasm and encouragement that was so helpful to me in those days of long ago and in later years enabled me to follow more closely his advice and do my share in making this genus better known. At that time I promised to visit his garden again but notwithstanding his many pressing invitations I never had an opportunity of keeping my promise till 1936 (See Figure 60.);



Fig. 60. George Yeld and Amos Perry in Yeld's garden in 1936.

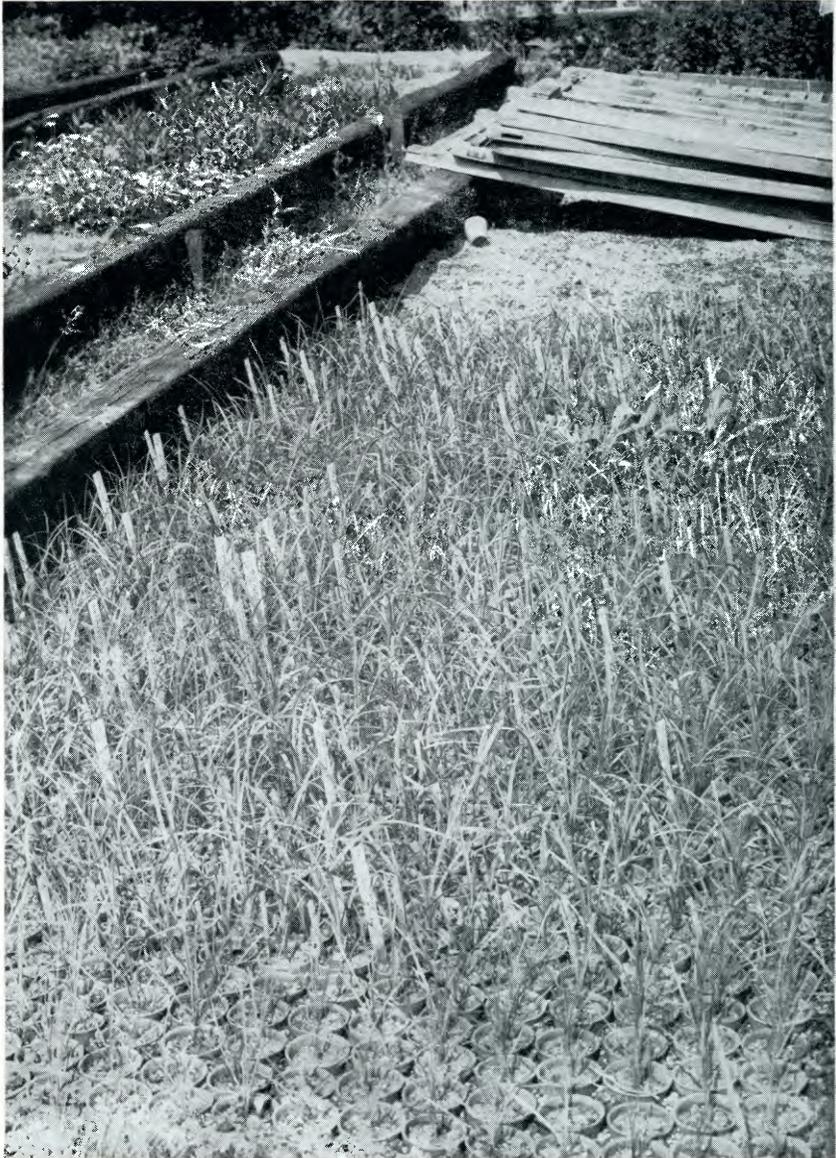
when he, beaming with joy showed me his latest daylily introduction—*Magnifico*, growing in a large pot in his small propagating house. Prior to this date he had given me *Beauty*, *Chrysolite*, *Corona*, *Halo* and many others. It is to be regretted that he lost *Frances*, which he described as being one of his best seedlings raised by using *H. aurantiaca major* as seed parent.

About 1895 Karl Ludwig Sprenger, the famous Italian plant breeder, after a visit to my nurseries, sent along a plant of *H. citrina*. The possibilities of these plants were now becoming apparent; I became interested in the genus and the following year intercrossed this species with *H. flava*. A visit to Messrs. Kesselring's nurseries in St. Petersburg secured *H. Middendorffii* and other species and varieties, which with the several varieties previously secured from Mr. Yeld, *Ajax*, *Golden Ball*, *Noceriensis* and *Dr. Regel*

from Mueller, formed a nucleus upon which to work. The results were not encouraging, almost the only variety worthy of selection being a shy-flowering hybrid between *H. citrina* and *H. flava*. The first plant of this was sent to Mr. W. E. Gumbleton of Queenstown, Ireland, a keen amateur who was particularly interested in *Hemerocallis* and did much to foster my own enthusiasm. A deal of correspondence passed between us and on Feb. 3rd 1905 he wrote:—"Do you still esteem as good and distinct varieties, three *Hemerocallis* hybrids you sent me some years ago—named *Sovereign*, *Gold Dust* and *Orangeman*? If so, I could let you have them back, I can see little difference between them! Your



*Amos Perry*



*Perry daylily nursery; seeds sown in mid-January; photo July 20, 1941*

hybrid of *H. citrina*, though it bloomed nicely for me in 1903 did not flower at all last year; the species *H. citrina* growing alongside is in bud.”

After this I made little or no headway and lost all interest in the genus for many years; other families were more prodigal with results so that between 1906-1930 my interests were centered around asters (Michaelmas Daisies), geums, lilies, papavers, spiraeas and monardas. During the 1914-18 holocaust, business was at a standstill and during this interim I started cross-breeding *Iris* species and the *barbata* (June-flowering) varieties. The venture was not unsuccessful. As a direct result of these labours I received 43 Awards of Merit, gold and silver medals, the Dykes Memorial Medal, the Foster Memorial Plaque; and produced such interesting hybrids as *Margot Holmes* (*chrysographes* x *Douglasiana*); *Wat-bract* (*Watsoniana* X *bracteata*); *Tebract* (*tenax* x *bracteata*); *Tebract Brilliant*; *Delavayi pallida*; *chrysowegi* (*chrysographes* x *Hartwegi*); *Harten* (*Hartwegi* x *tenax*); *Doug-graphes* (*Douglasiana* x *chrysographes*). Just after the war Mr. J. C. Wister, President of the American Iris Society, visited my nurseries and in a note on what he had seen of interest in this country, wrote “Getting into London I had a hard schedule ahead to see the *Iris* gardens. I went first to see Perry’s as he was nearest London. I found his *Iris* in full bloom. If I had been pleased with the seedlings at Cayeux’s and Goos and Koenemann’s I was literally knocked off my feet with what Perry had to show. I began to rate them so high that I began to wonder if there was anything wrong with my eyes.”

However, *Hemerocallis* were not entirely forgotten and during those enforced years of reduced activity (1914-18) I gradually acquired further new varieties. These were used as seed and pollen parents in conjunction with our own stocks so that the 1920’s began to show some results.

In 1921 I introduced *Lady Fermor Hesketh* (*thunbergi* x *citrina*), named after an American lady of great charm—the mother of our local Member of Parliament; quite distinct from any other form in my possession. During the summer of 1920 Mr. George Yeld visited my nursery and was much impressed by my many selected seedlings and told me he considered it a great honour to have such a beautiful variety as *George Yeld* (*thunbergi* x *cypriana*) named after himself and remarked “it will be a good plant when my name is but a memory”; this was subsequently offered in 1925 and plants were freely distributed to U. S. A., Holland, India, Canada etc.

Another variety that received much attention was *Margaret Perry* (*Fulva* x *cypriana*). *Chrysolora*, *Gold Standard* and *Erika* were the best of my 1921-25 introductions, and last but not least *Viscountess Byng of Vimy* which was highly esteemed and found favour with the many American and European visitors to my garden during 1925 and onwards, and has been freely used in America for breeding purposes. This plant has given me a lot of trouble both at home and overseas by correspondence, my attention being called among other things to the



Plate 201 *Perry daylily nursery; selected seedlings for future trials and cross-breeding*

several published criticisms of my attempt accurately to describe this bewitching little beauty; but still I do not care, I know it is a good plant and when introduced was distinct from any other form on this side.

1926 ushered in *Eldorado* and by 1927 I was offering 39 species and varieties, including *Gold Imperial*, *Iris Perry* and *Mrs. Perry*. In 1927 Mr. Franklin B. Mead visited my nursery and was much impressed with the seedlings—especially those of *Margaret Perry* crosses. In October, 1928 he wrote from Fort Wayne, Indiana, "I am sending with my compliments a plant of *Hemerocallis Hyperion* in return for the many courtesies which you extended and in memory of the pleasure I had in seeing you and your nurseries a little over a year ago." *Hyperion* proved a first-rate seed and pollen parent and some good results were obtained, as I shall mention later.

During 1933 *Byng of Vimy* was introduced and named by special permission of that great General who won international fame during 1914-1918. 1934 produced *June Boissier* and *Sunset*; 1935 gave us *Elizabeth Pyke* (*Middendorfii* x *fulva*)—the first good dwarf (18 ins.); and 1936 ushered in *Mars*, rich tangerine-orange, crimped petals; *Bellona* (*Imperator* x *fulva rosea*), delicate shade of orange-apricot; *Sri Chandra* (*Reggie Perry* x *fulva rosea*), delicate shade of reddish-apricot, green base; *Idele* (*Reggie Perry* x *fulva rosea*), deep reddish-apricot; and *Lamia* (*Cinnabar* x *fulva rosea*), medium-sized flowers, orange-red. Many of these, and others, were crossed with *Hyperion*, and the most outstanding of the progeny were given the following provisional names (I have found this system less confusing than the use of numbers in the field); definite names will be given later.

*Ceres* (*Hyperion* x *Reggie Perry*); an exceptionally large, short-copper flower, rich butter-yellow, the whole flower of great substance, petals as stout as a *Camelia*.

*Clacton* (*Mars* x *Hyperion*); deep orange, 6 ins. across.

*Dublin* (*Idele* x *Hyperion*) rich orange; 35% of flowers semi-double; flowers open early morning and remain in good condition till 11-12 next morning.

*Forty Hill* (*Idele* x *Hyperion*) rosy apricot-bronze, madder zone.

*Frinton* (*Hyperion* x *Sri Chandra*) broad overlapping divisions, bronze-apricot.

*Golden Hind* (*Hyperion* x *Wau-Bun*) extra large, rich yellow. June.

*Perth* (*Hyperion* x *fulva rosea*) reddish crushed-strawberry, distinct shade.

*Paignton* (*Hyperion* x *Bellona*) crimped divisions, soft bronze.

*Rugby* (*Hyperion* x *fulva rosea*) large open flowers, rich crimson-claret.

During 1935, I raised a number of *H. Forrestii* hybrids, one of the best, *Fumy* (*Forrestii* x *Middendorfii*), forms compact tufts of medium thin foliage; flowers rich tangerine-orange, reddish-brown shaded reverse; flowers are produced in great profusion from 6-10th June onwards; 3 ins. across, slightly crimped.



*Perry Nursery; one of two bomb craters 62 feet apart; note wreckage of orchid greenhouse that stood in this spot; water lilies in crater pond, and daylilies on margin.*

Plate 202

*Hemerocallis fulva rosea*, a present from Dr. Stout, has worked wonders and transformed this genus—the second, third and fourth generations are wonderful—and I am of opinion will be responsible for lifting this interesting genus from obscurity to one of the most popular of our summer-flowering border perennials.

*Bijou* and *H. multiflorus* have given me a new race of great beauty and interest, one of my finest is *Phillipine Green* (*Lamia* x *Bijou*) a delightful little beauty; neat tufts of grass-like foliage from which emanate slender branching stems bearing numerous small, well shaped flowers, barely 2 ins. across; pretty shade of orange-red; not more than 15 ins. over all.

These forms were greatly admired at a recent exhibition in London when 123 named and unnamed hybrids (selected from about 7000 seedlings produced over a period of three years), were shown—many of them for the first time (See Plate 205). All these forms are distinct and many others are coming into flower for the first time: selection becomes increasingly difficult, I can't throw away any that show promise—they are too precious—but am afraid of being accused of naming too many. (See Plates 200 and 201.)

Although *Hemerocallis* and the other herbaceous plants mentioned have occupied so much time and affection, the dominant interest of my life has been hardy ferns and water plants. The latter subject has a fascination all its own and it has been a great source of satisfaction to witness the evolution of this form of gardening from the humble tub-garden of the last century to the attractive pools and warm water tanks of this "concrete age." High explosive bombs dropped recently on my nursery at Enfield may have destroyed our collection of *Scolopendrium*s (which took my father and me about 70 years to gather together), but the craters have formed fine new ponds and as such are now supporting water-lilies—surely the fairest flora that ever came out of a bomb-hole! (See Plate 202.)

I am a Member of the following standing Committees of the R. H. S.:—Floral Committee B.; Cory Cup Committee; Iris Committee; *Lilium* Committee; Alpine Committee.

I am also Founder Patron, Guild of Trade Horticulturists.

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#### BERTRAND H. FARR

The following excerpts from a biographical sketch of the late Bertrand H. Farr, by Dr. A. B. Stout, are reprinted with permission from the *Journal of the New York Botanical Garden* for December, 1924, the year in which Mr. Farr passed away:

"Bertrand H. Farr died at his home in Wyomissing, Pa., on October 11th., only a few days after a sudden apoplectic stroke and only three days preceding his sixty-first birthday. Death has thus removed a leader in the field of American floriculture; one whose work and accomplishments have been conspicuously noteworthy.

Mr. Farr was born in Vermont. At an early age he moved with his parents to Wisconsin and then into Iowa. He attended public schools in Iowa and at the age of twenty went to Boston, Mass., where he studied music for several years. Thereafter for a period of about twenty years he was engaged in business, chiefly that of selling musical instruments. It was this work that at last took him to Reading, Pa., and led to his having a home at Wyomissing.\* \* \* While a student of music in Boston, he spent many hours among the plants of the Hovey gardens. Throughout the years of conducting a music store, flower-growing was his hobby, until in 1910 his hobby became his business and he was happy. This was but a natural development. First his home-garden collection of flowering plants spread over vacant lots until several acres were under cultivation. Then a farm was purchased and the Wyomissing Nurseries Company was established. At the time of Mr. Farr's death the nursery was being removed to a still larger farm nearby. The business had been incorporated and will now be continued by those who were associated with him.\* \* \* Mr. Farr was widely known as an authority on the peony and the iris.\* \* \*

Mr. Farr has been a frequent visitor at the New York Botanical Garden. He was much interested in all our collections of hardy flowering plants and he gave freely of such plants as the bearded and the Japanese irises to increase the collection and make them more complete. He supplied a complete set of the various day lilies (*Hemerocallis*) in cultivation for use in the breeding work now under way in our experimental plots. Last summer he inspected the numerous seedlings that were in bloom and arranged to name and distribute some of the best of these."

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Mr. Farr gave us the very fine daylily clone,—*Ophir*, that thrives equally well North and South. It is gratifying to all that the ones associated with him during his lifetime in the Wyomissing Nursery Company are carrying on where Mr. Farr left off, and they are to be congratulated on the success they have achieved. True to Mr. Farr's original purpose they continue the daylily as one of their specialties.

*Beltsville, Maryland,*  
November 29, 1941

—H. P. T.

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#### HANS PETER SASS

#### AN AUTOBIOGRAPHY

I was born in Alt Duvenstedt near Rendsburg, Schleswig-Holstein, Germany, September 19, 1868. In 1884 my parents emigrated to the United States of America with family and settled in Omaha, Nebraska. The next spring we moved to a farm ten miles west of the City and pursued general farming. I was the second son in the family and as the younger boys grew up I worked for a year on a dairy ranch in the State of Washington. In 1893 I came back to Nebraska and rented a farm for

myself on a ten years' lease. In 1901 I was married to Miss Elsa Ohm, and the next year I bought an 80 acre farm near Elkhorn, Nebraska, and now Midwest Gardens. As I was very much interested in plants, particularly in floriculture, I at once made up my mind to beautify the new home with flowers, shrubs and trees. I had studied botany at Rendsburg in my youth. As I lived in the country, several miles from town, I had to bring the plant material along to be studied in school. This naturally heightened my interest in plants.

At the new place in Nebraska, I found a neglected garden in front of the house, and here I dug out a large patch of the *Fulva Kwanso* daylily for I wanted to devote this space to other flowers. I also found *Fulva Europa* growing on the premises but dug out most of it. I had a dislike for rapidly spreading rhizomatous plants. At that time I had to practice rigid economy, but fortunately I had Park's Floral Magazine, published by the Geo. W. Park Seed Co., La Park, Pennsylvania. This Company sold seeds and plants very cheaply, and I started out with a great variety of plants, many of them not adapted to the Great Plains Region where I make my home.



Fig. 61. Hans Peter Sass.

Among the plants I received there was the Great Orange Daylily, *Hemerocallis aurantiaca major*, and when it bloomed I made crosses between this and *Fulva Europa*. The experiment was a failure for no seeds set. For the time, I gave my attention to other flower subjects, mainly irises and peonies. In fact, my breeding of daylilies has been sporadic. Often

heat and drouth interfered with seed setting, or the young seedlings perished in a year of extreme drouth and heat.

In 1916, I bought a collection of daylilies from the late Bertrand H. Farr, including some of his *H. citrina* hybrids. These produced tall scapes and I then made crosses between these, and *H. aurantiaca major*. This was a success but the flowers of the first generation were not up to size. I crossed the better individuals back on *Major*. In 1932, I made a selection of the best. Some of these were named later. I now have the third generation in bloom, all with yellow coloring, from Martinus Yellow to near orange. These are mostly from 1938 seeds for the drouth years from 1930 to 1937 were not favorable for daylily breeding. So far I have not used *H. fulva rosea* or the pink and red clones. As a daylily breeder I am not up to date.

I have introduced the following daylily clones: *Sunny West* (1933); *Golden West* (1933); *Star of Gold* (1934); *Hesperus* (1937); *Nebraska* (1937); *Moonbeam* (1940); *White Lady* (1940), and *Revolute* (1941).

My breeding with irises has been successful as shown by the many awards and medals received, including the Dykes Medal. My peonies are also coming to the front as the last ratings indicate. I have also experimented with Oriental poppies, *Umbellatum* lilies and many other flower subjects.

## PAUL HOWARD COOK

### AN AUTOBIOGRAPHICAL SKETCH

I was born near Poneto, Wells County, Indiana, in 1891. I became interested in plant breeding about 1910 after reading some of L. H. Bailey's books, and took up the work seriously as an avocation in 1916. I was attracted first to the small fruits, but gradually settled on *Iris* as a principal genus to hybridize, an interest that is still dominant.

The determination to take up *Hemerocallis* as a group to hybridize followed a meeting with the late B. H. Farr in 1923, and a collection of species and hybrids was secured that year. In this original collection were the species *H. flava*, *H. Middendorffii*, *H. Dumortierii*, *H. serotina* (*Thunbergii*), *H. citrina* and *H. fulva Europa*, and the named hybrids—*Apricot*, *Aureole*, *Gold Dust*, *Sovereign*, *Luteola*, *Ochroleuca*, *Baroni* and *Calypso*. The next year the species *H. aurantiaca* was added.

I began making daylily crosses in 1924. One of the plans at the beginning was to cross each two species separately, and from the first hybrids to raise large second generation progenies, in order to learn something of the inheritance of daylily characters. This proved too large an undertaking, even in a genus of comparatively few species, and it was carried through only in the case of *H. serotina* (*Thunbergii*) x *H. citrina*. The best early seedlings came from the use of *Calypso*, *Luteola* and *H. aurantiaca*, the flowers of many of these showing large size, substance and good form. *H. serotina* (*Thunbergii*) x *H. fulva Europa* gave four very different seedlings, one of which was fully fertile and later proved useful in work for red flowers. A cross between two first hybrids, [*H. serotina* (*Thunbergii*) x *H. citrina*] x (*H. flava* x *H. Middendorffii*) was one of the most interesting of those made early. Flowers of some of these seedlings had very wide segments. A very pale yellow came from *Calypso* x *Calypso*, and this seedling was much used in crosses. However, though some very pale yellows appeared, nothing in the way of an approach to a white flower ever showed up in any of the lines based on this pale seedling, even where the breeding was very close. Early trials to extend the color range in *Hemerocallis* by attempting outcrossing to *Hosta*, *Paradisea* and *Leucocrinum* ended uniformly in failure.

Beginning in 1931<sup>1</sup> the best of the yellow and orange seedlings already obtained were used in crosses with the new *Hyperion*. For the

<sup>1</sup>The clones *Vesta*, *Margaret Perry*, *Mikado*, and some Betscher clones were also added to the collection in 1931.

most part, these seedlings from *Hyperion* have provided the foundation for the strains of yellows and oranges now under development. The present red line is based chiefly on deep fulvous seedlings from *H. aurantiaca* and the seedling from *H. serotina* (*Thunbergii*) x *H. fulva Europa*. These reds are being intercrossed, and they are also being crossed to *Rosalind*. The daylily breeding is now confined to the set which flowers in July in northern Indiana, and the main interest is in



Fig. 62. Paul Howard Cook.

the clear yellows and oranges, especially flowers having wide segments and good resistance to sun and drought.

From the beginning to the present time some 12,000 seedlings have been raised; many of the more recent of these are third and fourth generation descendants of earlier seedlings. The largest set, 3,500 seedlings, flowered in 1940. Three seedlings have been named. These are *Stalwart* and *Gloaming*, both from *Calypso* x *H. aurantiaca*, and *Sharon*, from a Farr variety x *Calypso*.



*Herbert Medalist—Wilfred MacDonald James*

## THE 1941 HERBERT MEDALIST

The award of the William Herbert Medal to Wilfred McDonald James in 1941 marks a mile stone in the advancement of the amaryllids. Prior to this date it was a matter of awarding honors long past due. With the 1941 award, the Society bestows the Medal on an American worker who has made his contributions in this field mostly during the past decade, and in close cooperation with the Society since its organization.

Mr. James is an honest, modest man who by sheer genius and hard work has made important contributions toward the advancement of the amaryllids as shown by his contributions to past issues and the present issue of *HERBERTIA*. He has been active in introducing new amaryllids from abroad, and has diligently sought to determine their value to the American gardener. He has made important contributions to amaryllid cytology, culture, propagation, and storage. He has been an active plant breeder particularly with nerines and gladioli. An outstanding achievement is his charming hybrid *Nerine* (*N. filifolia* x *N. corusca major*), *Chameleon*. His contributions as a plant breeder have just begun, and we can expect much from him in the future.

The straight forward life story briefly sketched by Mr. James, which follows, is typically American. It proves once again that those who deserve of success in this Country of ours are bound to achieve it. In these trying times, it is another concrete reminder to us that our way of life is worth defending against Nazi threats.

We are proud to claim Wilfred McDonald James as a fellow American, and we hand him the William Herbert Medal with congratulations from all the members of the Society.

—Hamilton P. Traub

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WILFRED McDONALD JAMES

## AN AUTOBIOGRAPHICAL SKETCH

I was born August 8, 1893 at Springdale, Cedar County, in the east central portion of the State of Iowa. When I was ten years old, my parents moved to Pasadena, California, in October 1903. In 1914, I graduated from the Pasadena High School, and in 1916 I completed the non-degree course of the Northern Branch of the College of Agriculture of the University of California.

When America entered World War I, I enlisted in the Field Artillery Branch of the U. S. Army, in June 1917, "for the duration." I was overseas in the A. E. F. for eighteen months, and took part in one major engagement and several smaller ones. After the Armistice on November 11, 1918, as a member of the A. E. F., I attended the Royal Technical College in Glasgow, Scotland, during the spring semester in 1919. After returning to America, I was honorably discharged from the U. S. Army, August 8, 1919.

From 1919 to the fall of 1925, I worked mostly in Los Angeles, California, at various nursery and gardening positions in order to gain experience with plants. I also performed carpenter work for part of the time.

In November 1925, I took up a position with the Hope Ranch Park Homes Association at Santa Barbara, California. My duties consisted of supervising roadside planting in Hope Ranch Park, and assisting property owners in developing new home sites.

Early in 1929, Mr. and Mrs. William R. Dickinson started building a home in Hope Ranch Park. In June 1929, I took charge of their Estate as head gardener. On this Estate I was able to really make use of my experience by developing several small, connected gardens, and the Las Positas Nursery. I wish to take this opportunity to publicly thank them for their generosity and confidence in allowing me almost complete freedom in the selection and management of material, especially in the Nursery. It was an opportunity seldom encountered, and was much appreciated.

In the Nursery, plants were obtained wherever possible from all parts of the world and tested for garden and commercial value. Besides the study of the amaryllids mentioned in several issues of HERBERTIA [*Pharium* (syn. *Bessera*), *Milla*, *Leucocoryne*, *Brodiaea*, *Lycoris*, *Nerine*, *Cyrtanthus*, *Amaryllis*, *Callicore*, *Alstroemeria*, *Bomarea*, *Hymenocallis*, *Ismene*, *Phaedranassa*, *Cybistetes* (*Ammocharis* ex parte), *Nothoscordum*, *Haemanthus*], I took an especial interest in hybridizing various *Gladolus* species. Some splendid winter-blooming forms have been developed, one of which, *Winter Fairy*, is already on the market. One of these blooms in sixty days after planting. These forms are quite different from the summer-blooming types.

As can be imagined, many problems were encountered in connection with the many new plants brought together at Las Positas Nursery. Some of these may have been at least partially solved, although I feel that as a whole the majority remain unsolved. While living in Hope Ranch Park, I was fortunate in meeting people from all walks of life, and from many parts of the world. Often I have been asked where I received my training, and most of those asking the question did not seem to understand that specialized experience can be obtained by extra effort and study. However, "midnight oil and elbow grease" will avail little without the help of others, and I am deeply indebted to many for their counsel and advice.

In September of this year, I took charge of Rancho Rinconada, which is owned by L. M. Boyle, and is located at Ojai, California. Although my new work will be principally with cymbidiums and camellias, I do not intend to lose my interest in the amaryllids. The Society's test material is being moved from Las Positas Nursery to Rancho Rinconada. I also expect to carry on many of the hybridizing and other experiments started at Las Positas although I will not have the quantity of some of the kinds of material to work with at the start.

I married Ruth Putnam in June 1921, and we have three children—Robert, 16½ years; Richard, 12 years; and Barbara, 9½ years old. Mrs. James has had a full share in all of my accomplishments since our

marriage. During our association, many of my projects were completed only because of her encouragement and support.

My mother passed away in 1911, and my sister followed her in 1916. My father is still living and takes a keen interest in my work, although he is 80 years old. I have a younger brother who is Vice President of Operations of Western Air Lines.

Needless to say, it is impossible for me to fully express the pleasure and appreciation that I felt when I received notice that the William Herbert Medal for 1941 had been awarded to me by the Society. It is my sincere hope that I may continue to warrant the honor that it brings.

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#### HUBERT FISHER, SR.—IN MEMORIAM

“Hubert Fisher, Sr., florist and nurseryman at Germantown, Tenn., died unexpectedly June 17 at New York at the age of 63. Apparently in good health, except for the deafness with which he had been afflicted for thirty years, Mr. Fisher had left Memphis to attend a reunion of the Princeton University class of 1901 at Princeton, N. J.

Born at Milton, Fla., he matriculated first at the University of Mississippi, where he received his B.A. degree, later taking his M.A. degree at Princeton. He was admitted to the bar and entered the law firm of Carrol & McKellar at Memphis. In 1917 he was elected to Congress, serving until 1931, when he established his nursery. His son, Adrian S. Fisher, is assistant to the Assistant Secretary of State at Washington, D. C. His widow also survives, as does another son, Hubert, Jr.”<sup>1</sup>

Mr. Fisher was actively interested in daylily breeding at the time of his death. He was using such clones as *Fulva Rosea Rosalind*, *Patricia*, *Byng of Vimy*, etc. He was also growing some of the breeding progeny of Mr. Paul H. Cook, Bluffton, Ind., in order that Mr. Cook could obtain pollen by air mail of his late flowering clones to use on his early blooming ones. Mr. Fisher introduced the red daylily clones *Geronimo*, *Pascagoula*, and *Chisca*.

According to the October 9th. issue of Florists' Review, Mr. Fisher's business was purchased by Oliver Anderson, formerly associated with the Fruitland Nurseries at Augusta, Georgia. It is gratifying to know that Mr. Fisher's work will be perpetuated.

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#### IN MEMORIAM—SIR ARTHUR WILLIAM HILL

It is with the deepest regret that we record the death of Sir Arthur William Hill, since 1922 director of the Royal Botanical Garden at Kew, England. He was killed on November 3, 1941, when thrown from his horse while riding. He was sixty-six years old. Along with his world wide interests in science, he was a good friend of the American Amaryllis Society. His loss will be keenly felt by all who knew him.

—H. P. T.

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<sup>1</sup> From The Florists' Review, June 26, 1941.

## SOME DAYLILY PROBLEMS

J. MARION SHULL, *Maryland*

Societies for the promotion of special plant interests, whether devoted to the rose, iris, gladiolus, peony, or whatever else may catch the fancy of garden minded folk, are beset by much the same sort of difficulties, have to meet, and solve if they can, much the same sort of problems both in their initiation and in their future development. First a few interested and like-minded workers join forces with Nature in the process of collecting, and then in creating new varieties by the never ending process of mating unlike parents. Their successes interest and inspire others and lure new recruits who go and do likewise and lo a new "Society" is born to devote its energy and enthusiasm to the spread of a special interest.

The group now associated for the promotion—exploitation if you must—of the amaryllids, including the daylily is still an infant in swaddling clothes as compared with veterans of the rose, the peony, etc. Some of these older Societies just grew, much as Topsy did, grew to huge proportions and into problems sometimes insoluble. Could some of these difficulties along the way have been controlled or avoided by earlier guidance, or is every society foredoomed to pass through this same evolution into the same confusion and ultimate chaos?

Can we who are interested in *Hemerocallis* develop that interest in an orderly way through a better understanding of the pitfalls that beset the way of any horticultural society devoted to a single subject? Must the prancing nags that enter the race get out of control and inevitably end in a wild runaway? Let it be understood from the start that the present writer has no illusions as to one man's ability to chart a course for the guidance of all who come after. All he can hope to do is to state some of the major problems confronting such a group. Such understanding necessarily precedes any rational attempt at control.

There are already several hundred varietal names of daylilies recorded and the Society hopes to establish a system of registering and describing of all new additions to the list to avoid duplication of names and to provide better means of close comparison which should help to ward off the naming of too many that are essentially alike. To this end all producers, amateur or professional, are exhorted to great conservatism in the registering or issuing of new names or varieties. This is not meant to operate as a damper on the great pleasure to be had in the co-operation with Nature in the creation of new varieties. It is great sport and should not be discouraged or curtailed. But what are we to do with our surplus good seedlings if we are not to name and distribute them?

This problem faces every grower of seedling perennials and the more his enthusiasm mounts, the larger the number of individuals he works with, the more acute the problem becomes. There is but one thing to do with all seedlings that fall below average quality, unless they possess some unique feature still of use to the breeder. They should be destroyed as soon as they have demonstrated their lack of quality. But out of any batch of seedlings there will be many fine things, and if there were no

competition, all these might be worthy of names and distribution—but only a few will be of outstanding merit in view of the intense competition already provided. The rest are good, but no better than named varieties already freely propagated and moderately priced, and therefore available to all. To name and offer these for distribution is only to build up confusion.

It is fine plant material and, theoretically at least, ought not be destroyed. This being the case, why not offer this superior part of the producer's discards to the public by way of park or other public planting? But make sure that only quality material is so offered. Daylilies are practically free from pests and usually able to maintain themselves indefinitely without costly garden care. Such disposal would provide a sort of antitoxin against too rapid multiplication of registered names and the customary clutterment of a host of varieties that can not be distinguished one from another in the field. It would not deprive the public of such enjoyment as they could give, nor would it tend to curtail purchase of named sorts by the private gardener.

In the attempt at control and guidance there will necessarily develop some system of ratings to express the aggregate judgment either of a specially selected group or Committee of the Society, or a symposium representing the judgment of the Society as a whole. Herein lie many and subtle difficulties. Ratings will necessarily play an important part in the granting of awards—awards being in turn calculated to stimulate competition toward higher levels of accomplishment, though sometimes degenerating to the mere satisfying of personal vanity or craving.

A useful system of rating must demand some degree of uniformity of consideration and the setting up of guides or standard rules for rating, rules that will secure fairness as between varieties and yet not bind at any point to a fixed and inflexible requirement. Lucky indeed would be that Society whose wisdom was sufficient to establish such fortunate rules from the start that no material change would be required in many years! Having to change the basis of rating almost every year because of lack of foresight leaves many an older rating no longer comparable with those of the current year. Most of the older Societies are suffering today from the lack of truly comparable ratings.

Most of them have also been forced to be equally changeful in the matter of awards and in many cases have failed to find an equitable and workable system of awards. Usually a Society adopts some graduate system of award values, as Honorable Mention, Award of Merit, and sometimes a special award outranking these. Sometimes awards take the form of "Certificates" of varying degrees, or again there are medals of varying ranks. To make these awards on a rational basis again requires rules and regulations that may be wise or unwise according to the ability and foresight of the agency that sets them up. In regard to eligibility for the major awards it seems doubtful if any arbitrary age limit should be set up in the regulations. A worthy variety should be eligible to receive honors on merit alone and regardless of whether it was produced yesterday or twenty years ago. Under the regulations of some Societies the finest variety of all may never receive an award simply because it did

not have the good fortune to be seen by the right people within a restricted time limit. This should not be allowed to happen with the day-lilies.

Because of the recognized need for reliable comparative valuation of merit most plant societies have at some time or another attempted a solution by way of test gardens: The idea is very appealing and but for several very large and stubborn "ifs", would provide just the data required. Let us examine some of these "ifs". If we were not such a wide-spread and diverse community, with the utter impossibility that a single test garden could serve all with equal fairness, such a garden would be the ideal solution. But soil and climate vary so greatly from state to state and even within the same state that it would require many test gardens scattered all over the country to determine authoritatively the nation-wide deserts of a given variety, or the exact boundary within which such variety would prove exceptionally desirable and in what regions it should be excluded as unsatisfactory.

And even a single test garden becomes a costly thing to maintain, and a complete system of regional test gardens may be set down as a Utopian dream. Land must be occupied, and labor employed, and this on an ever increasing scale to accommodate the continuing expansion of introduction by enthusiastic breeders and distributors. I know of no single-flower association wealthy enough to provide and maintain such an official means of evaluating an unlimited number of new offerings.

If a Board of Judges, or even a single qualified Judge could visit every significant garden wherein new daylilies were being evolved, such desirable comparative data could be gathered and placed on file, but here again the cost would be prohibitive even if the task should not prove physically impossible since the best of judges still find it inconvenient to be in two widely separated places at the same time.

Perhaps the situation is not quite so hopeless as I have pictured it, for while no conceivable complete system of test gardens seems financially feasible it may be possible to arrive at something on a co-operative basis that would cost less and yet be worth doing. Best opportunity for this would probably come from some form of co-operation with established institutions such as Colleges of Agriculture, Botanic Gardens, or Park Authorities. However, if continuing usefulness is to be secured and maintained, some means must be found to prevent pyramiding of expenses. It would be impossible for such gardens to accept all new offerings for test unless some provision for discard is adopted that would permit area of ground occupied and labor involved to be reasonably stabilized. With this in view I offer the following suggestions.

All new and current offerings should be accepted without question and be given good planting and care for a predetermined period of say three or five years, long enough to become well established and yield typical growth and bloom, at the end of which period they should be appraised individually by a competent authority and only those attaining a very high standard of horticultural desirability retained. The rest should be summarily dropped from further test in this regional Test Garden and bodily removed from the premises. By adopting such a

scheme the co-operating Institution's burden for support would be fairly standardized.

The few top ranking varieties retained would be planted apart in a permanent plot, limited if need be to a fixed maximum number, say perhaps a hundred. When this maximum had been attained additions at the top would be compensated for by discards from the bottom. Such a Test Garden when fully mature would offer a collection of the hundred "best" for that region and this would become a valuable display garden and means of reference for all visitors. In addition to this elite group there would be the trial plantings consisting at any one time of the new offerings of breeders during the last three or five years as the case might be. These would vary slightly from year to year but by reason of the annual clearance either to the permanent display garden or by discard, the ground occupied and the labor of maintenance required would remain approximately the same in successive years and could be provided for in budget estimates with reasonable confidence. Such Test Gardens would be very useful and might escape the pitfalls that have usually proved fatal to such attempts in the past.

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## BOMBING AMARYLLIDS

### EXCERPTS FROM MAJOR PAM LETTER <sup>1</sup>

"I am sorry to say that the bulk of my collection of amaryllids has been seriously damaged and although some might recover in time, I have lost heart and am seriously considering giving away most of my species and only retaining a few *Pamianthe* and a few special plants. I had a high explosive bomb dropped within 50 yards of this House and quite close to my Head Gardener's cottage. The blast from this sucked most of the glass out of my greenhouses and the mess was really dreadful when we went there next morning. Only about 10 per cent of the glass was in place, the rest was scattered all over the place; a lot of glass had fallen into the houses and cut the leaves and bulbs very severely, pots of plants had been knocked over, some on the floor, and it was one of the most depressing sights for a keen gardener you can possibly imagine. Very luckily the night, and the next two, were fairly mild; if there had been a hard frost, all the plants would have been killed. One of my sunk pits was not as badly damaged as the rest, and with a lot of help from outside we were able to get some canvas and tarpaulins over the worst parts, and move the more precious plants into that pit; but many of them were in a terrible condition and at this season very little can be done; when a plant has lost three-fourths of its leaves, it is maimed for years, if not for ever.

"By good luck, my fine batch of *Pamianthe* did not suffer as much as other things, and I shall try to keep these going, even if I have to discard all the others, which will probably be necessary. At present all my plants which used to grow in a long range of about 50 yards are concentrated in a small pit about 10 yards long; you will realize that they

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<sup>1</sup> Letter from Major A. Pam, Wormley Bury, Broxbourne, Herts, England, dated March 16, 1941.

cannot be grown so close together, but I have not made up my mind which ones will have to go, as I have some very rare plants apart from my collection of amaryllids, many of which have a great sentimental value as having been given me by friends now dead. I expect that I shall be able to reglaze the pits properly, and perhaps also a small lean-to house for decorative plants for the House and for tomatoes, but it is evident that the bulk of the collection will have to be discarded, including a number of good cymbidiums, cypripediums and other orchids.

"I had had 3 high explosive bombs on my land in November, which did a lot of damage to my glass houses, but I had everything made good and the glass replaced, and hoped that this would be the end of Hitler's attack on a purely country area without any military objectives. But I cannot do this again, and must resign myself to the position as it now is, with thankfulness that the bomb did not drop 50 yards nearer and destroy this House and kill my family and all the many inhabitants."

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#### AMARYLLID MUSINGS

W. M. JAMES, *California*

Each year, almost each day, brings new problems or reveals phenomena which we would like to understand. To begin with, please turn to page 242 in HERBERTIA, Volume 4, 1937, and note the picture of *Leucocoryne* and the explanation accompanying it. As stated, the shallow growing bulbs were separated from the others and their seeds were also kept separate until after the first blooming time. So far all of the seeds from these "separate bulbs" have required the usual time of three years to grow to flowering size.

The winter of 1940 was exceptionally warm in Southern California. During this growing period, these selected bulbs went down to their usual depth of 12 to 15 inches, in spite of the fact that they had bloomed for two seasons after flowering in the seedling bed. Bear in mind that bulbs from pounds and pounds of *Leucocoryne* seed planted over a period of years have invariably gone down 12-15 inches deep before flowering, and after flowering at this depth in the seed bed, have always stayed at any depth they were replanted. Does this not indicate, for one thing, that this bulb prefers cool "feet"?

Another item is becoming alluring. For several years I have noticed that occasionally a bulb will make a complete circle or ring of offsets around itself, instead of the usual two to four. This is not limited to one genus, as is shown in the picture of *Nerine Bowdeni* and *Haemanthus Katherinae* (See Plate 204). A picture of a bulb of a *Brunsvigia-Callicore* hybrid on page 43 of HERBERTIA, Volume 7, 1940 also shows this unusual development.

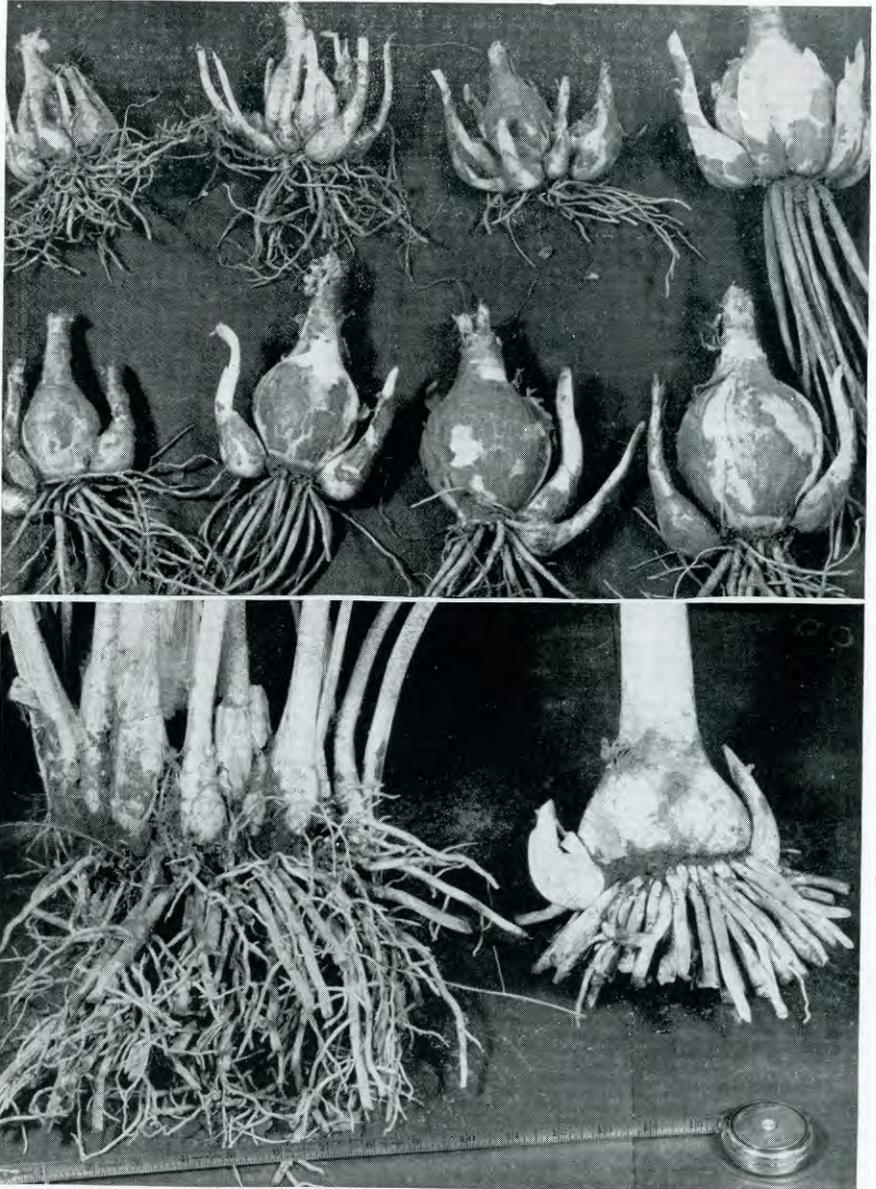
These offsets seem to initiate between the 1st and 2nd and/or the 2nd and 3rd scales from the outside of the bulb and take two years to make the growth shown in the pictures. I have had no opportunity to segregate any bulbs and observe them individually over a period of time. This excessive production of offsets does not seem to be limited to any certain

individual bulb or its offspring. Size does not necessarily influence it, as the picture of *Nerine Bowdeni* plainly shows. I hope that I, or someone else, will have an opportunity in the near future to determine whether it is age, or environment, or an individual inherent characteristic which causes this excessive development of offsets.



Fig. 63. *Crinum* species from Southwest Africa.

*Amaryllis candida* is proving a very poor seed parent. When the seed pod is about one-half grown, it forms what is apparently an abscission layer between the ovary and the end of the pedicel and falls off. This is my first experience with anything of this nature. Next season I



*Bulbs of Nerine Bowdeni, upper, and Haemanthus Katherinae, lower, showing development of offsets.*

hope to be prepared to use the plant hormone treatment which is being tried on apple trees to prevent premature dropping of fruit. If anybody has any suggestions, I will appreciate them.

For some time we have had an interesting bulb at Las Positas Nursery which came in as *Nerine multiflorum* from a collector in South-west Africa. The dry bulbs had no resemblance to any of the *Nerine* bulbs I had seen. Neither did the first foliage resemble that of nerines. The first flower indicated rather clearly that it was not a *Nerine* and probably was a *Crinum*. (See Figure 63.) Some of these bulbs were sent to Dr. Dyer at Pretoria, South Africa, for identification. These have bloomed and he says that it is a *Crinum*, but has not had time to determine the species. And now we come to the point!

For several years these bulbs have bloomed freely during the summer, but no seed has developed. I have always been a little puzzled because I never seemed to find any pollen on the anthers. One afternoon this summer I was "fooling" with a bud and found that the anthers were open and the pollen falling. It did not take much time to determine that the bud starts opening in late afternoon and is completely open about sundown. If it is a warm, dry evening the pollen all falls off the anthers before morning. If it is a damp, foggy evening, the pollen does not fall until the air is drier and may stay on for some time the next morning. Flowers which were pollinized an hour or two after dark all set seed, which develop nicely. This seed germinated readily and is growing vigorously, including crosses with two other species. Although this may be a characteristic of crinums, I was not familiar with it and neither were any of my friends in Santa Barbara.

Another problem was solved this summer. On *Milla biflora*, it was found that the anthers open, and the pistil grows up through them and is fertilized before the flower opens. Consultation with a botanist revealed that flowers of some plants do this, although it was an entirely new phenomenon to me.

In closing, I wish to mention one thing in addition which I am appreciating more and more as time goes on. That is the number of friendships and acquaintances made both by correspondence and actual contact through a mutual interest in plants. And it does not seem to make much difference whether the other person is on the opposite side of the world or just down the road a little way.

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#### THE DAYLILY EDITION COVER DESIGN

The cover design for the 1941 Daylily Edition of *Herbertia* was drawn by the eminent artist and horticulturist, J. Marion Shull. The design shows one flower of the hybrid daylily clone, La Tulipe, and is based on material grown at his home at Chevy Chase, Maryland, in 1941.

—H. P. T.



*Perry Daylily Exhibit at Royal Horticultural Society Show, summer 1941*

See page 47.

# 1. REGIONAL ACTIVITIES AND EXHIBITIONS

## SECOND NATIONAL DAYLILY SHOW

WYNDHAM HAYWARD, *Florida*

The American Amaryllis Society staged its second National Daylily Show at the Mead Botanical Gardens, Orlando-Winter Park, Florida, on June 1, 1941, with brilliant showings of new hybrid *Hemerocallis* and a good attendance of flower lovers from the Lower South.

The exhibition was "benched" on tables and shelves in the rustic lodge of the Garden, and was under the management of R. W. Wheeler, Winter Park. Mr. Wheeler was also credited with the outstanding general display of the show, his entries running from tiny dwarfs to large "reds".

The blooms were placed on exhibition as single flowers and entire flowering stems of the plant. They were arranged in attractive vases and jardinières, and in bowls and baskets. Large collections of the individual flowers were displayed in whiskey "shot" glasses, which proved convenient and satisfactory miniature vases for the smaller blooms. Other flowers were shown in glasses, bottles, paper cups and many other types of containers.

There were three main divisions of the show, as follows:

### SECTION I Collections of 5 or more.

- Class 1 Pale Yellow
- Class 2 Deep Yellow
- Class 3 Light Orange
- Class 4 Deep Orange
- Class 5 Fulvous (Including light Mahogany shades.)
- Class 6 Dark Mahogany Shades
- Class 7 Red
- Class 8 Pink (Including the shades approaching pink.)
- Class 9 Pastel Colors
- Class 10 Any Other Color
- Class 11 Dwarf (Stems not more than 18" high.)

### SECTION II Best Single Flower

- Class 1 Pale Yellow
- Class 2 Deep Yellow
- Class 3 Light Orange
- Class 4 Deep Orange
- Class 5 Fulvous (Including light Mahogany shades.)
- Class 6 Dark Mahogany Shades
- Class 7 Red
- Class 8 Pink (Including the shades approaching pink.)
- Class 9 Pastel Colors
- Class 10 Any Other Color
- Class 11 Dwarf (Stems not more than 18" high.)

### SECTION III Best Flower in the Show; No Class Entry Required.

The judges were Mr. and Mrs. E. L. Lord, leading garden and flower show experts of Florida. Mr. Lord entered a handsome display of his own daylily seedlings which were not in competition. Other exhibitors were Wyndham Hayward, Frank Vasku, Miss Helen Fuller, Mrs. Harry Hasson and Mrs. George G. Scott. The Mead Garden, which cooperated in the show with the assistance of Dr. E. O. Grover, president and Jack Connery, director, set up large groups of daylily flowers in tubs and vases from the mass plantings on the adjacent grounds.

R. W. Wheeler received an award of Merit for his major display entry, and the prize for the best flower in the show; also 9 first place ribbons; 11 second place ribbons, and one third place ribbon. Wyndham Hayward received 10 first place ribbons, eight second place ribbons; Frank Vasku received two first place ribbons, two second place ribbons, and four third place ribbons. Miss Helen Fuller received one first place ribbon, Mrs. Harry Hasson received one third place ribbon.

Both Mr. Wheeler and Mr. Hayward displayed large collections of new and un-named seedlings, in shades of pastels, bronze, "pinks" and "reds" into the dark purple-black color tones. These proved the main attraction of the show to those attending, who stared almost in unbelieving awe at the novelties on view. To many hundreds of them this was their first sight of the highly colored types of *Hemerocallis* hybrids.

Of special interest was a group of three flowers, exhibited by Mr. Hayward for Dr. Leon H. Leonian, daylily breeder and delphinium specialist of Morgantown, W. Va., which were from plants grown for trial purposes in Florida. These were early seedlings from Dr. Leonian's collection, and each received a First Class Certificate. They were given provisional exhibition names of "*Cherry*", "*Dr. Leon*" and "*Cerberus*". "*Cherry*" was the clearest "red" in the show, and "*Dr. Leon*", the best "pink", although still far from a perfectly clear shade of this color. "*Cerberus*" was a huge flower with pointed spreading petals, mahogany black in color with lighter throat and edges. These clones are still under observation and not available for distribution.

First Class Certificates were awarded to *Turbani* and *Halo*, in Mr. Wheeler's collection, while the judges awarded first class certificates to *E. W. Yandre* and *Minnie* in W. Hayward's exhibit. Mr. Wheeler's "best flower" of the show was his notable *Ruby Supreme*, which won a first class certificate at the 1940 Daylily Show.

Rules of the show were as follows:

1. There is no entrance fee.
2. Competition is open to both amateurs and professionals.
3. Tag awards for each class will be made as follows:  
Blue for first, Red for second, Yellow for third.
4. Only one entry from each exhibitor allowed in each class.
5. The Potted Plant, cut Flower Stem, or the Individual Flower may be entered in competition, and without penalty in either case.
6. Exhibitors must label each entry with correct name, or, if an un-named seedling, so state.

7. Exhibitors must have all entries in by 11 o'clock A. M., Sunday, June 1, 1941.
8. All entries are to be made in the name of the grower.
9. The Committee will not be responsible for loss or damage.
10. The decision of the Judges is final.

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THE DAYLILY COMES OF AGE IN BRITAIN,  
PERRY EXHIBIT AT R. H. S. SHOW, 1941

Mr. Amos Perry of Enfield, England, is one of the pioneer daylily breeders. Over a long period of years he has introduced many fine clones, and many of these are thriving in American gardens. The members of the Society will be keenly interested in the success of Mr. Perry's daylily exhibit at one of the 1941 R. H. S. shows (See Plate 205) as indicated by the enthusiastic reports in the British horticultural press. Some excerpts from these reports are given below.—*Ed.*

*Garden Work, August 2, 1941*: "Tremendous enthusiasm was aroused amongst the visitors to the recent R. H. S. Show, by the marvelous array of *Hemerocallis* staged by Mr. Amos Perry. Never before<sup>1</sup> has so large a display of this flower been made at one time. It was variously reported to consist of anything from fifty to one hundred varieties, but probably the correct figure was somewhere between the two. This exhibit created a most glorious splash of colour, and most of the visitors were undoubtedly impressed by the wide variations in colourings to be obtained in these flowers—rich butter yellow, deepest sulphur, and through every imaginable shade of orange to coppery bronze, and there are even a pale pink, a deep chocolate brown and deep crimson varieties. This display will undoubtedly do much to popularise the daylily as a garden flower."

*Nurseryman & Seedsman (Editorial), July 24th, 1941*: "At the last show at the R. H. S. there was an outstanding exhibit of *Hemerocallis* staged by Perry, it contained about 100 varieties and ranged in colour from the pale yellow tones to dark bronzy reds. It must have been a surprise to many growers to find such a marvelous range of coloring due, I am told, to the influence of *H. fulva*. It is, however, more remarkable when one knows that Amos Perry started with two plants more than 40 years ago and is now able to give the trade such a feast of varieties."

"Mr. Perry deserves the highest praise for his work and the trade itself should not be unmindful of this fact for sure enough it will help to bring the day-lilies out of their obscurity and reveal them as worthy subjects for all gardens."

*Nurseryman & Seedsman (Report of show)*: "Perry's of Enfield had one of the most arresting exhibits of the show, a long table completely filled with *Hemerocallis* and embracing numerous distinct varieties, the seedlings being representative of many years of work by this Veteran grower."

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<sup>1</sup> This statement has reference to Britain. —*Ed.*

“It is said that this is the first occasion<sup>2</sup> on which this hardy plant, its blossoms featuring every imaginable shade of brown and yellow had been exhibited as a self contained group and it attracted very wide interest. Silver Gilt Lindley Medal.”

*Horticultural Trade Journal*: “Perry’s group of daylilies was a revelation; it contained over 140 varieties of which 100 were unnamed seedlings. This, so Mr. Perry stated, was the result of over 40 years intensive and painstaking work; rich yellow, dark crimsons, orange, copper, cream, primrose and flame shades were seen.”

*Gardeners’ Chronicle*, July 26, 1941: “Seldom, if ever, have so many daylilies (*Hemerocallis* varieties) and certainly never so many of such beauty, been shown as those arranged by Mr. Amos Perry, who filled a whole length of tabling with them. Of the many named sorts we specially admired *Bardeley*, of pale tangerine-orange colouring; *Helen Campbell*, clear yellow; *Hyperion*, lemon-yellow; *Rutilla*, reddish-brown; *Mabel Hibberson*, shaded with apricot and *J. D. Gaynor*, yellow. Along one side of the tabling Mr. Perry set out, on boards, single flowers of no fewer than seventy-five new seedlings, as yet unnamed. To those whose previous acquaintance of the daylily was simply that of a herbaceous plant useful to fill an odd corner, or to place in the shrubbery, these most delightful new seedlings must have been somewhat of a revelation, for they were of lovely shades of colour ranging from clear, sparkling yellow to rosy-ruby. Many of the flowers were larger than the catalogued sorts and possessed the added charm of broader, clearly defined “mid-ribs.” To bring such an exhibit to the show occupied probably two days’ time, but to be able to do so represents very many years of patient hybridizing, selecting AND discarding. An unusual exhibit demanded an unusual award, and this was given in a Silver-Gilt Lindley Medal, which is for exhibits of a plant or plants of special interest or beauty, or showing exceptional skill in cultivation and for educational exhibits. It is struck in bronze, silver and silver-gilt—the highest award is not lightly made.”

*Gardening Illustrated*, July 26, 1941: “In view of the remarks we made in Casual Commentary recently on the daylilies, it was most interesting to find that Mr. Perry had, what must have been the finest display of *Hemerocallis* ever given to the public. The exhibit comprised one hundred and twenty-three varieties, ranging in colour from the palest yellow, through tones of apricot, pinks and beige, to reds of bronzy or chocolate tones. It is now forty years since Mr. Perry began the improvement and development of this flower with two plants, and he is certainly to be congratulated on what he has achieved, and the award of a Silver-Gilt Lindley Medal—so rarely given to an exhibit—is some indication of what he has accomplished. A large number are, of course, still unnamed and show a variation not only in colour, but in shape, that is quite intriguing. Amongst the best of the named varieties was the free flowering, deep chrome-yellow *George Yeld*, with flowers six inches across; *Topaz*, a brownly-red; *Bronze Beauty*; *Semiramis*; the lovely chocolate-red *Rutilla*, and, of course, *J. S. Gaynor* and *H. fulva rosea*.”

<sup>2</sup>This refers to Britain. The first all-daylily show, National Daylily Show, was held at Orlando-Winter Park, Florida, April 18-19, 1940; the second, also at Orlando-Winter Park in 1941. —Ed.

## NATIONAL AMARYLLIS SHOW, ORLANDO, FLA., 1941

WYNDHAM HAYWARD, *Florida*

Featured by an outstanding exhibit of flowers of the newer Daffodil clones shipped by air express from Oregon, the Eighth annual National Amaryllis Show of the American Amaryllis Society was held March 29 and 30, 1940, in the greenhouse of the Mead Botanical Garden, Orlando—Winter Park, Florida.

The daffodils making the 3,000-mile cross country trip were from the Oregon Bulb Farms, Jan de Graaff, president. Mr. De Graaff sent a showing of some of his choicest new clones, including a number of the rare novelties with rose and pink-colored coronas or trumpets. The exhibit received an Award of Merit.

Judges of the show were T. H. Everett, horticulturist of the New York Botanical Garden, Howard Eric, New York business man and Amaryllis fancier, who traveled from New York to Florida specially for the event and Mr. E. L. Lord of Orlando, Fla. Mr. Eric was unable to attend the full judging on the opening day of the show because of acute illness.

R. W. Wheeler of Winter Park was show manager, and received the congratulations of the hundreds of Amaryllis fans and flower lovers attending for his success in arranging a highly colorful and distinguished exhibition during a difficult period of spring weather, which handicapped the showings of a number of the leading growers in the Southeast.

Mr. De Graaff's exhibit, which was the sensation of the displays, presented for the interested examination of the show-goers a large number of white and yellow daffodils of huge size and perfect form and texture, besides the pink, orange and rose-trumpeted types. Mr. De Graaff is a member of a family famous in Dutch bulb annals, and is a conscientious and finished plant hybridizer in his own right, as his entries demonstrated.

Among the Daffodil flowers in the Oregon Bulb Farms display were *White Wedgewood*, *Royal Sovereign*, *St. Egwin*, *Asmode*, *Shot Silk*, *Eve*, *Suda*, *Beersheba*, *Eskimo*, *Robert E. Lee*, *Daisy Schaffer*, *Batavier*, *Veronica*, *Sunfirm*, *Mme. Van Waveren*, *Amourette*, *Lady Kesteven*, *Elly Ney*, *Copper Bowl*, *Octavianus*, *Seraphine*, *St. Agnes*, *Jim*, *Sublime*, *Rosabella*, *Goldona*, *Mary Copeland*, *Red Cross*, *Mrs. R. O. Backhouse*, *Actaea*. With few exceptions the blooms arrived in fresh, perfect condition, and lasted well through the second day of the show.

Besides the daffodils, the Amaryllis hybrids and species and related subjects held their powerful and colorful sway among the benches. *Asparagus plumosus* was used to bank the rows of giant flowers on both sides of the greenhouse.

Two awards of Merit were made, one to Mr. De Graaff for his daffodil exhibit, and the second to R. W. Wheeler and John Springer for their joint display of hybrid Amaryllis of the fancy Dutch types. The Wheeler-Springer blooms received two first class certificates for outstanding flowers, both large reds. The "best bloom" award in the show

also went to a Wheeler-Springer entry. First prizes for the best grandiflora collection and the best decorative collection went to Wheeler-Springer.

The Wheeler-Springer exhibit also received the following ribbon awards for individual blooms in the various color classes: first place, 34; second place 16, third place 1. Other ribbon awards were as follows: Wyndham Hayward, first place, 10; second place, 2; third place 1; Frank Nasku, first place 3; second place 6; third place 1; E. A. Peterson, second place 2; L. S. Thornton, first place 2; second place 1; W. H. Barnsley, first place 1; M. C. Varnier, first place 1, second place 4, third place 1; William Cammack, second place 2; third place 3.

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### VISITS TO MIDLAND GARDENS

HAMILTON P. TRAUB, *Maryland*

During the latter part of June, the writer left Beltsville by auto for the University of Wisconsin. Traveling through Maryland, West Virginia and Ohio, via the historic Cumberland Trail made famous by the tragic expedition of General Braddock, he arrived at Zanesville, Ohio at the end of the first day. The next day he stopped off at Van Wert, Ohio to visit the garden of Mr. Wassenberg. The peonies and irises were gone, but the daylilies were just coming into their prime. This suggests at once that these two excellent garden subjects should be supplemented with daylilies. Mr. Wassenberg realizes this and is building up his daylily collection. He is especially interested in the recently introduced red clones.

At day's end the writer arrived at Evanston, Illinois, and the next day he arrived at the home of Mr. and Mrs. Elmer A. Claar, at Wilmette, Illinois, where he spent two most enjoyable days. At the Claar home he found a numerous collection of daylilies. Although it was at the beginning of the season, several fine clones were in bloom. Some of Mr. Claar's seedlings were also in bloom and they looked quite promising. Various gardens in the vicinity were visited, including the one of Mr. David Hall, who is doing some excellent daylily breeding work. The Garfield Park Conservatory was visited where he met Mr. Van Tress who, in cooperation with Mr. Koch, originated the outstanding Garfieldii hybrid amaryllis that are among the best of the forcing clones. Mr. Claar gave a private showing of his excellent technicolor movies of daylilies, irises and peonies. This was a real treat.

After a profitable two days at the Claar home, he set out for the University of Wisconsin and arrived at Madison the next day at noon. In traversing six states on his way from Beltsville—Maryland, West Virginia, Ohio, Indiana, Illinois and Wisconsin—he noticed the *Fulva Europa* daylily all along the route with only hollyhocks as a rule to keep it company. This again emphasizes the outstanding value of daylilies in American landscape plantings. Later in August, the chief attraction at Madison was the array of *Hosta* species that were at their best in total or partial shade.

In late August, the writer set out for home, but stopped over for a day at Milwaukee, as the guest of Mr. Hammersley, a good friend of the Society. He had the opportunity of seeing at close range the very excellent park system of the County and City of Milwaukee in company with Mr. Hammersley and Mr. Boerner, the park superintendent. The writer was especially impressed by Milwaukee County's Whitnall Park Arboretum. This is indeed an ideal place for one of the Society's trial gardens.

The writer had hoped to visit again at the Claar home, but unfortunately the time was too short, and he turned his course due East, and he reached Canton, Ohio on August 25, and the next day, via Pittsburgh and the new Pennsylvania Turnpike (speed limit 70 m.p.h.) he reached Beltsville in the late afternoon.

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#### AUTUMN AMARYLLIS SHOW, POMONA, CALIF., 1941

CECIL HOUDYSHEL, *California*

The National Autumn Amaryllis Show at Pomona, California, was held as usual in conjunction with the Flower Shows at the Los Angeles County Fair in the Agricultural Hall.

Agricultural Hall was a steel and concrete structure, 800 feet long and 135 feet wide. The roof was supported by steel cross beams. There were no supporting pillars within the floor space to intercept the view.

In the center was the Lily Pool. Along the sides of one end were the displays of the citrus Associations. In the center of this end were displays by various counties and communities as well as by individual nursery firms. The space from the Lily Pool to the main entrance housed the Floral Exhibits with several exhibits of gardens by nurseries who do landscape work ranged along the sides.

The dates assigned to the Amaryllis Show were Sept. 18 and 19. We were especially fortunate in having for Judge, Mrs. Maria Wilkes who has lived for years in Italy, South Africa and Southern California. She has studied amaryllids in their habitat and in the places where they are commonly grown. In her judging she showed exceptional discrimination, and unerring ability to select the best.

The Amaryllis exhibits occupied a table about 75 ft. by 6 ft. There were about 100 entries.

Only the most outstanding exhibits can be mentioned. The most outstanding of all was presented by the Las Positas Nursery of Santa Barbara. This was a vase of three huge stalks of *Haemanthus Katherineinae*, in perfect form. They showed a fine vase of their new hybrid *Nerine, Chameleon*, another of mixed hybrid nerines, two *Bomarea* species and others of special merit. Las Positas with only eight entries, won seven firsts and one second.

Mr. J. N. Giridlian, Oakhurst Gardens, of Arcadia showed the rare *Agapanthus pendula* with lovely deep purple pendulous flowers; *Amaryllis aurica*; *Hymenocallis Daphne*, and others. Mrs. Leonard Swets of Riverside showed beautiful flowers of *Vallota purpurea* in perfect form

and of superior size and color; a fine *Crinum* hybrid, *Amaryllis aulica* and others. Prize winning exhibits were also entered by Mrs. Leonard Slosson of Los Angeles and Mrs. Norma E. Cooper of Ontario. We entered about 40 species and varieties.

The Sweepstakes First Prize of \$25.00 was awarded to the writer. We won 21 Firsts, 8 Seconds and 1 Third. The Second in Sweepstakes and \$20.00 was awarded to Mrs. Leonard Swets of Riverside with 9 Firsts, 5 Seconds and 1 Third. The Third in Sweepstakes with \$15.00 in prize money went to Las Positas Nursery of Santa Barbara. The Fourth in Sweepstakes and \$10.00 was awarded to J. N. Giridlian, Oakhurst Gardens, Arcadia. The Fifth place with \$5.00 was won by Mrs. Leonard Slosson of Los Angeles.

Much interest was shown by visitors in the amaryllid exhibits. Several stated they were the most educational of all floral exhibits. The Fair was attended by over 800,000. It is probable that nearly 100,000 saw our exhibits.

We regret to record that the beautiful Agricultural Hall was destroyed by fire the morning following the close of the Fair.

## 2. COLOR DESCRIPTION

### COLOR PHOTOGRAPHY AND THE AMARYLLIDS

WYNDHAM HAYWARD, *Florida*

Color photography is a distinct art in itself, which has come within the reach of every flower lover in recent years as the result of the development of the miniature camera and color film at popular prices.

Photographing Amaryllis flowers and the blooms of all the vast number of related genera and species has proved a fascinating hobby for many amateurs, and an essential professional sideline for garden club lecturers, authors on garden subjects, and bulb specialists in general.

The popular Kodachrome color film in the 35 millimeter size is used by the average amateur and professional, although larger sizes of Kodachrome may be used with other cameras in the hands of expert photographers. This color film is a product of the Eastman Kodak Company of Rochester, N. Y., and is processed or developed by the manufacturer, to which the films are sent by the photographer after exposure.

The 35 mm. Kodachrome film may be used in any good "miniature" or "candid" type camera constructed for this purpose. Suitable cameras may be purchased in a number of makes at prices from around \$25.00 to \$500.00 or more. For \$50.00 or slightly less an excellent 35 mm. camera may be obtained that will give reasonably satisfactory results for the amateur.

For the beginner, the only additional equipment that is recommended would be a tripod and a portrait or "close-up" lens. The extra lens is required for special pictures desired at short distances. A tripod is helpful, but not absolutely necessary for good results. It enables the photographer to maintain the camera absolutely steady while taking color pictures, an important factor, as the color film is a "slow film," requiring a wider lens opening and a slower shutter speed than most ordinary black and white snapshot films.

Bright sunlight is an essential for taking good Kodachrome pictures unless special compensations for less light are provided. As this discussion is intended solely for the amateur, no mention will be made of such factors as color screens, filters, reflectors, flash bulbs, etc.

The flowers to be photographed may be arranged in a vase, or pictured just as they grow in the garden, or in a pot. The directions for regulating the camera for lens opening and shutter speed should be studied carefully, as regards various lighting. A light-meter will be a valuable aid in this regard, although not absolutely necessary for the beginner. The writer has found in Florida that most flower pictures in Kodachrome will come out well if taken in full sunlight, preferably from 10 to 11 o'clock in the morning, and from 2 to 3 o'clock in the afternoon, with a shutter speed of 1/50th. second, and a lens opening of 4 to 6f. In less light, the shutter speed may be slowed to 1/25th. of a second, and the lens opening increased to 2.9f.

Actual practical experience is the best instructor in acquiring a knowledge of 35 mm. color photography. A few rolls of the film will

usually be sufficient to acquaint the amateur with the best results that may be obtained in the technical setting of the camera lens opening and shutter speed. The portrait lens will permit close-up pictures of small flowers, up to a foot away, or even closer in the case of high priced equipment.

The loading and unloading of Kodachrome films in the ordinary miniature camera presents no problem to the ordinary amateur, and can be learned in a few minutes, along with the fundamentals of operating the camera. The light-meter will provide a ready guide for the best settings of lens and shutter in most cases, although rule-of-thumb procedure can be worked out by the individual with a little practice.

The films of Kodachrome are sealed and sent to the manufacturer for processing, and are returned in a few days in the finished state. Duplicate films may be obtained from the manufacturer, and color prints from the films, which latter are actually color transparencies, are also available from a number of processors. These color prints, when made from good transparencies, are brilliant and effective, although not all color film negatives will make good pictures. The cost of the color prints may be from 75 cents to \$25.00 or more, depending on the size and quality of the work.

The 35 mm. films themselves are roughly a little more than an inch square, and are usually quite satisfactory for viewing in ordinary daylight, when held up to the bright sky, or when shown on a screen in the dark from a projection machine. There are also small portable viewers which show the film enlarged and lighted from behind.

Even to the most blasé "black and white" photographer, the use of color films, especially in the photographing of beautiful flowers will bring a new thrill of pleasure and excitement. Hardly any other hobby, for so small an investment, can deliver such soul-satisfying ecstasy as the color camera in the hands of the ardent garden and flower enthusiast, with all of the artistry and practical significance that the individual cares to apply.

Every commercial grower knows the despair of trying to describe the bloom of a new or rare bulb or herbaceous plant to one who has never seen it. By the use of a single color film transparency, the problem is solved, and the particular flower is captured for all posterity to see. This is especially valuable for both amateurs and professionals who wish to preserve for their friends and customers the full beauty of one or more of their most choice specimens!

### 3. DESCRIPTION, CLASSIFICATION AND PHYLOGENY

VISITS TO GARDENS OF DAYLILY ENTHUSIASTS, 1941

ELMER A. CLAAR, *Illinois*

I still feel in the year 1941 as I did in the year 1940 that my notes and observations are highly presumptuous and I again wish to issue a few personal notes of warning to anyone who reads anything I write about flowers. I have some very definite prejudices about bloom and color. These will very likely be reflected in my notes.

Once again my observations about daylilies must be taken as from one who has seen only a few of them. One person cannot see all the new daylilies under present conditions. I missed many fine new ones and I have seen other fine things at a disadvantage. I had to hurry from garden to garden which is not conducive to thorough study. Also with my limited experience as a gardener and limited knowledge as a botanist, color specialist, entomologist, chemist, soil specialist, and at least thirteen other major subjects relating to daylilies, I reserve the right, upon acquiring additional facts and information about any one of these subjects, to change and amend anything that I say either now or hereafter about any of these subjects.

In the middle of July I took a trip to Nebraska to see the daylily gardens of the Sass brothers, and later during the same month I went to New England, New York, Washington, Maryland, and Ohio. At Lowell, Mass., I again saw the Fairmount Gardens of Mr. and Mrs. Nesmith. At New York I again saw Dr. Stout's work at the New York Botanical Gardens. At Hyattsville, Maryland, I saw Prof. J. B. Norton's daylilies. At Beltsville, Maryland, I saw Dr. Traub's daylilies. At Chevy Chase, Maryland, I saw Mr. J. Marion Shull's daylilies. At Dover, Ohio, I saw Charles Betscher's daylilies. At Wilmette, Illinois, I saw Mr. David Hall's and my own daylilies.

*Visit with Sass Brothers.* I first went to Nebraska to those plant wizards, the Sass brothers, Hans and Jacob Sass, who have been hybridizing various kinds of flowers as a hobby for years. They have been so successful with iris that they have won the Dykes Medal, the highest award given by the American Iris Society, twice. This year Jacob Sass' *Red Douglas* won the Dykes Medal, and Hans Sass' *City of Lincoln* won second place. I would rather have Jacob Sass' new *Golden Fleece* than any other iris that I am growing, or in fact, that I have ever seen. The American Peony Society this year has issued a new rating of peonies and among the highest rating you will find the Sass peonies, *Elsa Sass*, *Evening Star*, *Nebraska*, etc. Several individuals who are connoisseurs of Oriental poppies have told me that the Oriental poppy *Aksarben*, a Sass creation, is the largest and one of the finest that they know. This name was created by spelling Nebraska backwards.

Their wizardry is again demonstrated in daylilies. Jacob Sass has done no hybridizing of daylilies up to this time, but he said that the Sass theory of hybridizing is "to make a lot of crosses, thousands, and select the best seedlings and recross them." Through the process of hand pol-

lination and selected straight line breeding Hans Sass has, from *Hemerocallis citrina* and the Great Orange Daylily, *H. aurantiaca* var. *major*, which he bought from the Park Seed Company of La Park, Pennsylvania in 1908, created some of the best yellow daylilies available today. Hans says he believes the Great Orange Daylily is the true *H. aurantiaca* var. *major*, but Dr. Stout to whom he sent a plant claims it is not the true clone as it is slightly smaller.

I was already growing all of the daylilies introduced by Hans Sass, but I wanted to talk to Hans, Jacob, Henry, and all the rest of the Sass family and see their introduced varieties and seedlings in their home garden. It was Sunday when I arrived and I was fortunate enough to be able to spend the entire day with them. The plantings were in different places on the Hans Sass farm. He must have several acres of daylilies—literally thousands. I took a couple of hundred feet of Kodachrome moving pictures comparing various daylilies. I took pictures of Elsa Sass, Hans' wife, holding *Golden West* and seedling No. 67-40 for comparison, and pictures of Jacob and Hans standing beside daylilies that were two feet taller than they are. I took pictures of Henry Sass, one of Jacob's sons, comparing *Patricia* and *Hesperus*. I took pictures of Hans and Henry Sass comparing five daylilies, blooms of which I personally selected to satisfy myself that they were typical and growing under similar conditions. Here were: *Hyperion*, *Star of Gold*, *Hesperus*, *Patricia*, and *Moonbeam*. If you like a large star-shaped yellow, *Hesperus* will please you. The Sass folk believe it is their best. If you like a small flower with overlapping segments, you will like *Patricia*. We compared and photographed *Hesperus* and seedling No. 45-40, *Hesperus* and *Patricia*, *Patricia* and *Moonbeam* and seedling No. 82-40. The light cream *Moonbeam* is lovely. I shall soon see it blooming as a typical plant besides Mrs. Nesmith's lovely cream *Starlight* and Mrs. Popor's (Port Rose Gardens) *Old Ivory* in my own garden. All the Sass daylilies are yellow-colored. Hans Sass' introductions from the lightest to the deepest coloring, as selected by Henry Sass and myself, are: *Moonbeam* and *White Lady*, very light, *Sunny West*, *Golden West*, *Star of Gold*, *Hesperus* and finally *Nebraska* which is a cadmium yellow.

Hans Sass likes star-shaped daylilies. Therefore, you will find nothing but star-shaped daylilies in his introductions. Another characteristic that he emphasizes is floriferousness. It would be well if more of the hybridizers were to emphasize this quality. Although *Hesperus* is a large flower, many of the individual scapes had fifty or more flowers on each scape with many scapes on each established plant. This, of course, makes for a long blooming period and increases the desirability of the flower very much. *Hesperus* is the best daylily from the point of view of floriferousness that I have seen.

Henry Sass is interested in daylilies and is going to start hybridizing them. I predict that he will carry on the Sass tradition in a manner that will make both Jack and Hans proud. I did not meet the other Sass brothers for they were in the Army.

Before I went there I thought I would not care if another yellow daylily were ever introduced, but they had seedlings in yellow that would

make even me unhappy if they were not introduced. The one that most appealed to me is 45-40, a big flower with a clear color and overlapping segments, fuller but somewhat similar in shape to *Pink Charm*. It is definitely superior.

There is so much work to be done in acquainting the public with the new colors in daylilies, that when I returned home I sent the Sass brothers pollen from some of the rare reds, purples, raspberries and pink daylilies. I later sent them plants of a number of the rare colored clones. They were kind enough to send me all of their peony introductions that I was not already growing.

If I were to select only ten yellow daylilies from among the many that have been introduced I would have the Sass' *Moonbeam*, *Hesperus*, and *Golden West*. *Star of Gold* is also very good and so is *Nebraska*. I do not care much for the form of *Sunny West* but it is a prolific bloomer and very late. *White Lady* is a very light yellow-colored flower but smaller, and seemed to me the least desirable of all of their introductions. The Sass daylilies within their respective color range are superior daylily introductions, and culled from the thousands of Sass seedlings, they represent a tremendous amount of intelligent and careful work.

*Dr. Stout's Seedlings*. I visited Dr. Stout in July, 1941. He does not want any of his seedlings described or photographed before their introduction, inasmuch as this causes correspondence and inquiries that he does not have time to handle. Dr. Stout must have an acre or two of daylily seedlings back of the conservatory. I am growing all of his plants so far introduced. They are very superior and I shall always buy anything offered by Farr and Company who sell all of his introductions.

Dr. Stout is not only a pioneer daylily hybridizer, but he is one of America's most distinguished botanists. The beautiful clones *Rosalind* and *Chengtzu* were secured from China through the special contacts of Dr. Stout and the New York Botanical Gardens. His red introductions, *Wolof*, *Vulcan*, and *Theron* are all fine. Dr. Stout's bicolor *Festival* I like as well as any bicolor I have seen. *Linda* is a wonderful flower. *Patricia* is a trim little yellow with wonderful form but the branching could be improved. This year he introduced 20 new clones. I have all of them but have not seen any of them in bloom.

*Fairmont Gardens*. I was thrilled again this year at Mrs. Nesmith's Fairmont Gardens, Lowell, Massachusetts, when I saw the marvelous daylilies *Honey Red Head*, *Royal Ruby* and seedling No. 39-345. None of these have been introduced. *Honey Red Head* is a lovely flower with very good form—a golden throat, red segments with a prominent white strip down the center and a light edge around all of the segments. It's a honey. *Royal Ruby* is a marvelous flower. It has an intense glowing color that will be much sought after when the supply is large enough to introduce. I am growing it near Plouf's *Craemore Ruby* and Ralph Wheeler's *Ruby Supreme*. I am anxious to see how they compare. Seedling No. 39-345 is one of the very best of the new things that I have seen. It is a rich maroon color with a very white strip down the middle of the petals. I should like to compare it with Mr. Hayward's wonderful red *Emperor Jones* if they both bloom for me next year.

“*Gay Troubadour*” impressed me as one of the best bicolors. The sepals are a frosty maize yellow and the petals are bright Indian or cherry red, making a stunning contrast. Some day we will have a flower like this with better form, but to date I have not seen one so I bought it. It definitely shows its *Byng of Vimy* ancestry. *Dawn Play* is one of her very fine plants and in my yard it seemed similar to Dr. Traub’s *Wekiwa*. *Milady* seemed similar to Dr. Stout’s *Charmaine*. It reminds one of *Rosalind* with the deep rose throat removed. *Purple Elf* is a striking flower. It is a small maroon purple almost black with recurring segments. It must have *Hemerocallis multiflora* blood in its makeup. *Pink Charm* is a very fine pastel-colored flower with fine form. Mrs. Nesmith’s seedling No. 39-185 reminds me of *Circe* except that it is deep purple. *Morocco Red*, and *Purple and Gold* were fine. I didn’t see *Royalty*, *Bold Courtier*, *Petra*, *Persian Princess*, or *Sweetbriar*.

Of her introductions this year I thought *Black Falcon* was outstanding. In fact, it was the most impressive of all of the introductions that I have seen bloom this year. It is really a very deep purple. It is very large and has good form, which is unusual for a flower of this color. *Su-Lin* will especially appeal to the ladies. It has very delicate pastel coloring. The petals are light pastel pink which Mrs. Nesmith calls orchid. The sepals are a light yellow which she calls Chinese. It is a distinct color break. I have a seedling which looks very similar to it. I was disappointed with the form of *Torobred*. It may be that the flower I saw was on a plant that was too young. *Highland Chieftain* and *Piquant* are fine flowers whose color impressed me as leaning toward raspberry. I was disappointed in *Matador* for I expected it to be a deeper color, but Mrs. Claar and Mrs. David Hall both liked it, and of course there is a light-colored mahogany.

I purchased the following seedlings which I thought worthwhile: 41-119—a lovely burnt orange; 41-122—a multiflora with tubular segments and a peachy pink coloring; 41-125—I liked this very well; it is a pastel pink or faint fulvous coloring with recurring tubular segments; 41-133—it has deep dark red coloring and the petals have a white midriff most distinctive; 41-32—an impressive fire-red flower.

If I were asked to select the finest un-introduced seedlings that I have seen in bloom and were limited to ten, I certainly would include *Honey Red Head*, *Royal Ruby*, and seedling No. 39-345. I would also place *Black Falcon*, which was introduced in 1941, as very desirable. It must be remembered, however, that I have not seen in bloom many of this year’s introductions: none of Dr. Stout’s although I am growing all of them, and none of Dr. Traub’s and Mr. Wheeler’s although I am growing many of them.

*Washington, D. C. and Vicinity.* From Mrs. Nesmith’s I went to Washington, D. C. Mr. J. Marion Shull was kind enough to take me around the various daylily gardens in the suburbs of Washington. At the U. S. Horticultural Station, Beltsville, Maryland, we went to see the seedlings of Dr. Traub (on leave of absence at Wisconsin for the summer) who had moved 20,000 seedlings from Orlando, Florida, to Beltsville, Maryland. He has donated the surviving 20,000 seedlings to the U. S.

Department of Agriculture, and any seedling selected for naming from this lot will be introduced by the Department. I was late for this planting and saw only a few in bloom. I am growing nearly all of the seedlings that he has introduced but have seen only a few in bloom. I especially liked his *Wekiwa*. I saw the last bloom of his *Dr. Stout*. However, Mr. Shull said he did not think this one was a typical bloom.

At Mr. Shull's I saw the last bloom of *Musette*, one of Mr. Shull's introductions. It has good clear coloring and is exceptionally large.

From there we went to Prof. Norton's garden. Prof. Norton is connected with the Agricultural College of the University of Maryland. He has been hybridizing daylilies for some time. He sent me most of his introductions this year but I have not seen them in bloom. I was disappointed not to find Prof. Norton at home. I saw his *Mongol* in bloom and it was a gorgeous big yellow daylily in its home garden. I shall be glad when I can compare it with *Hesperus*, *Musette*, and orange-colored *Majestic*. I did not see his *Takoma*, *Mary Webster*, *Melo*, *Prince William* or *Woodridge* in bloom, but I am growing them so I will report on them later.

It is interesting to note the difference in blooming conditions in this district. At the U. S. Horticultural Station at Beltsville the plants were all through blooming. This was a typical planting such as you would find on corn land on a farm. The daylilies of Mr. Shull were through blooming with the exception of one flower, *Musette*. His garden is a typical city garden with trees, etc. Prof. Norton's garden is situated on the side of a beautiful ravine, and although only a few miles from these other growers, it seemed to me that his flowers were at the peak of their bloom.

*Visit with Mr. Betscher.* From Washington I went to Carl Betscher's at Dover, Ohio. He has, I would estimate, eight acres blooming in an open field. They are all yellows and oranges with very few of the fulvous type, and I saw no reds, pinks, raspberries, etc. I arrived at a time when the daylilies were in full bloom so this large mass planting made a very impressive sight. I had a great deal of pleasure in looking over these plantings and talking to Mr. Betscher. After looking through his seedlings, I believe that among the summer bloomers the plant I like best of all is *Anna Betscher*. This is also his choice. His *Earlianna* is the best early blooming flower that I have seen. It blooms at the time of the iris. His *Glorianna* is the largest intermediate orange that I have seen. If I had to select the three finest flowers in Mr. Betscher's garden it would be these three. Inasmuch as I did not see any red, pink, cream, purple, or raspberry daylilies, when I returned home I sent him some pollen from these types.

*Millroad Gardens.* In Chicago the Millroad Gardens, just outside of Lake Forest, has quite an extensive planting of daylilies in charge of Dr. E. J. Kraus of the University of Chicago; it must be over an acre but I did not see any of the newer varieties, with the exception of *Sunny West*.

*David Hall Gardens.* Mr. David Hall, my fellow-townsmen of Wilmette, Illinois, had over a thousand daylily seedlings last year and he discarded all but three. He had one plant which I can describe best by saying it is an improved *Taruga*; this seedling Mr. Hall says bloomed over

two and one-half months for him. Two years from germination this plant, seedling *No. 39-2*, sent up 13 scapes. The petals are long, smooth, narrow, and noticeably twisted and pinched at the end. The color as compared to *Taruga* is a deeper yellow. Another of his seedlings, *No. 39-30*, is a full round flower of a deep rich yellow with a velvet finish and very wide petals. It has unusual substance. It is not overly-prolific but it is a fair doer. His seedling *No. 39-7* is a full round flower, heavily ruffled, medium yellow, exceptionally well branched. Among his 1941 seedlings the one I liked best is his seedling *No. 41-05*, a very vigorous plant 54 inches high with blooms 8½ inches across. It is a rosy-red bicolor. The petals are long and twisted. The sepals are rosy-red and the petals yellow with an overflush of pink. It bloomed in late August. It is shaped like *Rosalind* but much larger. Seedling *No. 40-03* is a combination of yellow and pink. *No. 41-05* and *No. 40-03* are both *Rosalind* seedlings.

*My own seedlings.* Among my own seedlings I saw a number of new things which agreeably impressed me, but heeding Mr. Lasman's warning that "each breeder is apt to think his duckling is a swan," I have decided to wait at least another year before describing any of them.

#### RANDOM OBSERVATIONS AND DESCRIPTIONS OF DAYLILIES

J. MARION SHULL, *Maryland*

An opportunity to observe daylilies blooming out of season in the greenhouse during the past winter, and to compare them with the same varieties blooming in their normal season out-of-doors, was afforded by material brought by Dr. H. P. Traub from his Florida plantings for re-establishment at Beltsville, Maryland in the autumn of 1940. Under the double abuse of out-of-season planting and subsequent severe drouth it has not been possible to carry on observations on the extensive scale originally projected, but enough material blooming under glass during February to April was paralleled by field-grown specimens of the same varieties blooming in July and August to warrant recording here.

By and large it may be said at once that no significant differences of color were found as between flowers of the same variety winter-grown under glass and those blooming in the summer garden. In fact such differences as were recorded were not greater than occur from day to day in the same plant in many varieties.

Daylily flowers fluctuate from day to day within narrow ranges both in color and size though the reason for such fluctuation is not always apparent. Size may be influenced by several factors such as soil moisture, temperature, kind and duration of light, all of which are unpredictably variable. What affects the color, bright one day and muddy another in some of the blends; brighter some whole seasons than in others, is more obscure and would be difficult to determine with any certainty. More than that there may be regional variation by reason of climatic and soil differences whereby a variety may be highly meritorious in one and relatively worthless in another region, and so the following notes and descriptions will not attempt to say of a variety it will do thus and so throughout our wide flung country—only that it appeared thus and

so in my garden at Chevy Chase or as seen in the field at Beltsville, Maryland, and at the particular time of observation.

I have had an opportunity to see a number of newer things, mostly from the productions of Dr. Traub, a few of which I shall describe in some detail concerning the flower though many were not yet well enough established to warrant report on stem and foliage characters or general habits. But before I report on these newer things let me say that I am not disposed to disparage older varieties merely because they are old and have become abundant and widely distributed. In my garden, located on the edge of the piedmont, such older varieties as *Ophir* and *Sir Michael Foster* are still among the finest yellows to be had. *Calypso* too, despite its night blooming, is a fine thing forenoon and evenings, and of course for taking into the house at night when most daylilies are quite useless.

FULVA ROSEA ROSALIND I have had growing under unusual circumstances, first transferred from greenhouse to garden in early May while in bloom and thus affording pollen for mating with *H. Middendorffii* and *H. minor*. The same plant then brought a second flower stem in September and is still blooming in mid-October as these notes are being written.

Using Ridgway "Color Standards and Nomenclature" *Rosalind* may be described as petals Jasper Pink and sepals Jasper Red, with moderately conspicuous eye-zone of Nopal Red surrounding a relatively small throat area which is more green than yellow. Form somewhat irregular, sepals much recurved, petals not. Petals twisty with curled or crimped margins. Filaments go from light green at base through yellowish to petal color in outer third. Reverse of flower light greenish at base, passing through Light Ochraceous-Buff to Orange-Vinaceous in broad petal margins.

In description of certain varieties the reverse color is of great importance but this will be discussed in more detail in connection with such varieties as *Emperor Jones* and *San Juan*.

DR. STOUT. Ground color Cadmium Orange overlaid and flecked with Brazil Red. Eye-Zone also Brazil Red but more closely applied, is not very conspicuous. Throat Orange becoming greenish at center. Filaments Orange. Petals show a fairly prominent Deep Chrome midrib. Reverse solidly Capucine Yellow. Segments much recurved.

VICTORY TAERHCHWANG is practically a red self. Ground color is Nopal Red and Garnet Brown with the eye-zone only slightly darker to Van Dyke Red and not conspicuous. All six segments display contrasting midribs of the throat color, which is Deep Chrome. Throat greenish toward the center. The regularity of this flower, with the radiating midribs, presents a starry appearance that is very pleasing. A handsome flower of only medium size but is reputed to be very free blooming.

GEORGE KELSO is a bicolor in which the outer half of petals is Mars Orange to Burnt Sienna with conspicuous yellow midrib. Prominent eye-zone is near to Garnet Brown. Sepals are Empire Yellow slightly overlaid with streakings of Burnt Sienna. Throat Greenish Yellow to Empire Yellow next the eye-zone. Filaments are Deep Chrome; pistil

lighter. A very striking flower with a spread of  $5\frac{1}{2}$  inches, somewhat recurved. With petals  $4 \times 1\frac{1}{2}$  inches and sepals  $4 \times 1$  inch there is good fullness and the reverse color all Empire Yellow gives a pleasing color mass not always to be found in bicolors.

CECIL HOUDYSHEL. A star-shaped self of medium size. Color mostly Dragon's-Blood Red deepening slightly to a hardly noticeable eye-zone of Pompeian Red. Sepals are narrowly margined yellowish corresponding to the Light Orange Yellow of the reverse. Throat is small, greenish Light Orange. Filaments bronzy in outer three-fifths. Style pale yellow.

WEKIWA is a near self with Brazil Red petalage and Capucine Yellow throat. Eye-zone darker to about Garnet Brown but is not conspicuous. Flower wide-spread to  $5\frac{1}{2}$  inches, somewhat irregular as in its parent, *Waubun*. General effect is orange red. A rather bright and cheery color.

CORINNE ROBINSON, a pinkish salmon self of good size, 5 inches across, slightly irregular with the upper portion well recurved. The Congo Pink of petals and Flesh-Ochre of sepals are so closely related that for practical purposes the flower is a self. Throat is Empire Yellow deepening to Sulphine Yellow at center. Throat color extends to about the center of petal where it becomes an inconspicuous midrib only slightly lighter than the petal body color. Veining on petals is a trifle darker than Congo Pink but is delicate and unobtrusive. Filaments greenish at the base, then yellow of the throat, passing gradually to petal color near the anthers.

Flower star-shaped, petals  $3\frac{5}{8} \times 1\frac{1}{8}$  inches; sepals  $3\frac{5}{8} \times \frac{5}{8}$ . Reverse of sepals and median portion of petals about Antimony Yellow. Petal margins stained through to near Pinkish Cinnamon. A very attractive soft color, the general effect being a little on the pinkish side of salmon.

FIRE RED. Grenadine Red in outer portion. Brazil Red eye-zone. Petals with strongly marked orange midrib. Throat orange to greenish, not large. Reverse Orange to greenish at base, filaments rufous in outer half, pistil only slightly so. Flower rather irregular and considerably recurved. General effect deep reddish orange somewhat deeper toned than *Rajah* but with much less prominent eye-zone.

SAN JUAN, a Morocco Red self varying lighter and darker to Garnet Brown but a somewhat livelier color than these as presented in Ridgway.

There is no definite eye-zone but there is a lighter though not conspicuous midrib. Throat Wax Yellow through Greenish Yellow to Yellow Green at center. Filaments the same except that the outer third is tinged with petal color. Reverse Empire Yellow with Morocco Red stained through toward the margins, greenish at base. Flower is therefore very definitely two-faced as in *Radiance* rose, entire outer or reverse surface predominantly yellow and in strong contrast with the rich red face. Flower 5 inches across, well recurved and nearly regular. This is possibly the best red to date though owing to reduced yellow pigment the light green throat is in almost too great contrast with the deep red surrounding it.

Seen from behind, the flower is not an effective red and for this reason will best be planted up against border shrubbery or a wall so that all flowers will naturally turn in one direction and toward the observer. This planting note is equally cogent with such other double faced varieties as Hayward's *Emperor Jones* with its very deep brownish, almost purplish red.

EMPEROR JONES, originated and introduced by Wyndham Hayward, is mostly Victoria Lake, a dark brown-red, to about Ox-blood Red at margins. There is a prominent midvein which extends the Deep Chrome of the throat to the apex of the petals but only faintly present on sepals. Extreme center of throat is greenish. Filaments are Deep Chrome to near Sanford's Brown in outer half. Reverse of petals shows a center stripe of Light Cadmium broadly margined with near Burnt Sienna. Sepals Orange overlaid with Burnt Sienna. Petals  $3\frac{1}{2} \times 1\frac{1}{4}$  inches; sepals  $3\frac{1}{2} \times 13/16$  inch. Flower somewhat irregular, much recurved. From behind it is brighter than *San Juan* but is also only really effective when seen from the front and should be planted to secure this point of view.

FRED HOWARD presents a different aspect from most varieties carrying the same or similar colors. The throat is not so definitely delineated. It is greenish at center to Lemon Yellow. This throat color passes almost imperceptibly to an overlay of Orange Rufous gradually deepening through Mars Orange to nearly Mahogany Red at petal tips. Sepals follow the same order but are not quite so deep toned. Both petals and sepals have a rather broad but not very sharply defined midrib of the underlying Lemon Chrome. Reverse of flower is lighter but also shifts very gradually from the greenish base to Antimony Yellow and near Tawny.

RUSSELL WOLFE is another of the double faced varieties, somewhat larger than *San Juan* but not quite as dark, and the transition from throat color, which is Lemon Yellow with green in the center, to the outer portion of the flower is less abrupt than in *San Juan*. It may be classed as a nearly red self, petals Brazil Red to near Ox-blood Red. Sepals Dragon's-blood Red with yellow underlay. Reverse of sepals is Apricot Yellow at tips lightening to Baryta Yellow and tinged greenish toward the base. Petal reverse, yellow as in the sepals but broadly margined Garnet Brown. Flower wide-spread, somewhat irregular, with eye-zone hardly noticeable.

My notes indicate this variety as an early quitter, perhaps partly night blooming. By mid-afternoon the flower was appreciably spent while *Indian Chief* and *San Juan* were still in prime condition.

ROUGE VERMILION. Nopal Red varying slightly lighter and darker with moderately conspicuous eye-zone of near Garnet Brown. Throat and base of filaments about Pyrite Yellow (greenish) and outer part of filaments near same color as segments.

Outer aspect of the flower is greenish yellow at base passing to yellow in middle portion of segments but margined Carnelian Red, broadly on reverse of petals, narrowly on sepals. Segments  $3\frac{1}{2}$  inches long but narrow. Petals  $\frac{7}{8}$  inch wide and sepals scarcely over  $\frac{1}{2}$  inch. Sepals

are much recurved, petals only slightly so, with the lower one strongly projecting, resulting in a decidedly triangular face. A bright cheerful red of medium size and near self.

**GOLDEN GLOW.** Though Dr. Traub's chief interest in reds and in pastel colors has been amply indicated in those of his introductions already described, varieties wherein red of one sort or another is a dominant constituent, the story would be incomplete without including a couple of outstanding things not in this category. *Golden Glow* is a fine yellow self of very heavy substance. The color is Light Cadmium Yellow with flashings of Cadmium Yellow, the exterior or reverse essentially the same. Expanse 5 inches. Petals broad,  $3\frac{3}{4} \times 1\frac{5}{8}$  inches, somewhat twisted toward the apex. Sepals  $3\frac{3}{4} \times \frac{7}{8}$  inches, much recurved but not twisted. This gives the flower a decidedly triangular cast as seen from the front. While *Golden Glow* is in a color field where there is intense competition it is nevertheless outstanding by reason of fullness of flower and heavy substance.

**THEODORE MEAD** is a little deeper in color than the preceding, a very intense self between Cadmium Yellow and Orange. Both petals and sepals are long and twisty and of very heavy substance. A very interesting novelty, quite irregular in form or even bizarre. Longest measurement as naturally standing 6 inches to tip of long-thrusting lower petal.

\* \* \* \* \*

Another year it is hoped that all these and many more may be seen in fully established growth that will supply dependable data on foliage and stem characters as well; also relative time of blooming, all of which had to be passed over for the current year. Then it should be possible to fill out complete data cards for permanent record.

### SOME DAYLILIES I LIKE

DAVID F. HALL, *Illinois*

In writing this article I wish the readers to understand that I have not by any means seen all the good daylilies in commerce or many of the fine ones as yet to be found only in hybridizers' gardens. I wish also for them to bear in mind that we differ, sometimes widely, in our likes and dislikes of daylilies as well as many other things and I can only choose those I have seen and that appeal to me.

I have been breeding iris for the past twelve years and found quite a gap between the end of the iris blooming season and fall. In looking around for something to fill in I chose the daylily as offering alluring possibilities for improvement. It has charm, hardiness, easiness of culture and is useful in gardens in all sections of the United States. I do not know of another beautiful flower that can be successfully grown in Florida, Minnesota, Southern California, and Maine without special attention and care.

## YELLOW DAYLILIES

There are so many yellows on the market which are so similar that it is difficult, and in many cases impossible, to distinguish between them. However when we consider the great increase in demand for daylilies and the fact that they increase slowly in comparison with most perennials this flood of yellow introductions may be useful in making our gardens colorful and cheerful until there is available in sufficient quantities and at low cost a dozen or more of the finer ones. The less desirable ones will then gradually fade from the picture.

I do not feel that we have all time daylilies in any color class. Hybridizers are developing better flowers right along and undoubtedly will continue to do so long after we have sprouted wings. There is not only a great range of colors not yet attained, but also better stalks, substance, texture, ability of flowers to last throughout the day without fading, and better branching, resulting in more flowers to a stalk, are in the offing.

I believe many hybridizers have not placed enough emphasis on good branching. Many daylilies producing very attractive flowers are poorly branched—with better branching they would produce more flowers and in many cases continue to bloom over a longer period of time.

I have a yellow seedling that is exceptionally well branched and produces up to fifty-four flowers to a stalk. They measure seven inches across, and have a very attractive golden yellow color but by noon the flowers have faded to an unattractive shade and it therefore has no commercial value. But hybridizers will undoubtedly shortly produce clones with similar branching and number and size of flowers in attractive colors that do not fade badly.

*Hesperus* (Sass) is my favorite yellow. It is a bold, free blooming, very large flowered medium yellow, well branched and carrying many wide petaled semi-flaring flowers, on stalks forty-five inches tall that do not require staking.

*Nebraska* (Sass) is my second choice. It also has large open flowers on forty inch stems. The color is Cadmium yellow with an apricot flush.

*Golden West* (Sass) is about the size and color of *Ophir* (Farr) with a more open flower, on a much better branched stem and carries many more flowers than *Ophir*.

The greenish yellow of *Hyperion* (Mead) never appealed to me very much although it is popular with many people and is easy to grow and a free bloomer. I like the large and gaily colored *George Yeld* (Perry) and *Mikado* (Stout).

I also like the deep golden yellow of *Mrs. A. H. Austin* (Betscher). The color does not fade as readily as most deep yellows and it is a free bloomer.

*Moonbeam* (Sass) is a tall growing creamy yellow and as near white as any day lily I have seen, and is fine in every way.

## REDS

*Festival* (Stout) The large open flowers are a combination of red, brown, and orange. The general effect is a very pleasing rosy red bicolor. The many flowers are carried on a forty-five inch unusually well branched

stem that does not require staking. It blooms freely over a very long period of time and is a grand daylily.

*Massasoit* (Nesmith) Grows five feet tall, the form and size of the flowers is similar to *Festival*. The color is reddish copper, nearly a self, is lustrous, showy and a strong grower, I like it very much.

*Dawn Play* (Nesmith) is a rosy red with a small golden heart. It is a large, well formed, sprightly flower, very fine.

*Matador* (Nesmith) A rich light mahogany, almost a light crimson red, a very attractive color. The sepals are a few shades lighter than the petals. It is a full cup shaped flower on a thirty-eight inch stem. *Matador* gives a much redder effect than *Festival* or *Massasoit* and is a fine addition to our reds.

*Emperor Jones* (Hayward) is a very dark blackish-maroon, striking in color. The flowers are of good size, open widely, and have a light stripe in mid-petal.

*Wekiwa* (Traub) is a well formed open flower of good size. The color is a dark red, a fine daylily.

*Wolof* (Stout) A good sized flower of dark maroon with an orange throat and a light yellow midrib. It has some brown overlay that dulls it a little, but it attracts a lot of attention.

*Black Falcon* (Nesmith) I have not seen *Black Falcon* growing but have seen Kodachrome pictures of it and have talked with competent judges of daylilies who proclaim this the largest and finest very dark daylily they have seen. The color is a dark maroon purple almost black, with a canary yellow center. It grows forty inches tall.

*Leonian Seedlings*. I saw about a dozen selected red seedlings of Dr. Leonian's this year, they covered quite a range of colors from dark red to nearly black. Some were quite attractive in color. All were one year plants, so I couldn't judge size, height or branching. Hybridizers are after a good bright cherry red self and if it hasn't already arrived it is about due.

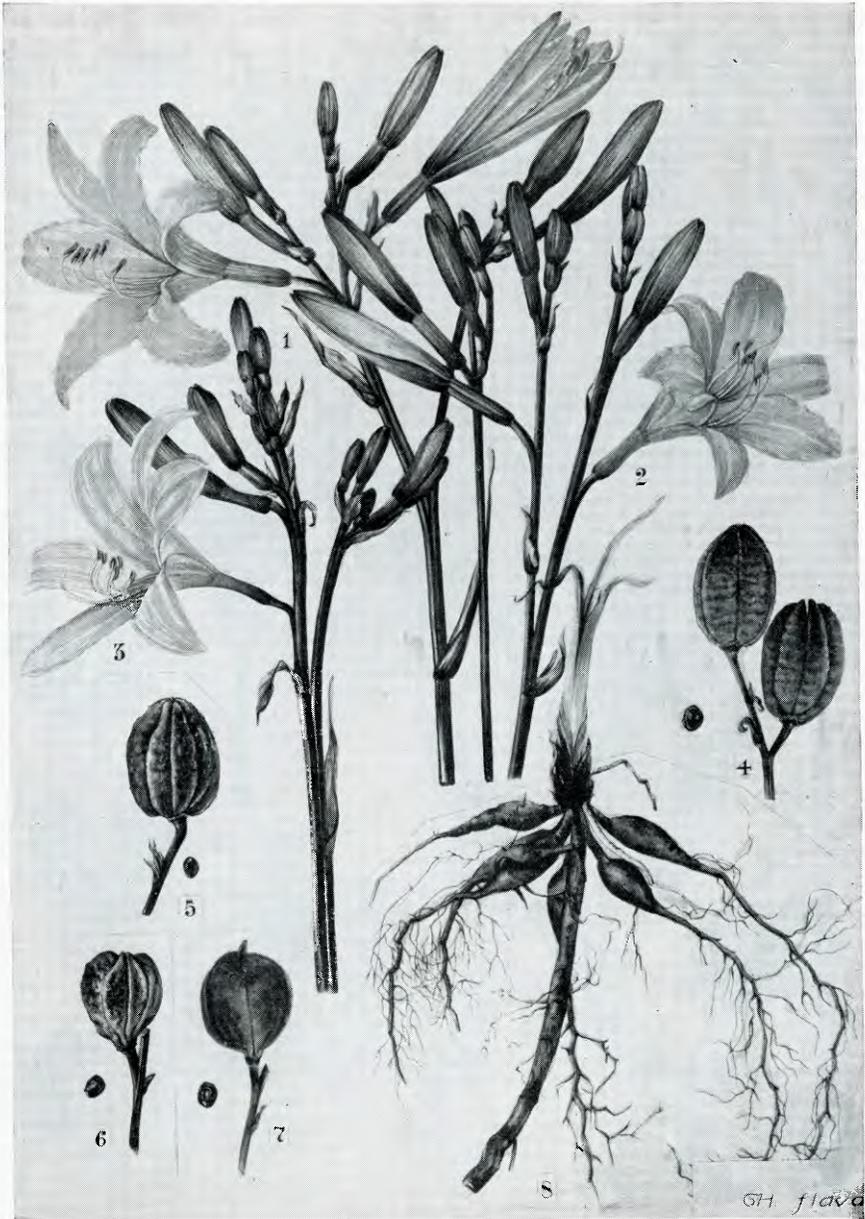
*Claar Seedlings*. Mr. Elmer Claar of Illinois last summer bloomed an astonishing number of nice reds, most of them of medium size and height. A number of them were nice sprightly reds, his *No. 39-4* appeared to be the best of the lot.

*Fulva Rosea* is producing many good reds as well as near pinks. I have crossed it with a number of the Sass giant yellows and expected the first generation to be dull faded looking pinks, but was surprised to find some good large, rosy red flowers on the order of *Festival* and *Massasoit*.

#### PINK TONES

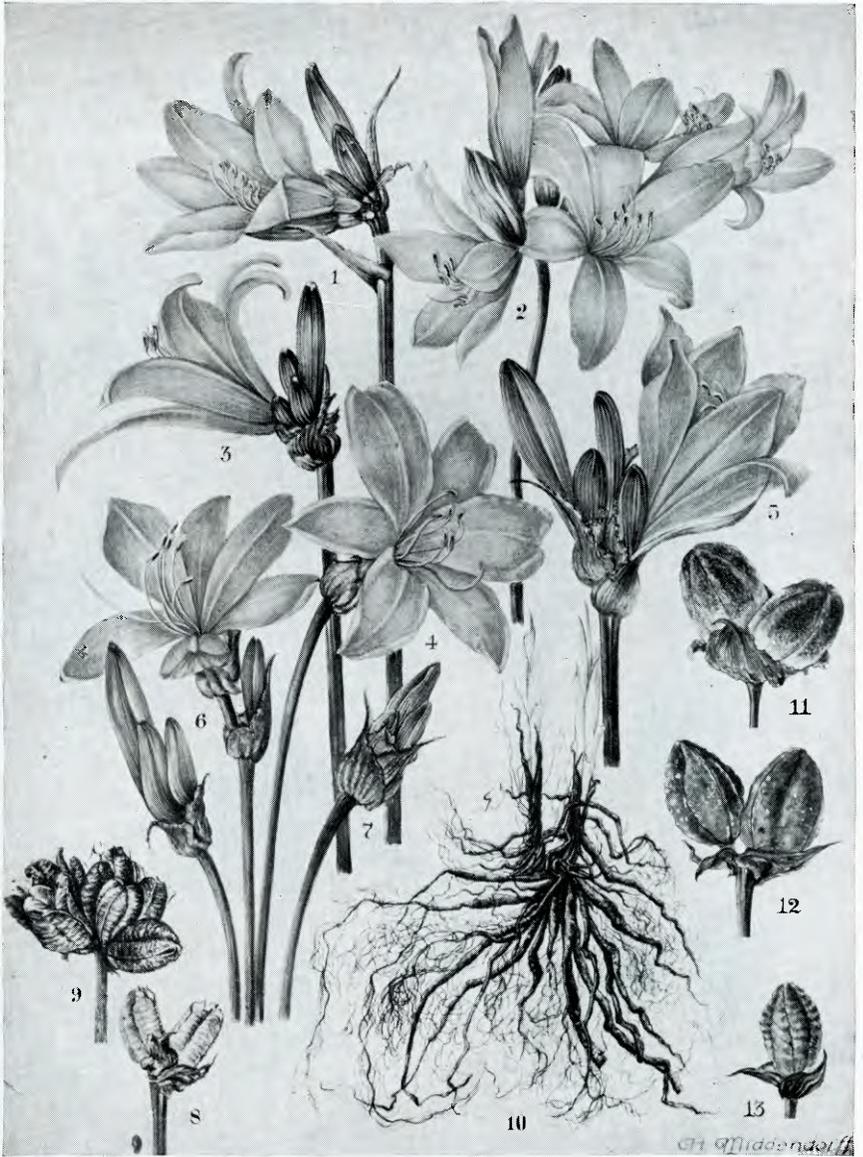
*Fulva Rosea* The ancestry of most, if not all pink toned daylilies, can be traced back to *Rosea*. It is a hardy, free blooming species, increases rapidly, sending out runners, a habit that is inherited by a few of its offspring. The flowers are a rosy pink, rather narrow petaled and long. The willowy stems are forty or more inches tall and quite well branched. It gives a bright color note in the garden.

*Heather Rose* (Nesmith) is a large open flower of good form and substance. The color, a soft or subdued pastel pink, fades rather quickly and



See page 69.

*Hemerocallis flava*  
Reduced Plate from forthcoming Stout monograph



See page 69.

*Hemerocallis Middendorffii*  
Reduced Plate from forthcoming Stout monograph

should be planted in partial shade. These soft pastel pink shades are popular with many ladies, but do not appeal to me very strongly. I believe *Heather Rose*, which is my choice of all pink toned daylilies I have seen, and other similar pinks, are but forerunners of more sprightly, deeper, richer toned pinks, that will shortly appear in the gardens of many hybridizers.

*Piquante* (Nesmith) has some attractive soft pink or raspberry tones. The flowers are of medium size with wider petals than sepals and are well carried on forty inch stems. It is a good daylily in this color class.

*Linda* (Stout) is a nicely formed large full flower. The yellow petals are flecked with rose and cinnamon, giving the flower a pink tone that is very pleasing. It is a strong grower and a free bloomer. It is a very fine and popular daylily.

*Claar Seedlings*. Mr. Claar last summer had about a dozen nice pale pink toned seedlings on the order of *Heather Rose* and a number of very large, full petaled open flowers that are hard to classify as to color. They are between the pinks and the reds, and carry terra-cotta and henna shades. They are very attractive and appealed to me immensely. Mr. Claar has for several years been securing pollen from Mr. Hayward of Winter Park, Florida from large late-blooming daylilies and using it on early blooming varieties in Illinois, hoping to produce larger flowered early bloomers and in a greater variety of colors. Several seedlings that bloomed early last spring looked very encouraging. They will have to be observed for a few years to see if they continue to bloom in late May or early June in Northern Illinois. There is a possibility that they "just got" their blooming dates mixed last spring.

#### MEMORANDUM ON A MONOGRAPH OF THE GENUS *HEMEROCALLIS*

A. B. STOUT,  
*The New York Botanical Garden*

A folio monograph devoted to the genus *Hemerocallis* is now in the late stages of preparation. As now planned this volume will consist of 24 colored plates 11 by 15 inches in size, about 25 pen sketches, and at least 90 pages of text.

The plates portray in true colors and in natural size or in one-half natural size the flowers (a) of the known species of *Hemerocallis*, (b) of certain species that are to be described as new, (c) of the best of the older horticultural clones, and (d) of the most important of the new types recently developed by hybridization and selective breeding. For most of the species there is an entire plate which shows the natural variations in the flowers, the character of the flower buds, the branching of the inflorescence, the capsules, and, in various cases, the roots. Photographs of three of the plates are herewith shown in Plates 206, 207 and 208. Pen sketches, all made to the same scale, show the habits of growth and the relative sizes of entire plants that are typical for the species and for the range of growth-habits in the horticultural clones. The text is a botanical



See page 69.

*Types of Hemerocallis fulva; cultivated and wild*  
*Reduced Plate from forthcoming Stout monograph*

and horticultural discussion of the genus based on studies (a) of the literature, (b) of specimens in the most important herbaria of Europe and America, (c) of living plants in European Botanical Gardens, and (d) of the extensive collection of living plants assembled at The New York Botanical Garden.

The matter of the publication of this volume has been considered in a preliminary way. A well-bound folio of the character contemplated can be published at lowest cost by advance subscription. It now seems that the subscriptions of 300 sponsors at a cost of approximately \$60.00 each would ensure the printing of an edition of at least 500. If a larger edition could be printed and sold a profit would accrue which might constitute a revolving fund for the publication of other folios of similar character. On the basis just outlined the publisher would receive no profit except an "overhead" percentage for actual expenditures. It may be emphasized that patron subscribers would not, in the strict sense, be subsidizing the publication beyond the purchase cost of a volume which each would possess. Yet the advance subscriptions would make the publication possible and in recognition of this the list of patron subscribers could be printed in the edition.

## EVALUATION OF DAYLILIES FOR NORTHERN FLORIDA

JOHN V. WATKINS,  
*Assistant Professor, Horticulture,*  
*University of Florida*

[*Editorial Note.*—*This report by Prof. Watkins is a landmark since it is the first comprehensive regional evaluation of daylilies using the official scorecard, and indicating the ratings on a numerical basis. Similar evaluations are needed from other climatic regions. Such regional evaluations will serve as a fitting background for the evaluation of daylily clones on a continental basis by a committee of specialists. Prof. Watkins is congratulated on his pioneer work. —H. P. Traub.*]

These evaluations are based on observations and data taken in the Daylily Display Garden of the University of Florida. While all of these ratings are solely the author's, they have been arrived at with a great deal of thought and deliberation and are greatly influenced by the reactions and remarks of fellow staff members and the many gardeners who visit the Display Garden annually. In arriving at the numerical values given the official score card for rating daylily clones on page 126, 1940 HERBERTIA, was used.

### 1. SPECIES

<i>Species:</i>	<i>Rating:</i>	<i>Species:</i>	<i>Rating:</i>
<i>Hemerocallis multiflora</i>	-----7.0	<i>Hemerocallis aurantiaca</i>	-----9.9
<i>Hemerocallis minor</i>	-----9.6	<i>Hemerocallis Forrestii</i>	-----7.7
<i>Hemerocallis flava</i>	-----7.0	<i>Hemerocallis nana</i>	-----7.0
<i>Hemerocallis citrina</i>	-----7.0	<i>Hemerocallis Dumortierii</i>	-----7.7
<i>Hemerocallis serotina</i>	-----9.6	<i>Hemerocallis Middendorffii</i>	-----7.7

## 2. CLONES IN COMMERCE FOR MORE THAN THREE YEARS

<i>Clone:</i>	<i>Rating:</i>	<i>Clone:</i>	<i>Rating:</i>
<i>Ajax</i> -----	8.0	<i>Golden Dream</i> -----	8.6
<i>Alba striata</i> -----	7.9	<i>Golden Mantle</i> -----	8.8
<i>Amaryllis</i> -----	8.5	<i>Golden West</i> -----	9.0
<i>Apricot</i> -----	7.8	<i>Goldeni</i> -----	8.0
<i>Aurantiaca major</i> -----	9.9	<i>Gracilis</i> -----	8.0
<i>Aureole</i> -----	9.9	<i>Guisseppi, Cissy</i> -----	7.0
<i>Aurillo</i> -----	8.0	<i>Gypsy</i> -----	8.0
<i>Austin, Mrs. A. H.</i> -----	9.0	<i>Hankow</i> -----	8.0
<i>August Pioneer</i> -----	7.8	<i>Harvest Moon</i> -----	9.0
<i>Bardeley</i> -----	7.8	<i>Hippeastrum</i> -----	7.0
<i>Baroni</i> -----	7.4	<i>Hume, Emily</i> -----	9.9
<i>Bagdad</i> -----	9.7	<i>Hyperion</i> -----	9.9
<i>Bay State</i> -----	8.2	<i>Imperator</i> -----	8.0
<i>Betscher, Anna</i> -----	9.3	<i>Kwanso</i> -----	7.7
<i>Bijou</i> -----	9.3	<i>Kwanso Variegatus</i> -----	7.0
<i>Boutonnierre</i> -----	7.8	<i>Ladhams, B</i> -----	7.0
<i>Bowles, E. A.</i> -----	8.8	<i>Lady F. Hesketh</i> -----	7.0
<i>Brownie</i> -----	7.9	<i>Lemon Queen</i> -----	7.0
<i>Burbank</i> -----	7.0	<i>Lemona</i> -----	7.0
<i>Burmah</i> -----	7.0	<i>Linda</i> -----	9.6
<i>Byng of Vimy</i> -----	8.0	<i>Lovett's Lemon</i> -----	8.0
<i>Calypso</i> -----	7.9	<i>Lovett's Orange</i> -----	8.0
<i>Chengtu</i> -----	8.0	<i>Luteola major</i> -----	8.0
<i>Chisca</i> -----	9.8	<i>Luteola palens</i> -----	8.0
<i>Chrome Orange</i> -----	8.8	<i>Mandarin</i> -----	7.0
<i>Cinnabar</i> -----	9.1	<i>Mann, Mrs. J. R.</i> -----	8.0
<i>Citronella</i> -----	7.0	<i>Marcus</i> -----	7.8
<i>Crawford, J. A.</i> -----	8.0	<i>May Morn</i> -----	8.8
<i>Cressida</i> -----	8.9	<i>Midas</i> -----	7.0
<i>Curlypate</i> -----	7.7	<i>Mikado</i> -----	9.9
<i>Dauntless</i> -----	9.9	<i>Miranda</i> -----	8.8
<i>Dawn</i> -----	7.0	<i>Modesty</i> -----	7.9
<i>Dazzler</i> -----	7.0	<i>Moonstone</i> -----	7.0
<i>Domestico</i> -----	9.9	<i>Mulleri</i> -----	7.0
<i>Dwarf Yellow</i> -----	7.9	<i>Nocerensis</i> -----	7.0
<i>Eldorado</i> -----	8.0	<i>Ochroleuca</i> -----	7.0
<i>Estmere</i> -----	8.0	<i>Ophir</i> -----	9.1
<i>Europa</i> -----	9.8	<i>Orangeman</i> -----	7.8
<i>Festival</i> -----	8.0	<i>Pale Moon</i> -----	8.9
<i>Flavinia</i> -----	7.0	<i>Parthenope</i> -----	8.9
<i>Florham</i> -----	9.0	<i>Patricia</i> -----	9.9
<i>Fulva Cypriana</i> -----	8.9	<i>Perry, Gladys</i> -----	7.0
<i>Fulva Maculata</i> -----	8.9	<i>Perry, Margaret</i> -----	8.8
<i>Fulva, wild type</i> -----	7.0	<i>Perry, Mrs.</i> -----	8.8
<i>Floriana</i> -----	7.8	<i>Perry, Thelma</i> -----	7.0
<i>Gold Dust</i> -----	7.8	<i>Queen of May</i> -----	8.0
<i>Gold Imperial</i> -----	7.8	<i>Radiant</i> -----	8.8
<i>Golden Bell</i> -----	9.7	<i>Rajah</i> -----	8.7

<i>Clone:</i>	<i>Rating:</i>	<i>Clone:</i>	<i>Rating:</i>
<i>Regel, Dr.</i> .....	8.0	<i>Taplow Yellow</i> .....	9.9
<i>Rosalind</i> .....	8.0	<i>The Gem</i> .....	9.0
<i>Royal</i> .....	8.8	<i>Theron</i> .....	8.1
<i>Salem</i> .....	7.0	<i>Vesta</i> .....	8.5
<i>Seith, Mrs.</i> .....	8.0	<i>Vulcan</i> .....	9.1
<i>Semperflorens</i> .....	9.9	<i>Virginica</i> .....	7.7
<i>Serenade</i> .....	9.0	<i>Wau-Bun</i> .....	9.9
<i>Sir Michael Foster</i> .....	9.0	<i>Winsome</i> .....	8.0
<i>Sirius</i> .....	9.0	<i>Wolof</i> .....	9.5
<i>Sonny</i> .....	8.7	<i>Woodlot Gold</i> .....	8.0
<i>Soudan</i> .....	8.9	<i>Wyman, D. D.</i> .....	8.0
<i>Sovereign</i> .....	7.8	<i>Wyman, Mrs. W. H.</i> .....	8.0
<i>Sungold</i> .....	7.8	<i>Yeld, George</i> .....	8.5
<i>Sunkist</i> .....	7.8	<i>Yellow Hammer</i> .....	8.0
<i>Sunny West</i> .....	9.0	<i>Zara</i> .....	7.8
<i>Tangerine</i> .....	8.0		

## SUMMARY OF CLONES IN COMMERCE FOR MORE THAN THREE YEARS

<i>Numerical ratings:</i>	<i>Number of clones:</i>	<i>Percentage:</i>
9.6-100 Excellent .....	16 .....	12.6
9.1-9.5 Very Good .....	6 .....	4.7
8.6-9.0 Good .....	27 .....	21.3
8.1-8.5 Fair .....	5 .....	3.9
7.6-8.0 Marginal .....	49 .....	38.6
Below 7.6 Discard .....	24 .....	18.9
Total .....	127 .....	100.0

## 3. CLONES IN COMMERCE FOR LESS THAN THREE YEARS

<i>Clone:</i>	<i>Rating:</i>	<i>Clone:</i>	<i>Rating:</i>
<i>Araby</i> (Hayward) .....	9.1	<i>Osceola II</i> (Hayward) .....	9.0
<i>Cleo</i> (Hayward) .....	8.8	<i>Senator Andrews</i> (Hayward) .....	9.1
<i>Florida</i> (Hayward) .....	8.0	<i>Star of Gold</i> (Sass) .....	9.1
<i>Kanapaha</i> (Watkins) .....	9.6	<i>Swan</i> (Watkins) .....	9.7
<i>Marcelle</i> (Hayward) .....	9.1	<i>Sybil</i> (Hayward) .....	9.0
<i>Marconi</i> (Hayward) .....	8.1	<i>The Yearling</i> (Hayward) .....	8.7
<i>Mrs. John J. Tigert</i> (Watkins) .....	9.1	<i>William Pelham</i> (Hayward) .....	8.0

## SUMMARY OF CLONES IN COMMERCE FOR LESS THAN THREE YEARS

<i>Numerical ratings:</i>	<i>Number of clones:</i>	<i>Percentage:</i>
9.6-100 Excellent .....	2 .....	14.3
9.1-9.5 Very Good .....	5 .....	35.7
8.6-9.0 Good .....	4 .....	28.6
8.1-8.5 Fair .....	1 .....	7.1
7.6-8.0 Marginal .....	2 .....	14.3
Below 7.6 Discard .....	0 .....	0.0
Total .....	14 .....	100.0

## EVALUATION OF DAYLILIES FOR CENTRAL FLORIDA

HAMILTON P. TRAUB and WYNDHAM HAYWARD

The ratings given below are based on several years' observation of daylily species and hybrid clones in Central Florida. Following the example set by Prof. Watkins of the University of Florida in the preceding article, the official score card was used in arriving at the ratings and the results are expressed on a numerical basis.

## 1. SPECIES AND VARIETIES

<i>Hemerocallis multiflora</i> .....	8.6	<i>Hemerocallis aurantiaca</i> .....	9.0
<i>Hemerocallis flava</i> .....	7.5	<i>Hemerocallis aurantiaca</i> var.	
<i>Hemerocallis flava</i> var. <i>major</i> ..	8.8	<i>major</i> .....	9.2
<i>Hemerocallis serotina</i>		<i>Hemerocallis exaltata</i> .....	6.0
(= <i>Thungergii</i> ) .....	8.5	<i>Hemerocallis Forrestii</i> ..	8.8
<i>Hemerocallis citrina</i> .....	7.5	<i>Hemerocallis plicata</i> (not tested)	
<i>Hemerocallis minor</i> .....	8.5	<i>Hemerocallis nana</i> .....	7.5
<i>Hemerocallis fulva</i> (See <i>Fulva</i>		<i>Hemerocallis Dumortierii</i> .....	7.5
<i>Europa</i> , <i>Fulva Maculata</i> ,		<i>Hemerocallis Middendorffii</i> ..	7.5
<i>Fulva Rosalind</i> , etc.) .....			

## 2. HYBRID CLONES

Clone	Rating	Clone	Rating
<i>Ajax</i> .....	8.6	<i>Calypso</i> .....	7.5
<i>Alba Striata</i> .....	8.0	<i>Cecil Houdyshel</i> .....	8.7
<i>Algeria</i> .....	8.6	<i>Charlotte Traub</i> .....	8.6
<i>Aloma</i> .....	8.0	<i>Chisca</i> .....	8.7
<i>Amarillo</i> .....	8.5	<i>Chrome Orange</i> .....	8.9
<i>Amaryllis</i> .....	8.0	<i>Cinnabar</i> .....	8.8
<i>Anna Betscher</i> .....	8.5	<i>Circe</i> .....	8.6
<i>Antares</i> .....	8.8	<i>Cissy Giuseppe</i> .....	7.0
<i>Antoinette</i> .....	9.0	<i>Cleo</i> .....	9.0
<i>Apricot</i> .....	8.0	<i>Corinne Robinson</i> .....	9.3
<i>Araby</i> .....	9.6	<i>Cressida-Gypsy</i> .....	9.2
<i>Audrey Blaser</i> .....	8.7	<i>Crown Prince</i> .....	8.0
<i>Aureole</i> .....	8.6	<i>Curlypate</i> .....	7.0
<i>Bagdad</i> .....	9.0	<i>Dazzler</i> .....	7.5
<i>Bardeley</i> .....	8.0	<i>Dawn</i> .....	8.0
<i>Bay State</i> .....	8.5	<i>Dauntless</i> .....	9.5
<i>Betty</i> .....	8.8	<i>Delovely</i> .....	8.0
<i>Bijou</i> .....	8.6	<i>Domestico</i> .....	8.0
<i>Boutonniere</i> .....	9.0	<i>Dorothy McDade</i> .....	9.0
<i>Brownie</i> .....	7.5	<i>Dr. Hughes</i> .....	9.6
<i>Burbank</i> .....	7.5	<i>Dr. Stout</i> .....	9.8
<i>Burgundy</i> .....	8.0	<i>Duchess of Windsor</i> .....	9.8
<i>Burmah</i> .....	8.0	<i>E. A. Bowles</i> .....	9.0
<i>Carmen</i> .....	8.0	<i>Elaine</i> .....	9.6
<i>Carnival</i> .....	8.6	<i>Elizabeth Pike</i> .....	8.6

Clone	Rating	Clone	Rating
<i>Emberglow</i> -----	9.7	<i>Mandarin</i> -----	8.8
<i>Emily Hume</i> -----	8.0	<i>Majestic</i> -----	8.8
<i>Emperor Jones</i> -----	9.8	<i>Mary Florence</i> -----	8.8
<i>Estelle Friend</i> -----	8.6	<i>Marconi</i> -----	8.8
<i>Estmere</i> -----	8.0	<i>Margaret Perry</i> -----	8.7
<i>E. W. Yandre</i> -----	9.0	<i>Marcus</i> -----	8.6
<i>Festival</i> -----	7.5	<i>Mauve Rose</i> -----	7.5
<i>Fire Red</i> -----	9.0	<i>Mayor Starzynski</i> -----	9.6
<i>Flamante</i> -----	8.5	<i>Mary Sadler</i> -----	9.0
<i>Flamid</i> -----	8.0	<i>Midas</i> -----	0.0
<i>Florida</i> -----	9.0	<i>Mikado</i> -----	9.4
<i>Fred Howard</i> -----	9.5	<i>Mildred Orpet</i> -----	9.8
<i>Fulva Chengtu</i> -----	8.5	<i>Minnie</i> -----	9.0
<i>Fulva Cypriana</i> -----	8.0	<i>Miranda</i> -----	9.0
<i>Fulva Europa</i> -----	8.8	<i>Modesty</i> -----	8.5
<i>Fulva Kwanso</i> -----	8.8	<i>Mrs. A. H. Austin</i> -----	8.0
<i>Fulva Maculata</i> -----	9.0	<i>Mrs. H. H. Dewey</i> -----	8.8
<i>Fulva Rosalind</i> -----	9.0	<i>Mrs. John T. Tigert</i> -----	9.0
<i>George Kelso</i> -----	9.6	<i>Mrs. W. H. Wyman</i> -----	7.5
<i>George Yeld</i> -----	8.0	<i>Mrs. Perry</i> -----	8.7
<i>Ginger</i> -----	9.0	<i>Multiflora Luna</i> -----	7.5
<i>Gloriosa</i> -----	7.6	<i>Nubiana</i> -----	9.0
<i>Golden Dream</i> -----	7.5	<i>Ophir</i> -----	8.9
<i>Golden Glow</i> -----	9.2	<i>Old Rose (Hayward)</i> -----	8.8
<i>Goldeni</i> -----	7.5	<i>Othello</i> -----	8.8
<i>Golden West</i> -----	9.5	<i>Osceloa II</i> -----	9.0
<i>Gold Dust</i> -----	8.5	<i>Pale Moon</i> -----	8.6
<i>Granada</i> -----	9.0	<i>Parthenope</i> -----	8.0
<i>Happiness</i> -----	8.7	<i>Patricia</i> -----	9.9
<i>Harvest Moon</i> -----	8.8	<i>Peony Red</i> -----	9.6
<i>Hector</i> -----	9.0	<i>Princess</i> -----	9.4
<i>Hesperus</i> -----	9.0	<i>Queen Mary</i> -----	8.8
<i>Helen Wheeler</i> -----	9.4	<i>Queen of May</i> -----	8.7
<i>Hyperion</i> -----	8.8	<i>Queen Wilhelmina</i> -----	8.9
<i>Imperator</i> -----	9.0	<i>Radiant</i> -----	9.0
<i>Indian Chief</i> -----	9.6	<i>Rajah</i> -----	9.0
<i>Irene</i> -----	8.8	<i>Ralph Wheeler</i> -----	9.0
<i>Iris Perry</i> -----	9.0	<i>Reba Cooper</i> -----	8.9
<i>J. A. Crawford</i> -----	9.0	<i>Reggie Perry</i> -----	8.5
<i>John Blaser</i> -----	8.8	<i>Rose Queen</i> -----	8.8
<i>J. S. Gaynor</i> -----	9.2	<i>Rosita</i> -----	8.8
<i>June Boissier</i> -----	8.5	<i>Royal</i> -----	8.7
<i>Lady Fermor Hesketh</i> -----	8.9	<i>Rouge Vermilion</i> -----	9.1
<i>La Tulipe</i> -----	9.6	<i>Ruby Supreme</i> -----	9.8
<i>Lemona</i> -----	8.5	<i>Russell Wolfe</i> -----	8.7
<i>Lena Hughes</i> -----	8.6	<i>San Juan</i> -----	9.8
<i>Linda</i> -----	9.0	<i>Semperflorens</i> -----	7.8
<i>Louise</i> -----	8.6	<i>Senator Andrews</i> -----	8.5

Clone	Rating	Clone	Rating
<i>Serenade</i> -----	8.5	<i>Theodore Mead</i> -----	9.6
<i>Shirley</i> -----	8.8	<i>Theron</i> -----	9.0
<i>Sibyl</i> -----	8.8	<i>Vesta</i> -----	8.8
<i>Sirius</i> -----	7.4	<i>Victory Montevideo</i> -----	8.7
<i>Sir Michael Foster</i> -----	8.8	<i>Victory Suomussalmi</i> -----	9.1
<i>Sonny</i> -----	9.8	<i>Victory Taierhchwang</i> -----	9.2
<i>Soudan</i> -----	9.6	<i>Viscountess Byng</i> -----	8.0
<i>St. Joan</i> -----	9.0	<i>Vulcan</i> -----	9.0
<i>Sungold</i> -----	7.5	<i>Wau-bun</i> -----	9.6
<i>Sunny West</i> -----	8.5	<i>Wekiwa</i> -----	9.5
<i>Sunset</i> -----	8.5	<i>Winsome</i> -----	8.0
<i>Sylphide</i> -----	8.7	<i>Woodlot Gold</i> -----	8.0
<i>Tangerine</i> -----	8.0	<i>Wolof</i> -----	9.0
<i>Thelma Perry</i> -----	8.7	<i>Yellow Hammer</i> -----	8.6
<i>The Gem</i> -----	8.6	<i>Zara</i> -----	8.0

## SUMMARY

		Number in each class:	Per cent in each class:
9.6 to 100	Excellent	18	10.2
9.1 to 9.5	Very Good	17	9.7
8.6 to 9.0	Good	86	48.9
8.1 to 8.5	Fair	14	7.9
7.6 to 8.0	Marginal	26	14.8
Below 7.6	Discard	15	8.5
	Total	176	100.0

It is of interest to note that approximately 10 per cent of the clones, as grown under central Florida conditions and on the basis of the present ratings, are *Excellent* (9.6 to 100); another 10 per cent are *Very Good* (9.1 to 9.5); almost 49 per cent are *Good* (8.6 to 9.0); about 8 per cent are *Fair* (8.1 to 8.5); and about 23 per cent (*Marginal* and *Discard* classes) might be considered for eventual discard (Below 8.1). Even then there would be 135 clones still in the running.

Considering the great number of named daylily clones that are introduced annually at present, it will be necessary to make a rigid selection if one wants to retain the best 100 clones.

## DAYLILY MUSINGS AND 1941 EXPERIMENTAL POLL

ELMER A. CLAAE, *Illinois*

Interest in daylilies is growing.

The American Iris Society held its convention at Nashville, Tennessee, on May 9th and 10th, 1941. Mrs. Claar and I drove down and had a swell time. These Iris fans are really folks. I am a Kodachrome moving picture fan. I had taken pictures of daylilies in the East, South, and

Middle West the year before and Mrs. Nesmith wrote and asked me if I would bring my pictures of Fairmount Gardens at daylily time and show them to her at Nashville. I was very happy to do this at Nashville. Mr. and Mrs. Nesmith asked if they might invite a few friends, to which I replied, "The more the merrier." Well, before we were through we actually had to hire a hall to take care of the crowd. Nearly 25 per cent of those registered at the convention came to see the pictures. Another 25 per cent voiced a regret that they had not known that I was going to show daylily pictures, otherwise they could have seen the new introductions.

Next year at the Iris meeting I shall attempt to see that everyone knows when I am going to show my daylily pictures and also that everyone is invited.

Daylilies are slow in propagation and are not widely disseminated at the present time. I believe the hybridizers could increase interest if they would introduce the rare colorings by classes. I still believe there is an excessive number of yellows and oranges and a need for evaluating daylilies according to their purpose.

#### 1941 EXPERIMENTAL DAYLILY POLL

In the 1939 Kelso poll 40 people voted. In 1940 I sent questionnaires to 67 people and in 1941 I sent questionnaires to 55 people. Again I was disappointed in not receiving votes from the people who are best informed about daylilies.

Inasmuch as a daylily does not give a normal performance and will not be widely distributed or typical until it has grown in one spot for more than three years, only those introduced in commerce over three years and catalogued by a commercial firm during 1937 or earlier are included. These are the only plants in my opinion worth the votes of the Society.

The poll as now taken is based upon the date of first bloom of the flower in the north, and from this point of view the classification is subdivided into four classes—Early, Intermediate, Summer, and Fall bloomers.

The next classification has to do with the color of the flower. I have divided the flowers into four color classes—monochromes or one color, two-color, three-color, and four or more colors. Much of the work done on this poll up to this time has been done on monochromes, inasmuch as there are entirely too many orange and yellow daylilies that have been introduced. In the matter of two, three, and four-colored daylilies it is most difficult to arrive at a satisfactory sub-classification. Dr. Stout has recently written an article entitled "Color Patterns in Daylilies." At first reading this strikes me as making the subject quite complicated because under bi-colors there would be at least ten different patterns and obviously this would be true of the three and four-colored flowers. It may be that the subject doesn't admit of being put in any more simple manner, but too great a subdivision of the subject matter means it just won't be accepted by the general public. The colors that we have used in a general way are those used by the Massachusetts Horticultural Society.

The ten best daylilies this year became twelve because of a tie in the last three—*Sonny*, *Soudan*, and *Wolof*. Two newcomers this year are Dr. Stout's *Linda* and *Wolof*.

Table 1. A rating of the Daylilies in commerce over three years using the numerical system, that is, "A" is 95, "B" is 85, "C" is 75 and "D" is discard. This is the same plan used by the late Prof. Kelso, but we have limited it to plants in commerce over three years and we listed only those that received five votes or more. We took the average score by adding all the votes on a variety and dividing this number by the number of votes received by the flower.

## EARLY BLOOMERS

## YELLOW

## LIGHT &amp; GREEN YELLOW

		No. of votes	"A"	"B"	"C"
<i>Florham</i>	89.29	7	5	—	2
<i>Flava</i>	89.00	5	2	3	
<i>Gracilis</i>	87.00	5	3	—	2

## YELLOW

<i>Gold Dust</i>	86.43	7	3	2	2
<i>Estmere</i>	85.00	8	2	4	2

## ORANGE YELLOW

<i>Aureole</i>	87.50	8	3	4	1
<i>Apricot</i>	86.25	8	2	5	1

## ORANGE

## ORANGE

<i>Tangerine</i>	85.00	6	2	2	2
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## INTERMEDIATE BLOOMERS

## YELLOW

## YELLOW

<i>Wau-Bun</i>	92.00	10	8	1	1
<i>Modesty</i>	90.56	9	5	4	
<i>Winsome</i>	90.00	10	6	3	1
<i>Sir Michael Foster</i>	89.29	7	4	2	1

## ORANGE YELLOW

<i>Queen Mary</i>	91.00	5	3	2	
<i>Queen of May</i>	83.57	7	2	2	3

## ORANGE

## ORANGE

<i>Dover</i>	83.00	5	1	2	2
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## SUMMER BLOOMERS

## YELLOW

## LIGHT &amp; GREEN YELLOW

<i>Patricia</i>	91.47	17	12	4	1
<i>Hyperion</i>	88.50	20	9	9	2
<i>Sonny</i>	81.25	8	1	3	4

	No. of votes "A" "B" "C"				
<b>YELLOW</b>					
<i>Golden Bell</i>	86.11	9	4	2	3
<i>Anna Betscher</i>	86.00	10	3	5	2
<i>Circe</i>	85.00	7	1	5	1
<b>ORANGE YELLOW</b>					
<i>Golden West</i>	88.75	8	5	1	2
<i>The Gem</i>	88.33	6	2	4	
<i>Bay State</i>	86.25	8	3	3	2
<i>Ophir</i>	85.63	16	4	9	3
ORANGE					
<b>YELLOW ORANGE</b>					
<i>Semperflorens</i>	89.29	7	4	2	1
<i>Chrome Orange</i>	88.75	8	4	3	1
<i>Radiant</i>	86.25	8	3	3	2
<i>Harvest Moon</i>	85.00	6	2	2	2
<b>ORANGE</b>					
<i>Cressida</i>	89.00	5	3	1	1
<i>Mrs. A. H. Austin</i>	86.11	9	4	2	3
<i>Aurantiaca Major</i>	85.00	7	2	3	2
<i>Goldeni</i>	85.00	6	2	2	2
<i>Midas</i>	81.00	5	—	3	2
<b>RED ORANGE</b>					
<i>Imperator</i>	89.29	7	4	2	1
<i>Gypsy</i>	87.86	7	4	1	2
REDS					
<b>ORANGE RED</b>					
<i>Kwanso Plena</i>	87.00	5	3		2
<b>RED</b>					
<i>Vulcan</i>	89.17	12	6	5	1
<b>ROSE</b>					
<i>Rosalind</i>	87.86	14	6	6	2
POLYCHROME & SHOTS					
<i>Dauntless</i>	93.57	7	6	1	
<i>Chengtū</i>	90.00	6	3	3	
<i>Fulva Maculata</i>	88.33	9	3	6	
<i>Bijou</i>	87.00	5	2	2	1
<i>Cinnabar</i>	87.00	5	2	2	1
<i>Bagdad</i>	85.00	5	1	3	1
<i>George Yeld</i>	83.00	5	1	2	2
<i>Serenade</i>	83.00	5	1	2	2

BI-COLORS

PETAL ONE COLOR, SEPAL ANOTHER:

		No. of votes "A" "B" "C"			
<i>Festival</i>	86.11	9	3	4	2
<i>Boutonniere</i>	85.00	5	2	1	2

FLOWER ONE COLOR, SPOT ON THROAT ANOTHER:

<i>Mikado</i>	90.26	19	11	7	1
<i>Rajah</i>	87.94	17	6	10	1

Table 2. We also secure a vote on the 1st, 2nd and 3rd best in each blooming period and in each color class for plants in commerce over three years. We eliminated all plants that did not receive one first class vote.

EARLY BLOOMERS				ORANGE YELLOW			
YELLOW							
GREEN YELLOW							
	1st	2nd	3rd		1st	2nd	3rd
<i>Florham</i>	5	—	2	<i>Queen Mary</i>	3	2	—
<i>Gracilis</i>	3	—	2	<i>Queen of May</i>	2	2	3
<i>Flava</i>	2	3	—	<i>Crown of Gold</i>	1	1	
<i>Flavina</i>	2	—	1	ORANGE			
<i>Salem</i>	1	—	—	YELLOW ORANGE			
YELLOW				<i>Omphale</i>	1	—	—
<i>Earlianna</i>	4	—	—	ORANGE			
<i>Gold Dust</i>	3	2	2	<i>Zara</i>	2	—	—
<i>Estmere</i>	2	4	2	<i>Dover</i>	1	2	2
<i>Sovereign</i>	1	1	1	<i>Glorianna</i>	1	1	—
<i>Domestico</i>	1	—	—	<i>Goldeni</i>	1	—	—
<i>Dumortieri</i>	1	—	—	<i>Sungold</i>	1	—	—
<i>Sieboldi</i>	1	—	—	<i>Taplow Orange</i>	1	—	—
ORANGE YELLOW				SUMMER BLOOMERS			
<i>Aureole</i>	3	4	1	YELLOW			
<i>Apricot</i>	2	5	1	LIGHT AND GREEN YELLOW			
<i>Judge Orr</i>	2	—	—	<i>Patricia</i>	9	4	1
<i>Orangeman</i>	1	2	1	<i>Hyperion</i>	7	7	2
ORANGE				<i>Sonny</i>	1	1	4
<i>Tangerine</i>	2	2	2	<i>Starlight</i>	1	—	—
<i>Middendorffii</i>	2	1		YELLOW			
INTERMEDIATE BLOOMERS				<i>Golden Bell</i>	5	1	2
YELLOW				<i>Anna Betscher</i>	2	4	2
<i>Wau-Bun</i>	8	1	1	<i>Soudan</i>	2	2	—
<i>Winsome</i>	6	3	1	<i>Circe</i>	1	3	1
<i>Modesty</i>	5	4	—	<i>J. A. Crawford</i>	1	1	1
<i>Sir Michael Foster</i>	4	2	1	<i>Gold Imperial</i>	1	1	—
<i>Gaiety</i>	1	—	—	<i>Highboy</i>	1	—	—
				<i>Woodlot Gold</i>	1	—	—

## ORANGE YELLOW

	1st	2nd	3rd
<i>Ophir</i>	6	6	3
<i>Golden West</i>	6	1	2
<i>Emily Hume</i>	3	—	3
<i>The Gem</i>	1	2	—
<i>Bay State</i>	1	1	—
<i>Mrs. Perry</i>	1	—	1

## ORANGE

## YELLOW ORANGE

<i>Chrome Orange</i>	4	2	1
<i>Semperflorens</i>	4	1	1
<i>Radiant</i>	2	3	2
<i>Harvest Moon</i>	2	1	2
<i>Irene</i>	1	—	—

## ORANGE

<i>Mrs. A. H. Austin</i>	4	1	3
<i>Cressida</i>	2	1	1
<i>Golden Dream</i>	2	1	1
<i>Crown of Gold</i>	2	1	—
<i>Majestic</i>	1	2	—
<i>Winnie Nightingale</i>	1	—	1
<i>Reba Cooper</i>	1	—	—
<i>Vesta</i>	1	—	—

## RED ORANGE

<i>Imperator</i>	4	2	1
<i>Gypsy</i>	4	1	1
<i>Europa</i>	3	1	—

## RED

## ORANGE RED

<i>Kwanso Plena</i>	2	—	1
<i>Margaret Perry</i>	1	—	1
<i>Cissie Guiseppi</i>	1	—	—
<i>Sir William</i>	1	—	—

## RED

<i>Vulcan</i>	6	3	—
<i>Wolof</i>	2	—	—
<i>Theron</i>	1	—	1
<i>Redahd</i>	1	—	—

## ROSE

	1st	2nd	3rd
<i>Fulva Rosea</i> ( <i>Rosalind</i> )	5	5	2
<i>Heather Rose</i>	1	—	1
<i>Fulva Rosea</i> ( <i>Chinese</i> )	1	—	—

## PINK

<i>Dawn Play</i>	1	—	—
<i>Pink Lustre</i>	1	—	—

## PURPLE

<i>Emperor Jones</i>	2	1	—
<i>Burgundy</i>	1	—	—

## BROWN

<i>Maya</i>	1	—	—
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## NEAR WHITE

<i>Hesperus</i>	3	—	—
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## POLYCHROMES AND SHOTS

<i>Dauntless</i>	4	—	1
<i>Fulva Maculata</i>	2	3	—
<i>Araby</i>	2	1	—
<i>Chengtzu</i>	2	1	—
<i>Bagdad</i>	2	—	1
<i>Byng of Vimy</i>	2	—	—
<i>Linda</i>	2	—	—
<i>Bijou</i>	1	1	—
<i>Serenade</i>	1	—	2
<i>Cinnabar</i>	1	—	—
<i>Cressida</i>	1	—	—
<i>Dawn</i>	1	—	—
<i>George Yeld</i>	1	—	—
<i>Sunkist</i>	1	—	—

## BI-COLORS

PETAL ONE COLOR, SEPAL  
ANOTHER COLOR

<i>Chicea</i>	4	—	—
<i>Festival</i>	2	2	2
<i>Boutonniere</i>	1	—	1

FLOWER ONE COLOR, SPOT  
ON THROAT ANOTHER  
COLOR

<i>Mikado</i>	8	4	1
<i>Rajah</i>	6	7	1

Table 3. There were 23 lists returned. It is interesting to note that 85 clones were listed by these 23 people. The last three clones were on four lists so that the "Ten Best" Daylilies in 1941 becomes Twelve.

<i>Mikado</i>	was on 13 lists	<i>Rosalind</i>	was on 9 lists
<i>Hyperion</i>	was on 12 lists	<i>Waubun</i>	was on 9 lists
<i>Patricia</i>	was on 12 lists	<i>Linda</i>	was on 5 lists
<i>Dauntless</i>	was on 11 lists	<i>Sonny</i>	was on 4 lists
<i>Rajah</i>	was on 10 lists	<i>Soudan</i>	was on 4 lists
<i>Ophir</i>	was on 10 lists	<i>Wolof</i>	was on 4 lists

## THE SEED CHARACTER OF AMARYLLIS PROCERA

HAMILTON P. TRAUB, *Maryland*

During 1940, *Amaryllis procera* flowered in Florida for Mr. E. J. Anderson of Palm Beach, and this event was reported in *Herbertia* 1940. In January 1941 Mr. Anderson sent fresh seeds that had set in the spring of 1940. This indicates that the time required for seeds to mature is relatively long for this species, a fact that has been previously reported by Worsley (*Gard. Chron. Lond.* May 1929, pp. 377-379, figs. 188 and 189; *Herbertia* 6:118-119.1939). The illustration, Fig. 64, represents the seed character of this species as drawn from nature by the eminent artist and horticulturist, J. Marion Shull. It shows the character of the large D-shaped seeds, 17 mm. long by 10 mm. wide; jet black in color. The inner edge is about  $\frac{1}{2}$  mm. thick, and the outer edge 1 mm. thick, somewhat sunken and wrinkled between the margins of the side walls. The embryo is about  $1\frac{1}{2}$  mm. by 6 mm. and is embedded in horny endosperm.

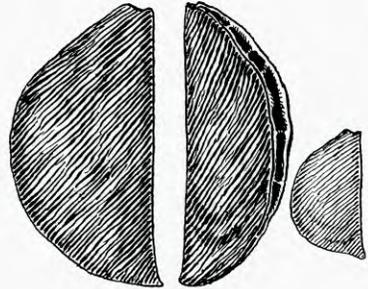


Fig. 64. Seed of *Amaryllis procera*: X2. Small Seed, XI. Drawn by J. Marion Shull.

## WAYMAN DAYLILIES

After the rest of the material in this issue was already in print, descriptions of the following named daylily clones were received from Robert Wayman, Bayside, N. Y.—*Apache*, *Bordeaux*, *Brilliant*, *Brown Beauty*, *Brown Symphony*, *Carmine Champion*, *Carmine Gem*, *Duchess*, *Exquisite*, *Extravaganza*, *Fireworks*, *Forest Fire*, *Glamour*, *Grenadine*, *Jack Rose*, *Pink Beauty*, *Pink Champion*, *Pomegranate Beauty*, *Rapture*, *Red Beauty*, *Red Brilliance*, *Red Empress*, *Red Flare*, *Red Glory*, *Red King*, *Red Lustre*, *Red Raider*, *Red Satin*, *Redskin*, *Red Sox*, *Red Splendour*, *Red Wing*, *Rose Beauty*, *Rose Champion*, *Ruby Queen*, *Scarlet Beauty*, *Terra Cotta*, *Unique*, *Wildfire*, *Zulu*.

Since no advance notice was given by the editor, descriptions of these clones will be included in 1942 *HERBERTIA*, but this does not invalidate the rule that from now on not more than 15 new clones by any one breeder may be described in any one issue of *HERBERTIA* (See page 83).—Ed.

## REGISTRATION OF NEW CLONES

Descriptions of new clones of hybrid amaryllids for this section should reach the editor by June 1 if possible. Information sent after that date may be held over to the next issue if space is not available. This information is published to avoid duplication of names, and to provide a place for the authentic recording of *brief* descriptions. 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.

## HYBRID DAYLILY (HEMEROCALLIS) CLONES

*Trial Gardens.* Cooperative daylily trial gardens have been established at (1) Cornell University, Dept. of Floriculture, Ithaca, N. Y.; (2) Southwestern Louisiana Institute, Dept. of Horticulture, Lafayette, La., and (3) Whitnall Park Arboretum, Milwaukee City and County Park Board, Milwaukee, Wisc.

Introducers should send complete collections of clones to these co-operating agencies in order that they may be impartially evaluated.

*Limitation of clones described.* On account of space limitations, not more than 15 clones from any one introducer will be published in this department in any one year. Breeders should use proper restraint in naming clones so that the work of evaluation will be simplified since inferior clones are bound to be weeded out sooner or later.

*Introduced by Glen Saint Mary Nurseries Company, Glen St. Mary, Fla.; originated by John V. Watkins:*

*Kanapaha.* Foliage upright, sharp-pointed, to about 18 inches, deciduous. Scapes heavy, robust, each one usually producing two proliferations in well established clumps. The blossoms, bright Cardinal Red in color, (M&P 5-L-5)<sup>1</sup> are sprightly and appeal universally to those who have seen the seedling in flower. As the segments are imbricated for 1½ inches above the perianth tube, the flower is not particularly full and wide-spreading. None of the available commercial varieties observed to date exhibit a color that is close to the sparkling Cardinal Red of this selection. Introduced in 1941. (See Plate 209.)

*Swan.* Foliage evergreen, upright, reaching a height of about 19 inches. The robust scapes, erect to about 27 inches, are furnished with white-margined bracts at their point of branching. Proliferations are not formed by this clone. The flowers, appearing in late May, are larger than those borne by any daylily in the collection at the University of Florida. The perianth segments, broadly arched, informally recurved, not imbricated, are of a glowing color near to Cavalry yellow, (M&P 9-L-7). This seedling, selected in 1935, for the large size and distinctive form of its blossoms, has been much admired by garden visitors, and will be introduced during the spring of 1942. (See Plate 209.)

<sup>1</sup> This and similar references refer to Maerz & Paul, **A Dictionary of Color.**



See page 83.

*Daylily clones: Swan (upper) and Kanapaha (lower)*

*Introduced by J. B. S. Norton, Hyattsville, Md.; year of introduction is indicated after each name:*

*Betty* (1938); growth vigorous, propagation rapid, scape graceful, 2-3 feet high, flowering through most of May, flowers clustered, yellow, fragrant, 2-3 inches wide, night and day blooming, 2 sets of flowers open at 6 p. m. Among the tallest of the first early.

*Citronetta* (1940); good foliage, slender 3-4 foot scape, rapid propagation, fragrant, light lemon, three inch flowers, June-July.

*Damozel* (1943); two foot scapes, 4 inch flower wide open, day blooming, July, segments narrow. The purest pink yet seen, no tint of yellow showing on the upper side.

*Dorothy Dawn* (1941); propagation slow, scapes 4 feet, flowers 5 inches wide, 6 inches long, shrimp pink to orange pink, open all day, July. The large creamy pink flower is more pleasing than most of the brighter pinks.

*Elizabeth* (1941); vigorous growth, rapid multiplication, graceful foliage, scapes 2-3 feet high, not branched, 3 inch star formed flowers with obtuse segments, day and night blooming, fragrant, chryse yellow, early May. The best of the early bloomers.

*Frances* (1942); scapes over 2 feet high, flower 3-4 inches wide, with wide obtuse segments, irregularly blended with orange brown and buff, June blooming. Unusual and rich coloring in a well formed flower.

*Garden Lady* (1942); short rhizomes, scapes 3 feet, flowers 5-6 inches wide, fully open, unusually wide throat, wide segments, salmon with lighter edges, July. Rare color and wide throat.

*Gertrude* (1941); scapes 3-4 feet, flowers 3-4 inches, orange with a slightly darker halo on the petals, June-July.

*Glowing* (1937); scapes 3 feet, abundant flowers over 3 inches wide, segments about an inch wide, light cadmium to light orange, petals with a narrow mars yellow spot giving a metallic sheen to the flower as a whole, June-July. The abundant flowers of this bright color make this variety very good for garden masses.

*Orange Rex* (1941); scapes 5-6 feet high with many 3-4 inch orange flowers. This kind towers over nearly all others.

*Prince William* (1940); scapes 2 feet, flowers 3 inches wide, with wide blunt segments, dull orange scarlet, June. One of the nearest pure red and has a well formed flower.

*Redahd* (1942); growth vigorous, scapes 3-4 feet high, not much branched but with very many buds, flowers 5-6 inches wide, dull purplish red with a light yellow mid line, June-July.

*Takoma* (1939); foliage graceful, the strong scapes 4-5 feet high, short branched along the upper part so that more than one flower at different levels may be in bloom at once, day blooming, flowers 5-6 inches wide, sepals dull orange, petals dark brown with a yellow mid line, July. This is the best bicolor I have seen.

*Woodridge* (1938); rapid propagating, graceful scape to 3 feet, the flowers open before sunset and close about 26 hours later so that in the evening two sets of flowers are open at once, sepals yellow, petals

dark red brown at first to light chocolate in the afternoon, long pointed and with a slight spiral twist, an inch wide, June and July. Very graceful and long keeping bicolor.

*Last Night* (1940); scapes 4 feet high, 4 inch very light yellow fragrant night blooming flowers in July. Very good for the electric lighted garden.

*Louise Webster* (1940); similar to Betty, the flowers last 26 to 28 hours. The tallest very early.

*Maharaja* (1942); very vigorous growth, slow propagator, strong scape about 3 feet high, widely branched, the 6 inch flowers dark orange red with darker shading below the middle of the petals, July. Rich color with very vigorous growth and unusually wide inflorescence.

*Melo* (1940); scapes 3 feet high, 3-4 inch flowers, pale brownish yellow with a darker arched halo on the wide petals, July. A delicious color combination like the flesh of a yellow peach.

*Mrs. Jones* (1938); a sport of an old early blooming variety with a tendency toward flowers with 7 to 12 segments, rapid propagation, 3 inch flowers yellow.

*Mongol* (1939); vigorous growth, good propagation, scape 3 feet high, flowers broad trumpet form, chrome yellow, 7 to 8 inches wide, petals nearly 2 inches wide, July blooming. This is the largest flowered hemerocallis I have seen.

*Introduced by the New York Botanical Garden (Dr. A. B. Stout); for full descriptions of these clones see Journal N. Y. Bot. Gard. Jan. 1941:*

*Afterglow*; capucine yellow, rosy tint in throat; 44 inches; early July to Aug. 12.

*Aladdin*; garnet-brown, golden cadmium with tinges of red-fulvous; 45 inches; mostly late June.

*Autumn Prince*; clear light yellow; to 42 inches; early Aug. to early Oct.

*Baronet*; orange, and Brazil red; 28 inches; June.

*Bertrand Farr*; pale orange and salmon red; 30 inches; July.

*Bicolor*; yellowish orange and pale fulvous red tinged with rose; 40 inches; July and August.

*Brunette*; yellowish orange, madder brown and tan-red; early, beginning June 1.

*Buckeye*; boldly banded, garnet-brown and cadmium-yellow; 30 inches; chiefly in late June.

*Dominion*; rich red; 40 inches; June 21 to middle July.

*Harlequin*; near to carmine and English red; nearly 4 ft.; mostly July but may extend to Aug.

*Hiawatha*; golden orange; 40 inches; climax latter half of July.

*Mignon*; lemon chrome; 40 inches; mid-June to August and into Sept.

*Monarch*; light cadmium, faint halo of fulvous; 3 ft.; July.

*Port*; Brazil red; 2 to 3 ft.; July.

*Red Bird*; vermilion-red; 3 ft.; July.

*Sachem*; dark red, and yellowish orange; 40 inches; July.

*Symphony*; bicolorred, greenish yellow, yellow, rose-tinted; 44 ft.; mid-June to mid-July.

*Triumph*; rich orange and slight fulvous halo; 40 inches; July.

*Yeldrin*; uniformly yellowish orange; 40 inches; late July to mid-August.

*Zouave*; rich fulvous red, sepals lighter; 40 inches; June and recurrent in September.

*Introduced by Ralph W. Wheeler, Winter Park, Fla.:*

*Turbani* (A-46-2); First Class Certificate; Best Flower in the Show. National Hemerocallis Show of the American Amaryllis Society, 1941. Robust, with a large, very spreading flower. The compact throat terminates in very recurved sepals and in petals which start to recurve and then abruptly straighten out. The petals are pinched for the outer half of their length. The flower outline is definitely a triangle. This is a new break in flower form. In color it is a clear, medium deep orange. This flower is a semi-night bloomer which remains fresh all the next day, even in full Florida sunshine.

*Halo* (14-5-6); First Class Certificate. National Hemerocallis Show of the American Amaryllis Society, 1941. Robust. A large, wide open, shallow throated flower with very wide, frilled petals with twisted tips and wide, somewhat frilled sepals. In color it is light yellow with a faint dusting high up on the petals and again on the petal tips. Both in form and coloring an unusual Hemerocallis. This is a night bloomer which lasts all through the following day and stands full Florida sunshine about 90%.

*Blackhawk* (12-51-6); Semi-Robust. A medium sized, cup shaped flower with wide petals. The all over color is a very, very dark maroon, the darkest flower yet of my hybrids. The throat is bright gold. This flower stands full Florida sun all day like no other dark colored flower I have seen.

*Dubonet* (24-58-4); Semi-Robust. Medium size, intermediate form. The color is a bright maroon with a very definite violet tone. The sepals are lighter than the petals and the throat is canary yellow. This flower does not stand full sun, but is very beautiful before its color is dulled by too much light.

*Duncan* (24-113-2); Semi-Robust. A large flower with rather narrow sepals and petals. Intermediate form. The color is dark maroon, with a bright gold throat. It stands full Florida sun 60 to 70%.

*Juno* (26-25-1); Semi-Robust to Robust. A large flower with roundly recurved sepals and petals. The color is pale yellow with the deep throat the color of greenish ice, and with an equally cool look. A stately flower which holds up all day in full Florida sunshine.

*Kadra* (13-69-1); Semi-Robust. A medium large flower of intermediate form. The colors are the darker mahogany shades, sepals lighter than the petals and a very dark eye zone on the petals.

*Luridum* (24-130-2); Robust. A large flower with rather tightly recurved sepals and somewhat less recurved petals which are wide, frilled and the tips twisted. The color is a bright red on the scarlet, with somewhat lighter sepals which have narrow gold lines through them. The throat is greenish gold.

*Ohred* (F-55-5); Semi-Robust to Robust. A large flower, measuring up to 6½ inches, of intermediate form and with somewhat narrow sepals and petals. The color is bright red with a greenish yellow throat and yellow hair lines through the center of the petals. The greenish yellow of the throat forms a perfect six pointed star with a greenish center and golden halo. There are many flowers on a stem.

*Porcellana* (17-9-2); Semi-Dwarf. Small flower of intermediate form with narrow sepals and petals. It is the color of aged ivory with a pattern formed by the darker hair line veining.

*Rose Marie* (14-26-2); Semi-Dwarf. Small, cup shaped flower with sepal and petal tips acutely recurved. The petals are a light antique rose, the sepals being dusted with the same color. The throat is a pale, clear yellow. This flower stands full sun about 85%.

*Solador* (14-13-1); Robust. This is a very large flower with very wide sepals and petals, whose tips are roundly recurved. The flower diameter is 6 inches, petal width 2 inches and sepal width 1¼ inches. The color is deep yellow, with a faint, dusted eye zone high up on the petals. The flower texture has a very silky appearance. This is a semi-night bloomer and remains fresh all the next day, standing full Florida sun about 90%.

*Tiger* (E-33-2); Robust. A large flower of intermediate form. Dark fulvous colors on a ground color of yellow-orange, with darker fulvous red eye zone and yellow-orange throat simulate the pattern and coloring of the tiger's coat.

*Tonquin* (24-138-1); Robust. A large, wide open flower identical in form and size with Turbani, of which it is a half sister seedling. The flower color, however, is quite different. The throat and ground color is a gold orange. The sepals are dusted a mahogany red while the petals are colored mahogany red with a slightly darker eye zone. It stands full Florida sun all day.

*Introduced by L. Ernest Plouf, Craemore, Lawrence, Mass.:*

*Apropos* (1941); July; fragrant, very full, round; outer segments embossed at edges; inner deep bronze-red with broad cream midrib, incurve at tips, wavy edges; outer segments paler; orange throat, heavy substance.

*Brazen Ego* (1941); July; 4 ft.; large velvety bright maroon-red; bright red-orange throat; broad orange-yellow midrib on inner segments; deeper red zone; open; flaring; heavily colored, bold; heavy substance; well formed; very full; red deepens outward from midrib area; keeps well; robust.

*Capricious* (1941); Aug.-Sept.; all segments rose-pink, slightly deeper zone blending upward; soft canary throat in good contrast; round tips; good substance; keeps well.

*Chilton* (1941); somewhat fragrant, large very full flower heavily toned purple-rose; outer segments a bit lighter; green-yellow throat; round outline; no eye-zone; flatly open; unusual quality of fragrance.

*Comtess de Vysart* (1941); 4 ft.; unusual color-pattern; high throat of bright gold framed beautiful deep rust; remainder of inner segments orange-rust with white midrib and decidedly crinkled edges; outer ones flushed paler shade; roundly recurved; good form; stiff tall stem; very sun-resistant.

*Coralpiece* (1941); 3 ft.; all segments decidedly rose-pink, veined deeper; green-canary throat; no eye-zone; increases rapidly; floriferous; sturdy stems.

*Craemore Henna* (1939); July 3 ft.; bright henna; ruby iridescence, excellent size, form and texture; deep orange throat; inner segments solid henna; all segments ruby along veins. Outer segments deep orange heavily flushed henna. Reverses rich orange in sharp contrast; upright funnel-shaped; wide open; full; well recurved; clean habit; good foliage; deciduous; keeps well late.

*Craemore Ruby* (1938); July 3 ft.; intensely red blooms; full, 5" flower; yellow-green throat; deep ruby red covering entire inner segments, darker veins. Outer segments slightly lighter, wide open. Ruby reverses on inner segments; darker zone; velvet texture; excellent heavy substance; compact clump; good in formal garden. Keeps well after dark.

*Domination* (1941); July 20; deeply colored lavender-rose inner segments; deeper cold-tone framing canary throat; outer segments paler, well flushed rose; roundly recurved; large; robust; tall; keeps well late.

*Utopia* (1941); July 20; very large; shoe-horn-concaved inner segments, very crinkled edges, recurved, cream midrib; yellow-orange throat, almost no deeper zone; inner segments bright deep bronze; outer ones flushed same color. Good substance.

*Finesse* (1941); July-Aug.; all segments even toned peach; full; bright gold throat; inner segments crinkled; outer crinkled and embossed; round outline; distinct from *fulva rosea* form; soft colors; keeps well late.

*Fulva Rosea Pastelrose* (1939); July-Aug.; 4½ ft.; a wild plant from China. Same form and size as *Fulva Rosea Rosalind* but without deeper zone; much more pink; taller; raised cream-white midrib on inner segments, less prominent on outer; keeps substance well; even more pink at end of day.

*Garnet Velvet* (1941); July 10; 5 ft.; very deep garnet, all segments even toned; full firm even form; edges somewhat wavy; circular outline; wide olive-yellow throat; heavy substance.

*Hannah Dustin* (1937); July 3 ft.; fragrant; full; clear lemon, greenish throat; excellent form; heavy substance; firm, well open; 3¼" flower, floriferous; deciduous, fine cut flower.

*Harbinger* (1941); May 28; fragrant, very full; bright golden yellow; stiff erect stems; very heavy substance; keeps very well to end of day.

*Harvester* (1941); Aug.-Sept.; broad incurved inner segments, deep peach; outer segments a little paler, embossed, crinkled and recurved; round outline; orange throat; flatly open.

*Herald* (1941); May 28; early fragrant lemon; tall erect stem, very well branched; full flower; good keeping quality; heavy waxy substance.

*Holildred Yeld* (1941); fullest and most recurved of all; segments are broad and curl way back; round outline; lavender, veined deeper; large flower; keeps well end of day; named after a daughter of the late George Yeld—the pioneer of daylily hybridizing.

*Indian Summer* (1941); Aug.-Sept.; fine shade of burnt-orange, olive cast; shoe-tongue-formed inner segments, broad and rounded at tips, decidedly crinkled edges, roundly recurved; narrow outer segments not recurved; good form; well open; good substance.

*Jocelyn* (1941); June 14; 3-4 ft.; very large rather flaring; intermediate season; sturdy stem; heavy chamois substance; slight fulvous tint at eye-zone; rich orange; keeps very well until after dark.

*Whittier* (1940); August 4 ft.; fragrant flaring 6½" flower, flatly open, gracefully spreading; bright canary; throat-base and reverses of outer segments green; good substance, sun-resistant, erect stem. Named for the poet whose birthplace is a few minutes' walk from where this daylily was raised.

*Jolly Roger* (1941); July 17; darker parallel veining on all segments a distinct characterization; orange throat; purple-maroon zone blending gradually to deep rose on broad inner segments which have distinct broad buff midrib; outer segments same rose becoming buff at tips; unusually even, firm form; fine substance; waxy-chamois finish; all edges deckled; large flower opening late, closing late.

*Kajin* (1941); July 24; very full; roundly recurved; deep rose blotch; rose-orange; crinkled edges; wide olive-yellow throat; fine form.

*Kinyo* (1941); July 10; 3 ft. fine distinct form; triangular spread; rich Chinese yellow; contrasting rose blotch bisected by cream midrib; inner segments very full and curl a bit; outer ones narrow, open; sun-resistant.

*Madelon* (1941); July 14; seventy or more 5" flowers; deep orange, throat blended greenish, framed with deep rose eye-zone; inner segments deep peach; decidedly crinkled edges; broad pale cream midrib; outer segments paler; firm substance; good form; open; full; very robust; keeps well.

*Madrepora* (1941); July-Aug.; unusual chalice-formed; segments deep bright coral; wide orange throat; very tall erect stem; not recurved, open; quite full; keeps well.

*Merrimac* (1940); Aug.-Sept.; 4 ft.; orchid-like crinkling, peach colored 4" flower; orange throat framed with a bright rose zone; darker veins on inner segments; full; embossed outer segments; very well branched; widely open; deciduous; floriferous.

*Piper Trail* (1941); a pale raspberry self; almost no midrib color; dull bright finish; crinkled; good form; open; rather round outline; keeps well end of day; tall stem.

*Purple and Cream* (1941); Aug.; 3 ft.; very full; strongly bicolor-ed; outer segments evenly toned cream; cream-white midrib on broad spatulate inner segments, blades heavily dusted deep purple, deeper at zone framing a yellow throat; all segments decidedly crinkled at edges; heavy substance; keeps well.

*Red Aroma* (1941); a fragrant red; fine deep raspberry-red on all segments; large flower; roundly recurved; long segments; round outline; yellow-orange throat.

*Rhythmic* (1941); July 20; very full and round; tips of inner segments rounded; orange throat; inner segments bronze-rose; crinkled edges; cream midrib; keeps well end of day.

*Rosafare* (1941); July; 2 ft.; large deep pure rose, veined deeper; outer segments paler; 5" flower; wide lemon-yellow throat; good form; heavy waxy substance; keeps well until after dark.

*Tresjolie* (1941); July-Aug.; 3 ft. fine distinct form; canary throat; large even-toned lavender-rose blotch edge of throat, remainder of segments pale peach-cream; well open.

*Tulip Effigy* (1941); 3 ft.; July 13; formed like a lily-flowering tulip; somewhat fragrant; tips of inner segments flare; not recurved; pale cream; high lemon throat, deeper color at midrib; inner segments, at throat edge, speckled purple, then rose becoming paler, tips pale cream; outer segments slightly speckled rose; reverse of inner are lemon; good substance; keeps well.

*Vadonna* (1941); July 20; 2½ ft.; segments strongly blended purplish-red-fulvous; outer segments deeper and speckled deep fulvous—deeper still along veins; yellow throat olive-cast; faint halo; waxy substance; erect stem; well branched; well open; keeps well.

*Warren Hutchings* (1939); July-Aug.; 3 ft.; large brick-red flower; very broad spatulate inner segments, flatly open, narrow throat; blooms open late and keep form and color until well after dark; deep orange throat; dark green foliage; strong erect stems; bold and unusual.

*Zakura* (1941); 3½ ft.; large, full, well open flaring flower; all segments decidedly peach, red-orange veining; wonderful contrast to bright deep gold throat; very sun-resistant; tall stem.

#### HYBRID AMARYLLIS CLONES

*Introduced by Ralph W. Wheeler, Winter Park, Fla.:*

*Lord Amherst* (#188); First Prize in its Class; First Class Certificate; Best Flower in the Show. National Show of the American Amaryllis Society, 1941. Leopoldi, Type A. Very large flower, 9 inches, with an unusually flat face. There is some frilling of the petal edges in the center of the flower. The color is a solid, dark crimson with decided violet tones.

*Jefferson* (#189); First Prize in its Class; First Class Certificate. National Show of the American Amaryllis Society, 1941. Reginae, Type A. This is a very large flower, 9 inches, with wide, recurved

segments which form a convex face. The color is a clear, medium dark red, clean color to the throat.

*Carmen* (7-17-7); Leopoldi, Type A. A very large flower,  $8\frac{3}{4}$  inches, petals 4 inches wide. The funnel is shallow and the face of the flower is only slightly convex. A most handsome form. The color is crimson, the violet tones not being very pronounced.

*Flamingo* (6-50-7); Leopoldi, Type A. A large flower,  $8\frac{1}{4}$  inches, with very wide, slightly recurved petals, producing a flower of good form and rich beauty. The color is a very deep rose pink, shading on the outer edges, particularly in the lower petals to a shell pink. The lack of pattern in the coloring and the colors themselves suggest the informal plumage arrangement of the Flamingo.

*Glamour* (#202); Reginae, Type B. A large flower, 8 inches, with wide petals, but with pointed tips in the manner of Type B. The color is the cleanest snow white with deep wine red splotches and feathering from the throat, on the three upper petals and on the upper halves of the two lower side petals. A striking flower.

*Lady In Red* (8-21-3); Leopoldi, Type A. A large flower,  $7\frac{3}{4}$  inches, of fine Dutch form with a slightly convex face, very wide petals with frilled edges in the center of the flower. The color is a beautifully brilliant scarlet which shows the orange tones only in the lighter parts. The center of the flower is satiny in texture and deeper in color.

#### HABRANTHUS CLONES

*Introduced by Hamilton P. Traub, Beltsville, Md.:—*

*Orlando* (*H. brachyandrus* x *H. robustus*); shape of perigone-segments and flowering habit like *H. brachyandrus*; color of segments orchid pink like *H. robustus*; filaments light red.

*Argentina* (*H. brachyandrus* x *H. robustus*); intermediate between parents; shape of perigone-segments like *H. brachyandrus*; color slightly deeper pink than *H. robustus* and lighter toward center; only slight suggestion of wine color in throat; filaments light red.

#### ARGYROPSIS CLONES

*Introduced by Hamilton P. Traub, Beltsville, Md.:—*

*Buenos Aires*; segregate from self pollination of *Argyropsis candida major* made at Mira Flores, Orlando, Fla., in 1936; opens light yellow, fades to almost white. Habit of *A. candida major*.

*Elizabeth Traub*; of same parentage as *Buenos Aires*; opens medium yellow, fades to light yellow. Habit of *A. candida major*.

## 4. CYTOLOGY, GENETICS AND BREEDING

### INHERITANCE IN DAYLILIES

J. MARION SHULL,  
*Chevy Chase, Maryland*

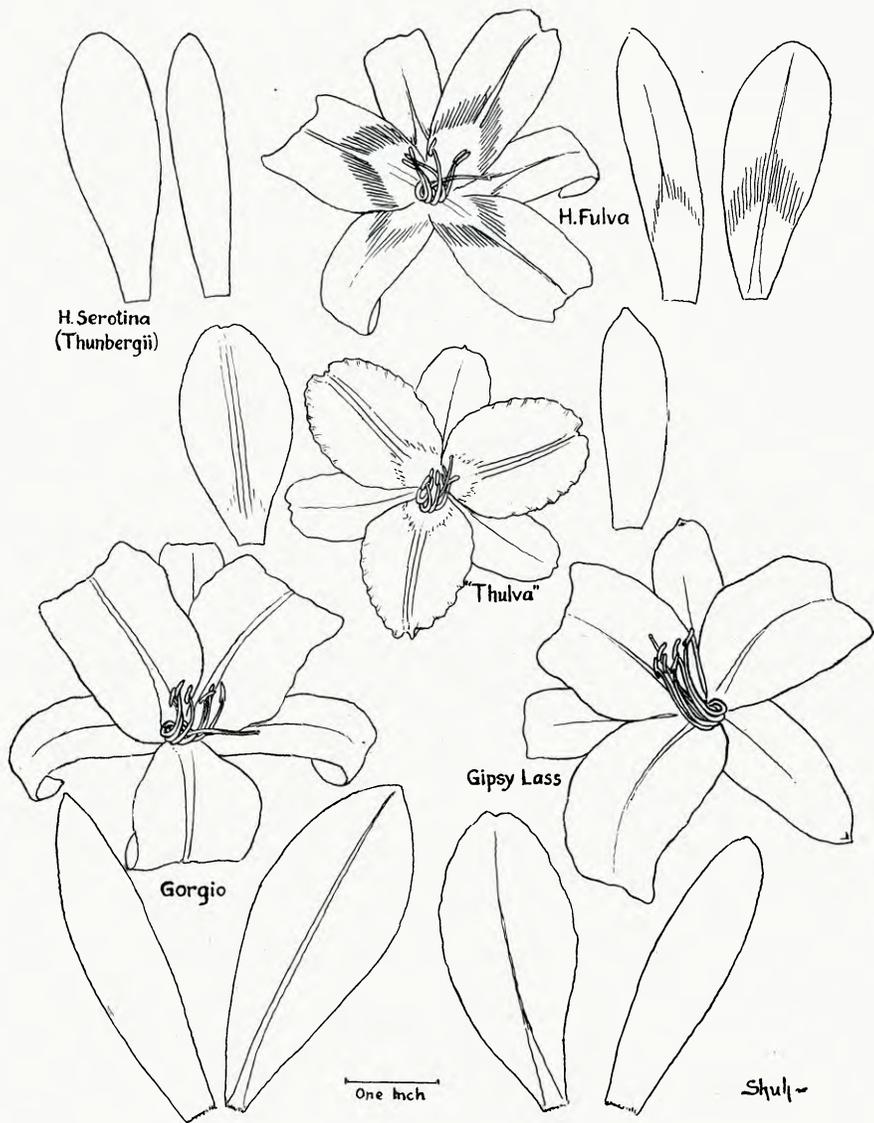
As yet little has been published regarding the genetics of *Hemerocallis* and of course nothing of importance can be contributed along this line by the hit-and-miss methods of "breeding" indulged in by many producers of new varieties at the present time. Only by carefully controlled matings of known species and varieties and well kept records of results, can such information be accumulated, to serve, and perhaps to save the time of, future daylily breeders.

It is quite possible to produce beautiful horticultural varieties by merely sowing the seed initiated by roving insects for it is only necessary to grow huge numbers of seedlings and select the best of them for distribution. Many of our fine varieties have originated in just this way but it would seem that a less wasteful method might be found through accumulation of data regarding their genetic behavior.

The notes here presented are confessedly meager and little more than a challenge, but they may serve as a stimulus for further work. They deal with the mating of *Hemerocallis serotina* (syn. *H. Thunbergii*) with *H. Fulva Europa*.

From its characteristics and behavior we must think of *Europa* as something less than a pure species, unavailable for selfing, but its pollen can be used on species that are fertile. In the case here reported *H. serotina* received the pollen of *Europa*. Only three offspring resulted from this union and two of these when they came into flower were outwardly not distinct from the seed-parent. The other, however, was very distinct from either parent. Petals were much broader than in either *Europa* or *H. serotina* (See Plate 210). The color was a bright orange body color strongly overlaid with red in the central portion of the flower but without *Europa's* distinct eye-zone. Diameter of flower is about the same as in *H. serotina*, not large, but owing to the greater width of petals producing what is known in daylily parlance as a "full" flower.

There has been no thought of introducing this variety, which for purposes of record was designated as "*Thulva*", but because it shouted its hybridity all over the premises it was chosen for further breeding work. True to general experience with hybrids it sets seed with considerable reluctance, about one in twenty pollinations resulting in seed. Seed was obtained from pollen of what I have as *Florham*, and also with pollen of *Iris Perry*. Petal and sepal tracings are presented from both of these matings. It is notable that although the origin of wide petals is not obviously inherent in either of the grand-parents, *Europa* or *H. serotina*, nor in the subsequent pollen parents, *Florham* or *Iris Perry*, nevertheless the wide petal character has carried on to the generation represented by *Gorgio* and *Gipsy Lass* (See Plate 210). *Gorgio* is a bright clear yellow self with a conspicuous near-white midrib, reflecting



*Petal and sepal tracings and face views of three generations of daylilies. HEMEROCALLIS SEROTINA X EUROPA producing "THULVA"; "THULVA" X FLORAM producing GORGIO and "THULVA" X IRIS PERRY producing GIPSY LASS. See text for further details, pages 93 and 95.*

in its color that of *H. serotina*, its maternal grandparent, as well as that of *Florham*, its immediate paternal parent. *Gipsy Lass* retains the orange color of both its immediate parents but discards the quite narrow petalage of the paternal *Iris Perry*.

In the absence of statistical data based on the sibs of *Gorgio* and *Gipsy Lass* these meager notes may not be of very great significance, but I have the impression that the wide petal character is quite prevalent among them and may be looked upon as a definitely heritable character.

## REPORT ON INTER-SPECIFIC HYBRIDIZATIONS IN HEMEROCALLIS

A. B. STOUT,

*The New York Botanical Garden*

This report presents the list of the inter-specific hybridizations that have yielded seeds in the breeding work done at The New York Botanical Garden during the past twenty-five years. References are made to the most important of the publications which give information on matters that are mentioned and these references are listed at the conclusion of the text. For convenience in presenting a compact tabulation, the species and certain clones are listed alphabetically and numbered consecutively. For each combination the seed parent is named first and the pollen parents are then indicated in numerical sequence. It should be noted that this tabulation does not include any of the numerous pollinations made (a) for later generations than F<sub>1</sub>, (b) for selective breeding after hybridization, (c) for intra-specific breeding, (d) for the hybridizations of hybrids with species other than their own parents, and (e) hybridizations which involve several types of daylilies that may later be described as new species. Also it does not include inter-specific pollinations which have failed to yield seeds.

### THE TABULATION

1. *H. aurantiaca* x 2, 4, 5, 6, 7, 10, 11, 12, 13.
2. *H. aurantiaca* clone *Major* x 4, 5, 6, 7, 10, 11, 13, 15.
3. *H. aurantiaca* var. *littorea* x 8, 10, 11, 13, 15.
4. *H. citrina* x 1, 2, 5, 10, 13.
5. *H. Dumortierii* x 1, 2, 6, 8, 9, 11, 12, 13, 14, 15.
6. *H. esculenta* x 1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 15.
7. *H. exaltata* x 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15.
8. *H. flava* x 1, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15.
9. *H. Forrestii* x 2, 4, 5, 8, 10, 11, 12, 13.
10. *H. fulva* x 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 15.
11. *H. Middendorffii* x 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14, 15.
12. *H. minor* x 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15.
13. *H. multiflora* x 1, 3, 4, 5, 6, 10, 11, 12, 15.
14. *H. nana* x 5, 12.
15. *H. Thunbergii* x 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

## COMMENTS

*Taxonomic considerations.* The name *H. aurantiaca* Baker (1, 5, 7, 24, 26, 32) was given to a single plant that had pale fulvous flowers as have many individuals of *H. fulva*. This one plant was propagated as a clone. No seeds have been obtained from the members of this clone to any self-, close- or intra-clonal pollinations. The breeding behavior, judged by hybrid progenies, indicates that this clone is heterozygous for such important characters as fulvous coloring in flowers and evergreen habit of growth (35). Several clones are being distributed under the name "*H. aurantiaca*" which are not like the clone described by Baker.

The "*H. aurantiaca Major*" Baker (2, 24, 26) is also a clone. Its flowers do not have fulvous coloring. It seems to be homozygous for absence of fulvous coloring and for the evergreen habit. It may indeed belong to a wild type that merits a specific name.

Of the *H. aurantiaca littorea* (Makino) Nakai (3, 5) the New York Botanical Garden has received from Professor Nakai two plants that are evidently divisions of one plant. The flower coloring is pale fulvous similar to that of *H. aurantiaca* and many plants of the *H. fulva*. The capsules are more typical for *H. fulva* than for the *H. aurantiaca*.

Of *H. flava* (9, 26, 30, 32) there are evidently two or possibly three main clones of which one has long been known in Europe. No plant closely resembling this one clone, which Linnaeus named as his type of this species, has yet been described or collected in the Orient. The name *H. flava* has, however, been applied to many of these plants.

In the above tabulation under the name "*H. fulva*" there are listed the F<sub>1</sub> hybrid seed progenies obtained with *H. fulva* clone *Europa* (14, 15, 26) and with those wild plants obtained directly from both China (including *H. fulva rosea* [18, 26, 32, 34]) and Japan which are at present included in one species. The characters ascribed to the *H. disticha* Donn and to the *H. longituba* Miquel (5, 14, 15, 26) are minor variations commonly seen in the group here considered as the one species. Breeding with the double-flowered clones of *H. fulva* (*Flore Pleno*, *Green Kwanso* and *Variegated Kwanso* [14, 15, 26]) has mostly been intra-specific.

The name *H. esculenta* here includes a group of wild plants obtained from Japan and seedlings obtained from selfing and crossing some of them. These plants conform closely to the descriptions and illustrations given by Nakai (5) for the species *H. esculenta*. It is now evident that this species does not have "rubra luteis" flowers as first described by Koidzumi (4, 26) but does have clear orange colored flowers most like the *H. Middendorffii*.

For the species *H. citrina* (16, 26, 32), *H. Dumortierii* (8, 26, 29), *H. Middendorffii* (10, 26), *H. minor* (11, 26) and *H. Thunbergii* (13, 26) the New York Botanical Garden has plants that are either definitely known to be of the older clones first described as the types of these species or clones long cultivated in Europe and also there are of each of these species plants recently obtained in considerable number from the wild in the Orient.

Of *H. exaltata* (26, 27) and *H. multiflora* (12, 19, 26) there are all the original plants obtained from the wild that were considered in the descriptions of these new species and also there are progenies of seedlings from both groups. Seedlings of *H. Forrestii* (26) have been grown from seeds collected in China. Of numerous plants obtained as *H. nana* (26, 29) only a few have been correctly named.

It should perhaps be stated that plants are being distributed in Europe and America under the names *H. nana*, *H. Forrestii*, *H. minor*, *H. Thunbergii*, *H. flava* and *H. multiflora* which do not conform to any specific name and which are obviously hybrids or aberrant individuals.

*Cold treatment for seeds.* At the New York Botanical Garden the seeds of daylilies are, as a rule, planted in seed pans during late summer or early autumn. Usually there is prompt germination. But there are seeds which rot in the seed pans without germination, unless they are given cold treatment (35). When seeds do not germinate within a few weeks after they are planted they are usually placed in a refrigerator at a temperature slightly above freezing for a period of about six weeks after which there is often prompt germination.

*Inter-specific hybridizations that have failed.* For the pollinations that have been made with the daylilies listed in the above tabulation only two combinations have failed to yield seeds in both of the reciprocal relations. These are *H. aurantiaca* with *H. Forrestii*; and *H. aurantiaca* clone *Major* with *H. flava*.

A number of inter-specific relations readily produced seeds when one species was a seed parent but repeatedly failed to produce seed when the other was the seed parent. There were only six failures among all the inter-specific relations that were tested in only one of the two possible reciprocal pollinations. In five of these a plant true for *H. nana* was the pollen parent.

In daylilies there are several somewhat special conditions aside from fundamental specificity that influence and even determine whether or not fertilization will follow pollination. The day-blooming, the night-blooming and the extended-blooming daylilies (25, 26) differ in respect to the time of the day when pollinations are most effective. Changes in weather produce irregular and abnormal opening of sets of flowers. For hybridizing pollination between parents that flower at different calendar dates, pollen that had been stored was often used and it was not always convenient to test the viability of the pollen.

*The record for H. nana is of special interest.* The species *H. nana* is, it now seems, the only one of the genus which has solitary flowers that are terminal on the main scape and on the few laterals (usually one or two) when these develop on a scape and also for this species there are no traces of secondary laterals or of their bracteoles which in all other species are either present to form bostryxes or evident in a rudimentary condition (36).

*H. nana* has hybridized both as a seed and as a pollen parent with *H. Dumortierii* and with *H. minor*. It has hybridized as a pollen parent with *H. flava* and with *H. Middendorffii*. But all the F<sub>1</sub> hybrids thus

far obtained which have *H. nana* as a parent are almost completely sterile from the abortions of microspores and macrospores. This sterility from hybridization is so strong in these hybrids that only a few seeds have been obtained from thousands of the flowers over a period of several years. Of the inter-specific pollinations which have been made, there were no seeds when *H. nana* was a pollen parent with *H. aurantiaca*, *H. aurantiaca Major*, *H. citrina*, *H. esculenta*, *H. exaltata* and *H. fulva*.

*Horticultural values.* Very few of the F<sub>1</sub> hybrids grown at the New York Botanical Garden have even been considered in selecting plants for horticultural culture.

Of the hybrids obtained from certain relations, individuals can be selected which closely resemble most of the earlier clones that were introduced, as, for example, the *Tangerine Daylily* and the *Gold Dust Daylily*. The more distinctly new and outstanding seedlings which have been propagated and introduced as clones (Mikado [19, 22, 26], Wau-Bun [20, 22, 26], Bijou [23, 26], and Theron [26, 28], etc.) were obtained after repeated hybridization had increased diversity and then often there were several generations of selective breeding (6, 22, 26, 28, 27, 31, 32, 37, 38).

There has, however, been selective breeding within certain species. The best and clearest shades of rosy-pink and pink colors without the eye-zone in flowers were obtained by intra-breeding plants of the botanical variety *H. fulva rosea*. But hybridizations of these plants resulted in greater diversity in the shades of color and also there were different forms and sizes of flower and plants widely diverse in stature, in habits of growth, and in season of flowering.

*Genetical results.* A discussion of the genetical results obtained in the breeding work with *Hemerocallis* was presented in the program of the Seventh International Genetical Congress held in Edinburgh, Scotland in August 1939. An abstract of this was published in the Proceedings of this Congress (37). Few of the readers of *Herbertia* will see this volume and as there are no separates of the abstract it may be somewhat appropriate to republish it here. It is as follows:—

“The recognized species of *Hemerocallis*, about fifteen in number, possess wide diversities in such important features as stature, habits of growth, season of bloom and flower characters (as size, colouring and flowering behavior). Except for the several triploid clones in the species of *H. fulva*, all species are, it appears, diploid with  $2n=22$  chromosomes. There are some inter-specific hybridizations that fail and certain F<sub>1</sub> progenies have not yielded seeds to any pollination\*; but many hybridizations between species that are widely different have been accomplished. As a rule, in the F<sub>1</sub> hybrids there is either some degree of dominance or some degree of intermediate expression for the sharply contrasted characters of species used as parents. In only a few cases do decidedly new and unexpected characteristics appear in the F<sub>1</sub>.

\* This statement refers especially to the F<sub>1</sub> hybrids which have *H. nana* as one parent. A few seeds have now been obtained on some individuals of most of these progenies. Possibly from such seed fertile allotetraploid plants may be obtained.

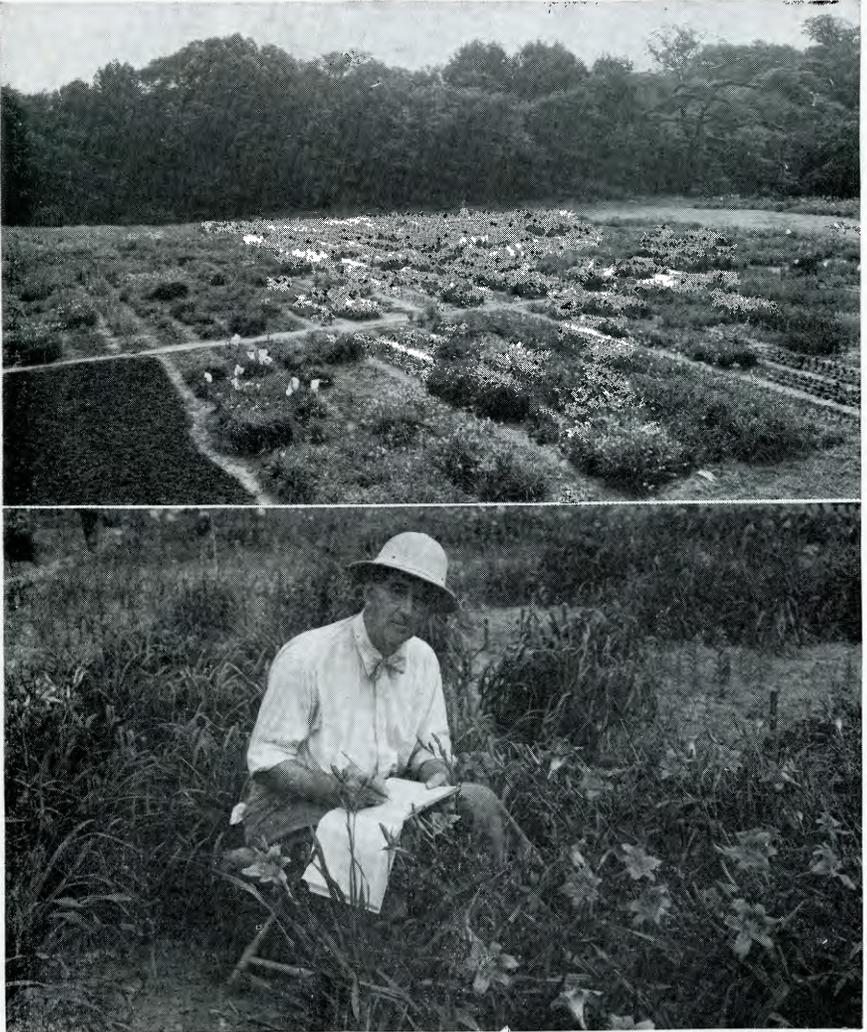


New York Botanical Garden

See page 101.

View of experimental greenhouse, New York Botanical Garden, March 1939; in front, Dr. A. B. Stout and Dr. Clyde Chandler; in rear, with coat on, Mr. Francis Cataldi. Asst. for two years supplied by W. P. A., and Mr. Michael Murphy, gardener since 1931. Note daylily seedlings in center bench.

Plate 211



Felda Griffith, N. Y. Bot. Gard.

See page 101.

*Upper, view of New York Botanical Garden experimental daylily breeding plots; lower, Dr. A. B. Stout at work.*

But numerous rather distinctly new expressions for various characters are obtained when hybridizations, especially those which involve several species in the parentage, are followed by selective breeding. These may be due (a) to recombinations which involve two or more pairs of contrasted characters, or (b) to distinctly new expressions. One example of the latter is the intensification of pigmentation which resulted in flowers which have dark mahogany red colouring. First there was hybridization which involved yellow-flowered species and species with fulvous flowers. The F<sub>1</sub> had pale fulvous flowers and of the F<sub>2</sub> none had flowers that were darker than the more fulvous parent. Then plants which showed the greatest degrees of anthocyanin pigmentation were used as parents in further breeding and in backcrossing. In the fifth generation a progeny of sixteen plants was obtained, all of which had degrees of dark red pigmentation not seen before in any day-lily. The various complementary factors which interact to intensify anthocyanin pigmentation in the flowers were brought together by hybridization and by the subsequent selective breeding into relations which produced a new type that had hitherto not been in existence. Thus in selective breeding after hybridization of *Hemerocallis* various specific characters may be modified for the development of distinctly new horticultural types of day-lilies.”

*Inter-generic pollinations.* Perhaps mention should be made here that numerous controlled reciprocal hybridizing pollinations have been made between various species and types of *Hemerocallis* and *Hosta*. Professor John V. Watkins made most of these during 1936 and 1937 while at The New York Botanical Garden on a scholarship basis. The writer has also made numerous of these pollinations over a series of years. A few seeds were obtained from one pistil of a *Hemerocallis* plant but the seedlings grown were purely daylilies indicating either lack of control in the pollination or apogamy.

*Acknowledgment.* During the thirty years of research with *Hemerocallis*, of which this paper reports a small part, the writer has had the efficient and valued assistance of several assistants, numerous students, recipients of scholarships, volunteer workers, and also helpers supplied by the Works Progress Administration in experimental work, in clerical work, and especially for paintings by artists. During the past few years the task of compiling the records of inter-specific hybridization and of making further inter-specific pollinations has been the responsibility of Dr. Clyde Chandler, Technical Assistant to the writer since 1927 (See Plate 211). The most noteworthy expansion of the research with *Hemerocallis* was made possible in 1930 when Dr. Elmer D. Merrill, then Director of The New York Botanical Garden, allotted the area, shown in Plate 212, to the writer for the studies in experimental breeding. To Dr. Merrill especially and also to others in the administration of the N. Y. Botanical Garden the writer here records his deep appreciation.

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## BREEDING FOR GOOD RED DAYLILIES

WYNNDHAM HAYWARD, *Florida*

Until good, bright, clean "reds" of pleasing full shape of flower are obtained by the daylily breeder, this phase of *Hemerocallis* hybridization will remain one of the most attractive avenues of discovery for the "plant explorer."

Probably the "reds" would have come into popularity without the introduction of *H. fulva* var. *rosea*, one clone of which has been given the garden name *Rosalind* by Dr. A. B. Stout. Before receiving the original plants of *H. fulva* var. *rosea* from Dr. A. N. Steward in China, Dr. Stout, who first took up the serious breeding of "red" daylilies, had developed a series of hybrids in this color class. The availability of the wonderfully significant *H. fulva* var. *rosea* opened wide the door to an amazing vista of breeding possibilities in the darker daylily shades.

Dr. Stout is to be congratulated on having made available plants of the rare, rose-colored, wild Chinese daylily to *Hemerocallis* breeders and fanciers in England and America. The garden world owes its congratulations to Dr. Steward for his perspicacity in sending back to the United States plants of the *H. fulva* var. *rosea* collected in China. All scientific progress is a matter of cooperation, and as a result of the generous distribution of the fundamental breeding material which has been made possible in recent years, back yard gardeners from Seattle to Miami are feverishly growing seedlings of the "red" shades of day-lilies.

*Hemerocallis fulva* var. *rosea* seems to be quite infertile to its own pollen. When carefully handpollinated with the pollen of other species or hybrids, it will set seed, sometimes in fair abundance, and from these first generation seedlings come some noteworthy surprises. The shades are usually not outstanding or striking in the first generation of flowers. Some will be coppery, some apricot-like, a few very dark maroon, and many in various brownish shades. A few seedlings, out of many, will have possibilities for further breeding of pink or true reddish colors.

Cross breeding between these seedlings of *H. fulva* var. *rosea* will give most interesting results, clearer colors, better forms, new shades, approaching chocolate, purple, wine, and even scarlet tones. From this point on, the future possibilities are almost unlimited, depending only on the care and enthusiasm and facilities of the hybridizer.

Of one thing the hybridizer may be certain, surprises—and he will also have more than his share of disappointments. If he obtains one new and outstanding type in a batch of one to five thousand seedlings he will be more than lucky. The great proportion of his "red" seedlings will not even be red, but a kaleidoscopic range of lighter or darker off-shades, usually on flowers of inferior shape and quality.

The achievement of obtaining a fine clear red *Hemerocallis*, with a flower of good shape, size and texture, will be the result of pure good luck or the most unremitting research and care in breeding, or both. It is a goal worth aiming at, and capable of inspiring the minds of plantsmen for years to come, in all probability. It will come, but it will take time, like anything worth while in horticulture.

## DAYLILY BREEDING ROUNDUP

The Daylily Breeding Roundup was begun in 1940 *HERBERTIA* with brief articles by eight of the younger daylily breeders: (1) Robert Schreiner, (*Minnesota*); (2) J. Marion Shull, (*Maryland*); (3) John V. Watkins, (*Florida*); (4) Elizabeth Noble Nesmith, (*Massachusetts*) [article by Mrs. Ethel P. Dewey]; (5) Wyndham Hayward, (*Florida*); (6) Leon H. Leonian, (*West Virginia*); (7) Elmer A. Claar, (*Illinois*); (8) Hamilton P. Traub, (*Florida*). The Roundup is continued in this issue with brief articles by additional daylily breeders.

There are still other of the younger daylily breeders to be heard from, and for their information it should be stated that this Roundup will be closed in the 1942 issue of *HERBERTIA*. Do not delay in sending in your brief article on your daylily breeding activities.

—*Hamilton P. Traub.*

## PRODUCING NEW DAYLILIES

J. B. S. NORTON, *Maryland*

Twenty years ago we acquired a new place to live on, with an acre of woods around the house. In looking for flowers that could be grown in shade, among other things, *hemerocallis* was recommended. We planted some *H. Flava*, single and double *H. Fulva*, some unknown clones, and soon bought the early Stout clones. In a few years it was found that they were blooming less and less in the woods, but did well in moist open ground.

Under the inspiration of Dr. Stout's brilliant work, I began to pollinate and save some seeds for the purpose of raising new clones, until now I harvest about 20,000 seeds a year, which is far more than can be grown on the acre or two we started with; but a great many beautiful and interesting selections have been made with a great deal of pleasure and satisfaction, and even frequent thrills from seeing new kinds come into bloom, often of types that could not be obtained on the market without waiting years.

Having plenty of science in my daily work, and carrying on the daylily production from an artistic standpoint, I have left the genetics largely to professional experts, and have methods, if they can be called methods, that will produce large numbers of crosses, with selecting and discarding as the main work. So far as feasible, pollen is put on all the flowers in the garden, every day, which, here near Washington, D. C., means from late April to late October. No bagging, emasculating, labeling or recording of parentage is done, except that seeds are kept separate from some more promising seed parents.

Stamens from which pollen is desired are carried around in the hand and the loose pollen touched to the stigmas, in general putting those together that seem more likely to make the desired combinations. The main interest is in seeing what the offspring will be like, rather than

in knowing their parentage. The heavy load of seeds produced may reduce growth and propagation of the plants, but if so, it has not been noted.

The mathematical chance of getting new kinds is very great. If all the combinations of characteristics noted could be made, the number of distinct kinds that could be distinguished would run into the billions. This indicates a field of effort large enough for everyone who wants to go into it to work for many years without exhausting the possibilities.

When the pods begin to crack, they are gathered and generally shelled the same day. If allowed to lie in unventilated masses, a rapidly growing white fungus softens the green pods. Some of the early kinds are planted in summer. Most of the seeds are sown thickly in open rows, October to December, or even in January, and again in March and April. Early spring and late fall sowings do about equally well. Some choice kinds are grown in the house in winter, and this gives them a little advantage. I have had a greenhouse grown plant to flower in 11 months from seed. The garden grown seedlings bloom in two to four years.

If I had plenty of ground, I would sow thickly in beds and transplant one year seedlings three to six inches apart in rows, discarding the inferior ones as they bloom and setting the selections into well-spaced rows. As it is now many of them have to be left to fight it out growing too thickly together.

The plan of selecting and breeding to an ideal type does not seem to me as good as to try to get many new kinds with beauty and quality, looking for new types not yet attained. This keeps up interest which is lost as the ideal is approached. Yet I have had some ends in view, some of which are being reached, and others for which there is little hope. There was a dearth of pinks, and with no pinks to start with I got creamy pinks in the second generation, and out of these, a practically pure pink this year. Whites tried for do not seem very promising. Many kinds of extra organs have appeared in petals, stamens, and carpels, but no real doubles as yet. I have tried to select some good fragrant night bloomers to fill a real need for cut flowers, moonlighted and electric-lighted gardens, and especially, for the majority of our gardeners who are away from home during the day, and our flower shows which are attended mostly by night. The main present interest is in color patterns other than spots, halos and bicolors.

#### AIMS IN DAYLILY BREEDING

C. W. CULPEPPER, *Virginia*

At present it seems that the principal object in growing daylilies from seeds is the production of new clones with superior qualities in the vegetative form of the plant or in the flower, the improvement of the flower being the most important. This is very well but propagation by seeds may be useful from another point of view. There are many

beginning garden-enthusiasts who feel that they cannot afford to purchase the assortment of clones necessary to secure a wide range of desirable color forms. This difficulty may be avoided by growing the plants from seeds. It is a simple matter to produce seeds that will give plants with flowers of the desired color range. By choosing a few good seed bearing parents and pollinating their flowers with a mixture of pollen from some of the better varieties the resulting seeds will produce plants that are the equal of any except the very expensive clones. In my own garden I have found that *Rajah*, *Stalwart*, *Hyperion*, *Gold Imperial* and *Vulcan* are good seed bearing parents. When these clones are pollinated with a mixture of their own pollens, the seedlings produce flowers of good quality. From a hundred or so such plants individuals may be selected that for all practical purposes will be the equal or superior to three fourths of the varieties that are generally offered by the trade at the present time. Among the early varieties *Dr. Regal* and *H. minor* produce seeds abundantly. No doubt there are many other varieties that would be satisfactory as seed bearing parents. Mediocre parents should never be used and the latest and best should be chosen where available. It would seem that seedsmen should not overlook this possibility of serving their customers.

My chief interest in growing seedlings has been the production of better early varieties particularly red-flowering forms. So far little has been accomplished. I am also looking for types that are more dwarf than those commonly grown. Improvement in floriferousness as well as in color and size of flower is desirable in the dwarfs.

A few seedlings of *Rajah* x *Vulcan*, and *Vulcan* crossed with other red forms, have been grown. Among these is one that is slightly deeper in color than *Vulcan* and borne on a taller, better branching stem. It will have to be tested further to determine whether it is sufficiently superior to warrant introduction.

#### DAYLILY BREEDING AND TESTING AT CRAEMORE

##### L. ERNEST PLOUF, *Massachusetts*

Our first object was to collect as many known clones as possible so that our breeding would begin at a point where daylily hybridizing had been advanced by others. Importations were made of clones introduced in England, from their original sources. Through the kindness of his daughters and his friends in England, all the introductions of the late George Yeld were obtained. All of Amos Perry's selections were collected. Many of the American introductions were purchased from the originators as well, and assembled in our garden. Today we have a collection of over three hundred and fifty varieties for breeding and testing. The Curator of the Royal Botanic Garden at Kew, England was considerate in supplying us with many items and from him we received *Fulva Rosea Rosalind* and *H. multiflora*. From the Royal Botanic Garden at Edinburgh, Scotland, we received the species *H. nana* and *H. Forrestii*. These have been especially valuable in our work. All these plants were tested and selected for breeding purposes.

We obtained a form of *H. fulva rosea* which we named *Fulva Rosea Pastelrose*. It is much more pink than *Rosalind* and without the deeper eye-zone. We were fortunate in purchasing deep red forms from a superintendent of an estate and this enabled us to make many crosses using reds for pollen parents. By persistently intercrossing reds and yellows we obtained fragrant deep red varieties.

All seedlings were started in the greenhouse for the first five years, giving blooms the second year, after which time only reds were used as seed parents. Each year seedlings not desired for further breeding were destroyed so that we would not have the urge to introduce clones before real progress had been made. Today we have a large number of seedlings to study.

Seedlings as well as new plantings of introductions of others, are grown at first in soil of poor plant food content that selections may be made for further study. After seedlings and named clones bloom the first time in poor soil, if worthy, they are moved to another garden with soil of good plant food content, where their real beauty can be realized and from this garden, when plants are thoroughly established, our descriptions are taken and introductions made. Temperatures here at Lawrence, Mass., range from twenty-eight degrees below zero to one hundred ten above in the sun. We have an excellent opportunity to test for hardiness and sun-resistant qualities. Some really fine clones recently introduced by others are not sufficiently hardy here.

Up to the present, we have introduced very few varieties, our first being in 1937, but beginning in 1941 we shall be ready for many releases.

We are particularly interested in red, lavender and pink varieties. The very full flowers are favorites with us. Fragrance in daylilies has been greatly stressed. It is our opinion that fragrant reds will be as prevalent as good fragrant yellows in time to come. We are greatly interested in flowers with decidedly green throats. We like those with the throat coloring reaching high up on the segments as well as keeping very low in the heart of the flower. Brighter lemon and yellow, mauve, raspberry, very bold reds with purple tones having soft cream to replace all the yellow are appreciated.

The writer, now in his late thirties, began daylily breeding in 1930. Professional photography is his occupation and always will be his work. To distribute adequately the daylilies originated he entered the commercial field under the name of "Craemore Daylily Gardens." Although any of the daylilies at Craemore are for sale, a specialty is made of "One Hundred of the Best Clones"—not by giving preference to his own, but by giving consideration to all. What he wants is good daylilies and not the glory of having introduced them. There are clones from nearly all prominent breeders in the selected-list.

The clones introduced by us are described elsewhere in this issue of HERBERTIA.

It is a pleasure to have had connections with Mr. Kelso and Prof. Graves who started the evaluation of daylilies. The latter was responsible for the planting, handy to us, of as many as three hundred varieties at the Mass. State College. We are appreciative of the work of The

American Amaryllis Society in recording daylily information. We are especially appreciative of the wonderful work of the late Mr. Yeld with daylilies at a time when results were very slow. His variety *Amber*, a very pale lemon, very full, with very heavy substance and of excellent fragrance is a monument to him. Of course we all know of Dr. Stout, who is responsible for our having the new species to revolutionize the daylily, and not forgetting Mr. Betscher, one of the pioneers to give us breeding stock.

*Seedling Distribution.* The distribution of daylily seedlings which are not worthy of naming and introduction, in our opinion, should be greatly discouraged in order that real progress will continue in daylily hybridizing. It is true that the breeder has numbers of very fine seedlings to discard each season. They are, however, inferior to the one selection made for introduction. The release of unnamed seedlings will spread daylilies generally more rapidly but it seems to us that the introduction of really fine varieties is much more important.

Another aspect to be considered concerns the breeder who sells his introductions. The caring for a field of sixty thousand seedlings for the period of time necessary for selection and reselection for introduction is costly. Out of a field of that number of seedlings possibly only a small number should be retained for further study and of this group only a few introduced. When large quantities of seedlings are grown to assure really fine forms, much help for their care is required. In turn the commercial breeder must realize sufficient income from his introductions to permit him to continue the work each year. Unnamed seedling distribution will decrease his sales.

That the progress in daylily hybridizing will not be retarded, making his business secure, we are certain that the breeder who has large quantities of unnamed seedlings will not distribute them, even though they are much better than those now generally in gardens. The hobbyist who does breeding should use great care to select only the very best of his seedlings, and to study large collections before introducing any and should destroy all others rather than to distribute them among friends. They might in time be named by others with too little knowledge of the new daylilies of today.

It takes quite a strong will to destroy large quantities of raspberry-colored seedlings, fine lavender-hued types and large, very fragrant deep red forms. However, there is great reward, if only the unusually outstanding seedlings are retained for further study and introduction.

#### MY INTEREST IN HEMEROCALLIS

M. B. MATALACK, *Virginia*

This interest in daylilies began when I first obtained a plant of *H. Middendorfi*. The color, habit of growth and time of blooming were so different from the only other daylily which I knew (*H. fulva*) that I was very much impressed. I then began to collect those which were within my financial reach. This was at about the time at which some

of Dr. Stout's newer creations were beginning to be released. Not being able to obtain the newer and finer breeding stock I commenced to make crosses among those at hand. I have been interested in working towards lightness in color, extension of time of bloom and of greater variation in color and form of early blooming varieties. As yet I do not feel that I have produced any plants which are sufficiently superior to those already on the market to warrant their introduction but I have had a lot of fun and still hope to obtain something of merit.

2700 North 25th St.,  
Arlington, Virginia.

#### DAYLILIES IN JACKSONVILLE, FLORIDA

MRS. W. E. MACARTHUR, *Florida*

The daylily continues to interest the garden minded in this locality now that the daylily horizon has been broadened by the distinct new types and varieties of larger, more colorful hybrids that have extended the already long blooming season in Florida. The Camellia growers turn naturally to the daylily for spring and summer activity fascinated by the quick possibility of new creations all their own.

Mr. P. D. Shoemaker, of Jacksonville Landscape Co., has a fine collection of daylilies. One of his cherished, worthwhile seedlings has been named *Mary Grace*. Mr. Shoemaker recognizes the value of daylilies as landscape subjects and uses them copiously in parks, estates and small home plantings in this area. Mr. Ernest Sligh, of Slighs, Inc., has a very exclusive collection of all the finest varieties that have been released. By hybridization he has originated some very handsome new varieties, some of which have been named for his friends and customers. Junior Garden Club members are also experimenting in this fascinating work of daylily breeding.

Mrs. John H. Churchwell who excels in all phases of good gardening has perfected several vigorous bi-color seedlings of outstanding beauty. One gorgeous seedling has been named *Senator Fletcher*, in honor of the late Hon. Duncan U. Fletcher, United States Senator of Florida for many years.

The old-fashioned daylily has undergone a magical transformation in the hands of capable hybridists in these last swiftly passing years. Some have even been concentrating on more durable bloom, self-cleaning habit and the coveted shades of blue and white.

Floridians observe with pride the daylily breeding carried on at the University of Florida by Professor John V. Watkins with the cooperation of Dr. H. H. Hume. Some amazing new color combinations have been secured, one striking new seedling has been named *Mrs. John T. Tigert*, for the wife of the President of the University of Florida. This new clone has been released to the flower loving public by The Glen Saint Mary Nurseries, Glen Saint Mary, Florida, a firm that also introduced the twisted, lovely golden-petaled *Emily Hume*.

While daylilies are excellent in garden designing for reason of easy culture, freedom from the molestation of numerous garden pests, their greatest asset is their ability to give daily bloom all through our hot, dry or wet summers with a minimum of care. Last but not least they are being recognized and used in designing artistic arrangements for luncheons and teas.

#### PRELIMINARY REPORT ON TIME OF FLOWER FORMATION AND CHROMOSOME NUMBERS IN NERINE

W. M. JAMES<sup>1</sup> AND F. T. ADDICOTT<sup>2</sup>

The Genus *Nerine*, found only in South Africa, was first introduced to cultivation many years ago and has gradually become more and more popular, especially in England. In spite of being in cultivation so long, little is known of the details of its life history.

The species of this amaryllid genus may apparently be divided into two cultural groups—those that bloom before the foliage is produced and those with flowers contemporaneous with the foliage. The first group, including among others *N. sarniensis* and *N. humilis*, is found in the western part of South Africa where there is rainfall in the winter only. The other group, including *N. flexuosa*, *N. filifolia*, *N. Bowdeni* and others, is found in the eastern parts where there is rainfall in the summer only. These distinctions, however, must be accepted with reserve as there may be, in certain instances, a little overlapping. For example, there is *N. undulata* which comes from both summer and winter rainfall areas.

A collection of English hybrids and a few species growing at Las Positas Nursery gave an excellent opportunity to study reproduction and hybridization in this genus. It was found that some of the English hybrids failed to set seeds or cross with certain other hybrids or species. Some of the crosses made at Las Positas Nursery gave rise to apparently sterile plants. In his *Amaryllidaceae* (published in 1837), Herbert mentions sterility in certain crosses. This sterility unfortunately prevents recombination of certain desirable characteristics.

Because a knowledge of the chromosome numbers and morphology is an aid in determining relationships among species and hybrids of some genera, it was believed that a chromosome count of all the *Nerine* species available might show a reason for the sterility noted. There seems to be little literature on *Nerine* cytology. (HERBERTIA Vol. 4, 1937, pages 170-171). The report of Heitz (*Der Nachweis der Chromosomen Zeit. Bot.* 18: 625-681, 1926) was studied by the writers and it was found to be very limited.

*Materials and Methods.* It was anticipated that chromosome counts could be obtained from anther smears stained with Belling's aceto-

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<sup>2</sup> F. T. Addicott received his Ph.D. degree in Plant Physiology and Genetics from the California Institute of Technology and at present is Assistant Professor of Botany at Santa Barbara State College.

carmine. The first few slides made showed that final reduction of the pollen grains takes place some time before the flower buds or umbel emerges from the bulb. Therefore it was found that it would be necessary to cut the bulbs in order to get anthers in the proper stage.

The supply of bulbs of most kinds was too small, and the bulbs were too expensive to cut. The quantity of *Nerine filifolia* was almost un-

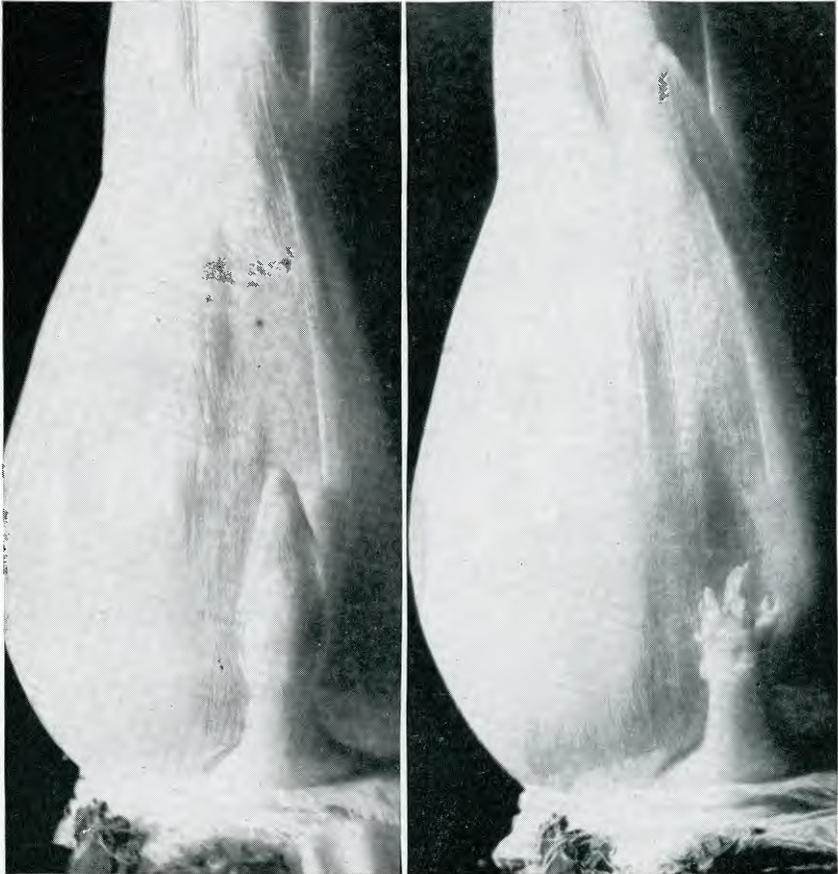


Fig. 65. Dissected bulbs of *Nerine Bowdeni*, showing next year's inflorescence; X4. Photo by W. M. James.

limited, but these bulbs are small and difficult to handle, especially in exploratory work. A few bulbs of *N. Bowdeni* were cut, with surprising results.

The first bulb dissected was a very lucky choice. At the time of cutting, it had a fully developed flower stem, with about one-half of the flowers in the umbel fully open. Close to the outside of the bulb the

dry remains of last year's blossom stalk was found. About half-way in, on the opposite side of the bulb, was the flower stalk with the open flowers already mentioned. Farther in, just inside the scales with fully grown leaves on them, again on the other side, a very small inflorescence was found. This was quite far advanced but the perigone segments were not completely developed, and this would presumably produce next year's flowers. An anther smear showed that the pollen cells were probably resting before meiosis and had not yet made a final reduction. Two flowering bulbs were cut later with only the present year's flower stem being found. The bulb shown in the illustration (Figure 65) was dormant and had been out of the ground for about one month when examined. Not nearly enough bulbs were cut to determine the bulb structure with any accuracy. However, certain things were quite evident. The leaf arises from one-half, or one side only, of the circular scale or swollen leaf base of the bulb. The side from which the leaf arises is thicker than the other side. Six, seven or eight circular scales were found between each flower stalk. On each side of the flower stalk is a scale only part of the circumference in width; on the outside of the stalk it is about one-fourth of the circumference and on the inside about one-eighth. (See Figure 65.) It should be emphasized that these findings are only tentative and subject to revision if necessary in the light of further work.

Because of the time necessary in making slides by the paraffin method, temporary root tip smears were tried. Young main roots used before laterals started to develop and having slightly tapering, light yellow colored tips gave the best results. To start with, slides were made hourly during the day and night. This showed the greatest cell activity to be between the hours of 2 or 3 p. m. and 9 or 10 p. m. on clear warm days. Very little or no cell division was found when slides were made after a cloudy day. Following the preliminary trials, all slides were made between the hours of 5 p. m. and 10 p. m.

Sections were cut 50 microns in thickness with a straight razor and a hand microtome. The root tip was held in the microtome clamps between pieces of pith which had been cut from mustard stalks thoroughly soaked in water. Mustard pith was used because of its availability and because it was easy to find pieces with worm holes just the right size for the roots.

The sections stick to the knife and can be transferred with a needle to a slide with a drop or two of aceto-carmine stain. Four to ten sections were placed on one slide and then left in the stain from 5-10 minutes, or until they appeared darkly stained as seen through a hand lens.

The sections on the slide were then washed with a drop or two at a time of a solution composed of equal parts of hydrochloric acid and 95 per cent ethanol. This washing was continued for 5-10 minutes, or until the sections appeared to be destained sufficiently as seen through a hand lens. Some care must be used in this operation or the sections will wash off the slide.

The acid solution was then washed from the slide with 95 per cent ethanol. This operation moves the sections very little if it is done care-

fully and not too fast. Observation will soon show just how much washing is necessary to completely remove the acid solution from the slide.

Next a drop or two of stain is put on the closely grouped sections on the slide and a cover glass placed over them. After a minute or two the actual smearing was done by removing the surplus stain and flattening the sections between the cover glass and slide. Best results were obtained by placing a double thickness of soft writing paper over the

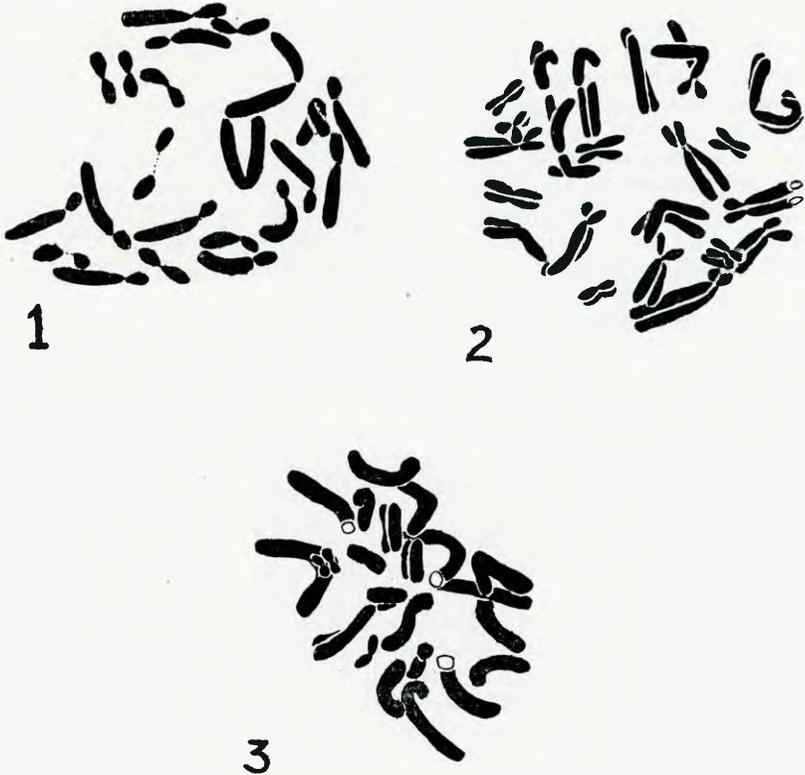


Fig. 66. Chromosomes of *Nerine* species; 1, *Nerine falcata*; 2, *N. Manselli*; 3, *N. coruscans major*; X1460.

entire slide, holding the paper very firmly on one end of the slide and then stroking the paper, over the cover glass, very gently toward the other end. If surplus stain is removed too rapidly, air bubbles are apt to form under the cover glass. The edges of the cover glass were then sealed by applying a mixture of paraffin and vaseline. Slides prepared in this way remained in good condition for several weeks. The chromosomes were stained by the time the cover glass was put on, but became darker and more distinct after a few hours. Chromosomes were counted with the aid of camera lucida sketches.

*Results.* Drawings of metaphase plates of the chromosomes of three species appear in Figure 66. These are all drawn to the same scale and indicate roughly the degree of variation of chromosome size within the genus *Nerine*. Within a species the chromosomes vary considerably in size as is usually the case in monocotyledons.

Table I shows the results of studies of six *Nerine* species and horticultural clones that were available. These counts are not to be considered final. It is intended to expand the list and check it carefully by a different method as time permits. The table does show several points of interest:

(1) The work of Heitz (quoted above), concerning *N. Sarniensis* and *N. curvifolia*, is corroborated. He reported the following haploid numbers: *N. sarniensis*, 11 -(12); *N. curvifolia*, 11 -(12); *N. undulata*, 11; *N. pusilla*, ca. 12.

(2) The chromosome numbers within the genus appear to be, however, somewhat more variable than Heitz' work suggested. If the hybrid horticultural clones are included, there are probably at least four different diploid numbers. The numbers 22, 24 and 28 seem fairly certain with a fourth number in the low 30's.

TABLE I

*Chromosome numbers of six Nerine species and five horticultural clones*

<i>Species of hybrids</i>	<i>Diploid chromosome number</i>
<i>Nerine flexuosa</i> var. <i>alba</i> .....	22
<i>Nerine sarniensis</i> var. <i>coruscans major</i> .....	22
<i>Nerine Bowdeni</i> .....	22 (-23?)
<i>Nerine falcata</i> .....	22 (-23?)
<i>Nerine curvifolia</i> var. <i>Fothergilli major</i> .....	24
<i>Nerine filifolia</i> .....	24
Hybrid <i>Nerine</i> hort. clone <i>Chameleon</i> .....	22 (?)
Hybrid <i>Nerine</i> hort. clone <i>Manselli</i> .....	24
Hybrid <i>Nerine</i> hort. clone <i>Elegantissima</i> .....	28
Hybrid <i>Nerine</i> hort. clone <i>Mrs. George Barr</i> .....	28
Hybrid <i>Nerine</i> hort. clone <i>Ingens</i> .....	32 (-34?)

(3) Examination of these preliminary counts alone indicates no simple explanation of the relationships among the species within the genus, and of their breeding behavior.

It should be noted that the chromosome morphology varies from species to species. That is, certain chromosome shapes may appear in some species but not in others. Time has not permitted more than a few observations of this phenomenon. But some rather unusual shapes have been noted. In *N. Bowdeni* was observed what appeared to be a very large satellite. The satellite itself appeared to be as wide as the chromosome proper and was 2 to 3 times the thickness of the chromo-

some in length. It was attached by a fine thread of about the same length as the satellite. There was only one of these chromosomes to be found in any of the cells observed. *N. falcata* showed a pair of small V-shaped chromosomes whose arms were separated by a slender thread about the length of each arm (see figure).

*Conclusions.* In conclusion it appears that the work to date has raised more problems than it has solved. For example *N. Bowdeni* mentioned above is supposed to be a good species. Why then should at least one chromosome be found without a homologous mate? It is the opinion of the writers that this and other questions concerning the cytology, taxonomy and genetics of the species of *Nerine* can not be approached until the chromosome types of each species are known and identified. This work has been started and will advance as rapidly as regular duties will allow.

#### NOTES ON NARCISSUS BREEDING AND CULTURE

L. S. HANNIBAL, *California*

Throughout most of the temperate parts of the earth narcissi rank in or near first place with reference to early spring flowers, for they are equally suitable—either as a cut flower for indoor use, or a foreground border or bedding plant in almost any type of outdoor garden. Old records show that the species were in some use back in the early Roman time, and at present their widespread cultivation is a unanimous proof of their ever increasing popularity. Unfortunately this best known genus of the Amaryllidaceae has not received the full attention in Herbertia that it is undoubtedly entitled to. The following information is presented for the benefit of those who desire to try their hand at *Narcissus* breeding and culture on a small scale. The lack of practical data has apparently kept many amateurs from attaining results with one of our finest plant subjects that actually presents many unique and interesting possibilities—A truly fascinating field of work for those few who are actively engaged in it.

In general one has a wide range of *Narcissus* species and hybrids from which to select, far greater than one ordinarily suspects.<sup>1</sup> Records show that there are some 8000 named horticultural clones with many new ones added each year. No person can be expected to know more than a limited number of popular clones from any group, nor can one expect all to thrive under identical conditions. *Narcissus* species come from a number of different climatic and environmental areas extending from northern Europe and Spain to China. Normally the trumpet classes from northern Europe desire a cool, moist winter climate while the polyanthus types do better in dryer regions of limited rainfall and light frosts, or no frost at all. In most cases hybrids for several generations retain the desire for the general climatic requirements that their ancestors were adapted to, most types requiring dry or near dry summers, though there are exceptions—notably the Jonquil, or a few *N. tazetta*

varieties and their hybrids, that may be adapted to citrus areas subject to heavy summer rainfall.

With these facts in mind one should select rather than be a collector of species and horticultural clones. In the northern areas of heavy winter rains and frosts choose the hardy daffodils; the Poetaz and Tazetta types should be avoided as they freeze easily. In central and southern California Yellow Trumpets, *Incomparabilis*, *Leedsii*, *Cyclamineus*, and Tazetta hybrids all do well. *Barrii*, *Triandrus*, and *Jonquil*, which require more moisture, often give some difficulty unless one is equipped to cope with their special requirements.<sup>2</sup> The types that can be grown in Florida<sup>3</sup> owing to the heavy summer rainfall have been limited essentially to the *Polyanthus* and *Jonquil* types; however, new material consisting of hybrids having parentage of the Southern Chinese *N. tazetta* species give promise of new possibilities, and eventually will find wide spread use in many semi-tropical areas.

*Narcissus* do best in a light garden soil, but they are also adaptable to other soils including heavy calcareous clays. A mulching of the soil is not considered essential, but is of benefit for choice specimens when fine blooms are desired. Suitable deep mulching can best be done while the bed is in preparation for planting by working ample manure into the soil down to a depth of 18 inches. This is especially desirable for the *Jonquils*.

In the moist areas of the Pacific coast a planting depth of 6 inches in sandy soil, and 4 to 5 inches in heavier loams is standard. However, as one moves inland or south into the drier summer areas, deeper planting is advisable, primarily to conserve moisture about the bulb, but likewise to keep the bulb cooler during the hot summer days. A depth of 12 inches may sound excessive, but it has been found very satisfactory in exposed areas where summer moisture is limited, especially if the ground bakes excessively under the hot sun. In warm areas of summer rainfall shallow plantings apparently are advisable. We understand that Mr. Hayward suggests 2 inches in central Florida.

One point of interest when shallow planting is practiced in central or southern California, but apparently of little importance along the Atlantic Coast, is the tendency of the bulb to multiply rapidly. This is not only experienced with *Narcissi* but also with tulips, and to a certain extent with hybrid *Amaryllis*. The abnormally dry conditions which the bulbs are subjected to during their summer's rest definitely contributes to this behavior, which can easily be overcome by deeper planting.

As mentioned above many new hybrids are being introduced each year. Unfortunately it takes many years for the best types to reach a price range which is within the reach of the person with the average sized pocketbook. For that reason one seldom sees the newer types in the home garden. They are usually confined to the large estates or to choice private collections. A visit to one of these collections is always of interest, but the real opportunity is to visit the gardens of those who are actively engaged in *Narcissus* breeding such as that of S. B. Mitchell in Berkeley, or K. L. Reynolds in Pasadena. The color compositions, size, texture, and number of new types with their extreme variety of

form far exceed ones expectations and unfortunately can not be described here in detail. With the breeding activities of the last 20 years great improvements have been made, for comparatively speaking the 50 year old *King Alfred* or *Sir Watkins* cannot hold first place for show purposes in a garden containing the newer types. The new color developments are partly responsible for this. Perianths may vary from pure white to cream or deep yellow white the cups ever extend into the deep orange-red for some types; *Francisca Drake* being one of the striking examples where an apricot red cup is backed by a large white perianth. Size is another character of interest—a number of the trumpets and *Incomparabilis* type have a perianth often 4 to 5 inches in diameter and grow well above the foliage on strong sturdy scapes in a manner that immediately attracts attention. This is under normal outdoor garden conditions; larger flowers can be obtained by forcing. This also applies to clones of the *Leedsii* group.

With a number of people, to whom size is not so essential, the *Triandrus* hybrids offer several medium to small sized forms which cannot be excelled, and there are also the true miniatures suitable for rock garden use. The species *N. canaliculatus*, a dwarf China Lily, and *N. bulbocodium conspicuus*, the "Hoop Petticoat" daffodil, are the two best known of a group of dwarf species. A number of dwarf hybrids have been produced and are sure to become more popular as time goes on.

In regard to breeding, many of the newer hybrids may be unavailable, particularly due to high prices, but a large number of clones are not advisable since they are often partially or almost completely sterile, or they may be sterile in certain areas due to adverse climatic conditions. As one gains experience in breeding, these newer types can be tried in different combinations, but if a hybrid is reported as near sterile one can expect it to have viable pollen only under the best of climatic conditions. The history of Buttonhole<sup>4</sup> is a good illustration.

For the beginner there are a number of older clones that have good possibilities when used in certain combinations, especially when crossed back on *Narcissus* species such as *N. triandrus*. A surprising number of the recent new clones have been obtained in this manner. Mr. S. B. Mitchell in his popular garden book, *From a Sunset Garden*, lists some 20 daffodils by name, all of which are good seed parents and can be used in a number of ways. This list includes,—*Bernardino*, *Cleopatra*, *Great Warley*, *King Alfred*, *Lord Kitchener*, *Mme. de Graaff*, *Mrs. Krelage*, *Monarch*, *Beersheba*, *John Evelyn*, *Mityline*, *Naxos*, *Sun Star*, *Beacon*, *Fortune*, and others.

The following suggestions are given in brief as a possible outline for experimental breeding:

Some *Jonquilla* hybrids are slightly fertile—i.e., partly viable pollen can be had from *Lady Hillingdon*. The species offer good hybridizing possibilities. In warm dry areas the seedlings may be sensitive to stripe. Poetaz hybrids are sterile due to an odd chromosome complement—an exception is *Fortune* where the pollen can be used under ideal conditions. *Triandrus* species such as *N. triandrus* var. *alba* will often take *N. tazetta* pollen, such as *Paper White*, and give rise to a number of interesting

plants. The reverse cross of *N. triandrus* pollen on *N. tazetta* will not take since the latter has a higher chromosome complement.<sup>5</sup>

*Triandrus alba* on Trumpet or Leedsii clones will often give a pendant flower type of unusual interest. *N. triandrus calathinus* on any good daffodil will give good results—many of the seedlings may resemble *Silver Chimes*. If used on a Leedsii, a *Thalia* type is often obtained. The cross of *N. triandrus calathinus* on “*Grand Monarch*” gave rise to seedlings similar to *Silver Chimes*, which is one of the most outstanding white Polyanthus hybrids recently produced. *N. triandrus calathina* on *N. triandrus concolor* will give attractive plants with good pollen. If the former is used on some of the pink Trumpet daffodils, such as the *Mrs. R. O. Backhouse* type, pink types are often obtained. *Mrs. R. O. Backhouse* itself takes pollen poorly. *Jonquilla simplex*, and the dwarf *Jonquilla*, cross both ways with *N. cyclamineus* giving rise to a variety of seedlings, a number of which have a long flowering period. Most Incomparabilis make good breeding stock. Many *Narcissus* hybrids are not self-fertile. Emperor is an exception.

Concerning the methods of hybridizing: With most *Narcissus* the stigma of the flower to be treated is in the receptive condition for pollen during the third day of blooming. An anther obtained from the pollen parent is brushed lightly over the end of the stigma. The best success is obtained during warm (50° to 60°F) dry days. Damp, humid conditions tend to make the pollen deteriorate rapidly. Pollen can be stored under dry conditions in a desiccator for a month or more. The seed ripens in 6 to 9 weeks and for best results should be planted while still fresh. A good sandy garden loam enriched with bonemeal can be used, and normally the seeds are planted an inch deep. The bed should be partly shaded and remain slightly moist, but not too damp until growth starts during the following winter. Uniform moisture should then be provided until late May or June, when the foliage dies back. Flowers cannot be expected within 4 years and they often take 6 or 7 years.

We have heard much regarding chromosome doubling. Daffodils present cases where this had occurred in nature. *King Alfred* possesses a double chromosome complement of  $4n=28$ . A number of other Trumpets also have this condition, including “*Tunis*” which is a seedling of *King Alfred*. Seedlings from these parents possess a vigor and hardiness which makes them highly desirable, and they are used frequently in breeding work. In fact, among the *Narcissus* species and hybrids one finds various chromosome complements which present numerous interesting possibilities to those who undertake advanced *Narcissus* breeding.

Sports are not uncommon among the *Narcissus*—several forms have been reported in literature.<sup>4</sup> Mr. Hornbeck of the Oregon Bulb Farms recently reported a double found in a block of *John Evelyn* which has excellent promise.<sup>7</sup> The writer had several double sports called to his attention in a nearby garden where daffodils are raised for the cut flower trade. Only this spring the writer had the occasion to note that several bulbs in an established clump of *Sir Wakens* had produced flowers having eight petals and an ovary of four sections. These bulbs were in a

relatively cool location. Apparently the botanists are correct when they say that the *Narcisseae* are a late development. We can expect some interesting results in the years to come, not only from cross breeding, but by watching for sports also. Why not join the fun? .

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MRS. ROWNTREE ON CALIFORNIAN AND MEXICAN  
WILD FLOWERS

Mrs. Lester Rowntree of Carmel, California, who contributes the excellent article on *Hesperocallis undulata* in this issue of *Herbertia*, is rendering a very valuable service in popularizing Californian and Mexican wild flowers. Mrs. Rowntree is author and publisher of the delightful book, "Flowering Shrubs of California and their value to the Gardener." This work has been enthusiastically welcomed by gardeners generally. Mrs. Rowntree is also to be congratulated for her inspiring "Talks on Californian and Mexican Wild Flowers". These talks are illustrated with excellent colored slides, and will be given according to the following approximate schedule, spring-autumn, 1942:

Southern States: Southwest—March  
Southeast—November  
Central States:—late April and May; early June  
Eastern States:—Late June to early November

Interested persons and organizations should communicate directly with Mrs. Rowntree.

—HAMILTON P. TRAUB

## 5. PHYSIOLOGY OF REPRODUCTION

### SOME EXPERIENCES IN DAYLILY PROPAGATION

J. S. COOLEY, *Maryland*

At this time of rapidly expanding interest in daylilies, many growers are anxious to know how to obtain rapid increase from a limited stock of varieties that are difficult to propagate. The rampant spreading clones, as *Hemerocallis Fulva Europa*, that become objectionable because of rapid vegetative reproduction are not concerned in this discussion. We want to know the conditions most favorable for natural increase and also the time to divide the clumps so as to cause the least disturbance to their growth and consequently to promote the maximum increase.

The rate of reproduction of several varieties of daylilies has been observed when growing under adversity, such as low moisture and food on account of tree roots, in contrast with plants in fertile and well-cultivated soil. The rate of increase was much more rapid where the plants were given conditions approaching the optimum for growth than where moisture and food were decidedly insufficient. It would be interesting to carry out controlled experiments to determine the influence of soil condition on rapidity of rhizome production.

Concerning the proper time to divide clumps, the usual advice is to divide them any time. This has been contrary to the experience of the writer when growing daylilies in a silty soil having an impervious sub-soil or hardpan several feet from the surface and where the soil is consequently sometimes too wet. Dividing soon after blooming is completed has given good results in most seasons. Root activity was less at this time than at any other time when examinations were made. If dividing is done in a period of low root activity and just prior to a period of rapid root growth, one would expect much better results than when the plants are disturbed in the midst of or toward the end of their active root growth. According to the observations of the writer, working in the vicinity of Washington, D. C., there is a period of rapid root activity in the spring and again in the fall with more or less lull between these two periods. The shock to the plant resulting from disturbing when it is in full leaf is sometimes very severe.

Dividing in late fall or even transplanting where all the soil is removed has given bad results under certain conditions. It is now known that in certain plants, such as apple trees, wounding just prior to severe cold, may increase susceptibility to cold-injury. A similar situation seems to obtain in case of the daylily. Cold-injury to the crown has been much more prevalent on disturbed or damaged plants than on those having become well established by reason of dividing before the advent of cold weather. Sometimes late transplanted or late divided plants have died outright, apparently from cold-injury, and other clones under other conditions become stunted resembling plants with virus disease. The leaves are short and crinkled and growth very poor with no bloom on the affected shoots. Such plants struggle through the summer following

the injury but recover by the next year. The evidence at hand indicates that this stunted condition is not due to a disease organism but to cold injury at the crown. Similar response has been noted where otherwise undisturbed clumps have been injured by tramping during the winter.

#### EASY GERMINATION OF SEEDS OF AMARYLLIDACEAE IN SPHAGNUM MOSS

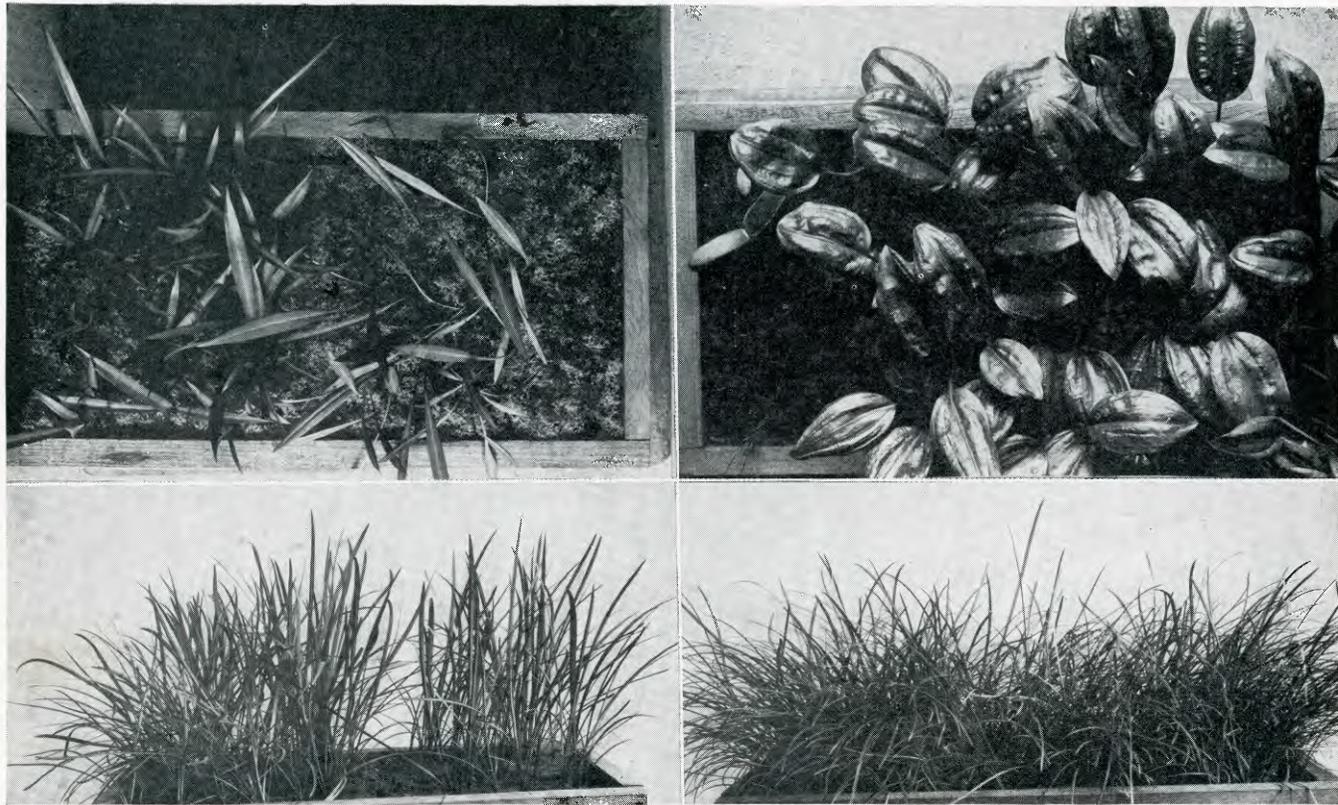
ALBERT W. CLOSE, *U. S. Plant Introduction Garden,  
Glenn Dale, Maryland*

The use of sphagnum moss as a seeding medium is not a new technique but has not received the attention it deserves. The author (2) and co-workers (6) have recently called attention to its value and have given directions for practical use. Sphagnum moss has been used almost exclusively for indoor seed germination at the U. S. Plant Introduction Garden, Glenn Dale, Maryland for a period of over 15 years. Few references to the use of sphagnum moss may be found in the literature although Burbidge (1) Hatfield (5) and Craig (3) recognized its value as an aid to germination. Morrison (4) has advocated the use of dried sphagnum to cover seed of azaleas sown in seed flats of compost.

The sphagnum seeding method prevents the development of damping-off troubles. Sphagnum is easily prepared, requires no sterilization before using, and its use eliminates the need for subsequent chemical treatments. Plants grown in sphagnum are removed easily for potting without loss of roots. Another advantage in its use is the easy regulation of growth, since seedlings may often be kept on in good condition for long periods of time while needing almost no attention if feeding with nutrients is withheld. The method requires a minimum of attention and if a suitable covering is provided, the seeds will usually have germinated before a second watering becomes necessary.

Living sphagnum has been used for seed germination in much of our work since it is available locally. However, the dry baled sphagnum, which is available to all at a reasonable cost, is as satisfactory. The preparation of the medium is simple. A hammer mill is useful for shredding large quantities, but to provide the small amounts ordinarily needed, the sphagnum may be rubbed through a hardware cloth sieve having three meshes per inch. The dry sphagnum may be kept ready for instant use for a long time after preparation.

Seed flats should be prepared with a moisture-retaining substrate, such as soil or preferably peat and sand. A layer about an inch and a quarter thick of the shredded sphagnum is placed loosely over the substrate in the flat and after it is levelled it is firmed to three fourths inch. An air space of one-half inch should be left between the top of the flat and the surface of the moss. Then the flats may be watered, preferably before the seed is sown, watering twice if necessary. Since there is no



UPPER LEFT, *Manfreda* sp. (thicker stand, right); *Praedranassa carmioli* (thinner stand, left); seeds sown 4-15-41 on living sphagnum, photo 11-3-41; UPPER RIGHT, *Haemanthus Katherinae*, also 2 plants of *H. albiflos*, left; seeds sown 2-12-41 on dried sphagnum; photo 10-3-41; LOWER LEFT, *Cyrtanthus angustifolia* (right), *Cyrtanthus* sp. (left); LOWER RIGHT, *Cyrtanthus* sp.; seeds sown on dried sphagnum, 2-12-41, photo 10-3-41.  
Plate 213

danger of excess moisture if the drainage is adequate, watering should be ample. Although not necessary, the use of mineral nutrient solutions hastens the development of the plants. A solution of one tea-spoonful each of potassium nitrate and commercial superphosphate per gallon is satisfactory, and may be applied freely before seeding. Additional applications may also be made after germination. The flats should stand for an hour or more before sowing, in order to give the moss surface time to become springy and porous and to form small cavities into which the seed may settle.

After the seed is sown the flats should be covered with a pane of glass or a light wooden frame covered with a glass substitute. Suitable shading should be provided. When germination is complete, the cover should be raised slightly to permit surface aeration. When the plants have hardened, the covers can be removed completely.

Tests with this method, placing the sphagnum layer on the soil in an outdoor sash-covered frame demonstrated that the use of this method is not limited to the greenhouse (6).

A conspicuous feature of the use of sphagnum is the virtually complete freedom from damping-off which is secured. One of the advantages of sphagnum over steamed soil is that the danger of accidental infection is eliminated. Intentional inoculation with fungi may kill a few seedlings in localized areas, but the fungus does not spread as it would in soil.

Among the genera so germinated at the U. S. Plant Introduction Garden include *Agave*, *Ammocharis*, *Bomarea*, *Cooperia*, *Cyrtanthus*, *Habranthus*, *Haemanthus*, *Manfreda*, *Nerine*, *Phaedranassa*, and *Zephyranthes* (See Plate 213). Those familiar with the germination behavior of these seeds will know that no particular problems are involved. It is doubtful if better stands will be obtained by the use of sphagnum. However the method has the advantage of convenience in the early care of the seed flat, and if seedlings are to be transplanted while very young, the process may be facilitated by the use of sphagnum.

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## 6. AMARYLLID CULTURE

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

#### DAYLILIES IN CALIFORNIA

DONALD B. MILLIKEN, *California*

The Editor and Secretary have asked me to write on the subject of *Hemerocallis* in California. I am willing to give my views based upon my own experience and observations but they will not be premised on a comprehensive survey of daylily plantings throughout the entire state. Such a survey would require much time and travel for California is a large state, there are in it many gardens, and growing conditions are diverse.

I know that *hemerocallis* thrive under most California conditions. They seem to enjoy the dry air of our inland valleys and they flourish along our beaches and coastal plains. My Arizona friends tell me that daylilies grow exceptionally well under the extremely arid conditions of their mesas. *Hemerocallis* and iris without question are plants which are adaptable to a very wide range of climates, soils, temperatures, and available moisture supplies.

Still daylilies are not yet as generally used in California gardens as one might expect. This I think, is due to the fact that only a few of the older named sorts are generally known and these have not caught the imagination because their differences are not sufficiently pronounced. So soon as it becomes generally recognized that our hybridists, led by Dr. Stout, have now made available in these hardy plants a wide diversity in color, size, height, shape and time of flowering, there certainly will be much more extensive use of daylilies in our California gardens.

California gardeners will wish evergreen foliage when this can be secured without too great a sacrifice of other characteristics. Very likely some clones which do not thrive in the northern and central states may find a welcome home here. However, it will always be possible, as Prof. Watkins suggests, to use deciduous daylilies without leaving large bare spots in the winter garden by grouping them with some of the evergreen types.

I am convinced that daylilies should and will come into a much larger use in the future than they have had in the past. Milliken Gardens is going to try to do its part in bringing to the attention of its friends both in California and elsewhere, whom it has been supplying with iris for many years, that this sturdy plant, the daylily, while perhaps not exhibiting quite the wide range of colors found in iris, is no longer what many people think it to be. That it is not always yellow or tawny red, that a man by the name of Stout has stirred things up, that other able workers have taken hold and helped and that if they think that a daylily is always yellow or tawny that then they have a surprise coming.

At Milliken Gardens we shall be interested to get acquainted with the new releases of Dr. Stout as they are made by the Farr Nurseries under the able and conservative management of Mr. Seyler, to keep track of the work of the Sasses, Mrs. Nesmith, Mr. Claar and others working in the North but we shall also be watching with keen interest the selections coming from Dr. Traub, Mr. Hayward, Prof. Watkins, Mr. Wheeler, and others who are working in the South in an environment similar in its mildness to California. From them California will be expecting beautiful specimens with evergreen foliage, rich clear colors which do not fade in our bright sunshine, and dwarfs which will be charming in flower arrangements as well as in the garden. Finally whether from the North or South, East or West, whether deciduous or evergreen, we shall be looking for that white daylily, of splendid form and texture, borne on tall, well-branched scapes. Then when we are asked for a lily which will grow in the sun or in partial shade, in rich soil or soil which is slightly alkaline, in heavy soil or light, in dry or in wet places, we shall have the answer.

There is no valid reason why California should not keep up with the procession in the appreciation of the new daylilies. As far as the suitability of her environment is concerned she should be helping to lead. It is an embarrassing thing for a Californian to admit but apparently many of its residents have an educational deficiency. *We shall have to start doing something about it.*

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#### INITIATION OF INFLORESCENCE IN DAYLILIES

J. MARION SHULL, *Maryland*

Curiosity as to time of blossom bud formation in the daylilies led to the dissection of a number of crowns and a general study of their natural manner of increase and of scape production. There are peculiarities of behavior that make such study a bit difficult.

In HERBERTIA for 1939, pp 184-187, Grainger, writing of *Amaryllis*, presents diagram and text indicating that in *Amaryllis* hybrida an inflorescence is set off for each successive four leaves produced. And in Araceae, growth is generally on a sympodial plan, a scheme wherein a definite number of leaves are followed by a scape even if, as in the Skunk cabbage, some of the buds so set off have to be aborted, sacrificed by blighting, either for seasonal reasons or to reduce the strain of fruit and seed production to the capacity of the foliage to support and mature such fruit.

It was thought that perhaps the *Hemerocallis* followed the same procedure, but this does not appear to be the case. The *Hemerocallis* does evidently convert its terminal bud into an inflorescence just as in the above, and as in the genus *Iris*, but this is probably done either on a seasonal basis, as a result of accumulating energy, or as determined by a definite status of maturity, and not on the purely mechanical basis of the number of leaves as in normal sympodial growth.

While it has not been possible as yet to carry this study to completion, to determine with certainty just when blossom buds are laid down in a number of standard varieties, one may hazard a tentative statement based on results to date. In general it would seem that the early varieties, due to bloom in April or early May in the latitude of Washington, D. C., lay down their blossom buds before winter sets in and lie over in this condition ready to jump into action at the first stirring of spring. However, in one early variety, *Aureole*, no such buds were found in October though the crowns seemed sufficiently well developed to warrant expectation of bloom in 1942.

No dissection of known late bloomers disclosed blossom buds at this time. Whether or not blossom bud formation goes on even during the otherwise dormant condition of these later flowering sorts, or whether they are formed during the early growth of spring, will have to remain for further investigation.

Results of this study up to the present time are shown visually in Plate 214. The following legends, *A* to *H*, inclusive, refer to the figures in Plate 214.

*A*, *Hemerocallis minor* as of October 28, 1941. Plant was flaccid and foliage nearly spent. One-half natural size. Flower scape for next year's bloom and renewal bud, at left, five times natural size.

*B*, *Hemerocallis flava*, October 28, 1941. Green leaves, dead scape, and lateral bud, one-half natural size. At right, flower scape and renewal bud five times natural size.

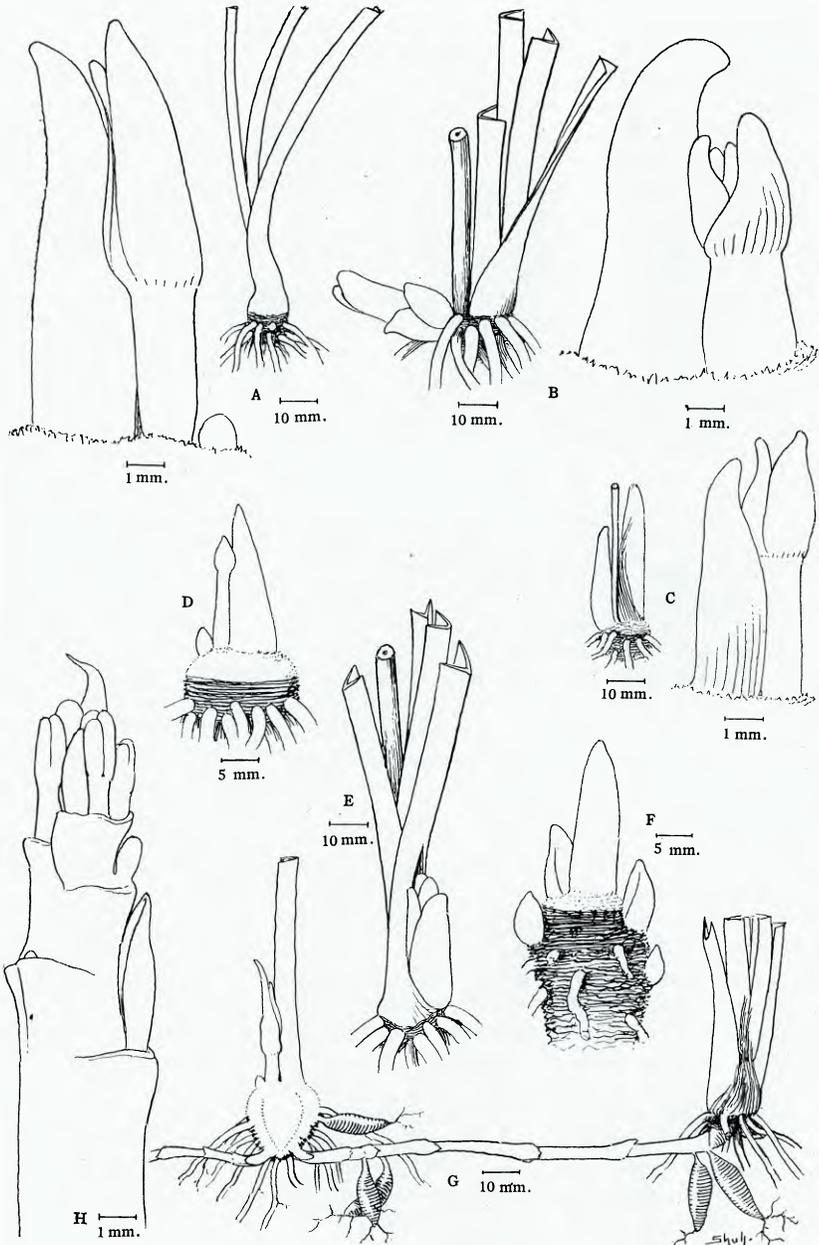
*C*, *Hemerocallis* clone *Dr. Regel*, October 28, 1941. Plant completely dormant for approaching winter. Large bud at right of dead scape contains both blossom bud and new terminal or renewal bud. At left of the scape is a smaller lateral bud comparable with the heavy horizontal bud in *B*. One-half natural size. Flower scape and renewal bud, at right, five times natural size.

*D*, *Hemerocallis Middendorffii*, October 7, 1941. Plant completely dormant. Scape between renewal bud at right and first lateral bud at left. Natural size.

*E*, *Hemerocallis*, clone *Calypso* as of October 27, 1941. Appearance is deceptive. The large bud is terminal and originated in the axil of the leaf nearest the scape to the right. Swelling of the bud has caused it to erupt through the bases of all three leaves so that it seems to stand behind them. Although this bud was probably destined to bloom the following season there was still no evidence of an inflorescence at the above date. Old scape, and a small lateral bud not shown, are just inside the leaf at left. One-half natural size.

*F*, *Hemerocallis*, clone E-15(Shull) as of October 18, 1941. This strong crown, presumably destined to bloom in 1942, as yet shows no evidence of bloom for the coming year. It is presented here for contrast with *G* as illustrative of clump habit.

There are present a well developed terminal bud and four laterals of progressively decreasing size. Theoretically there is a bud, or the possibility of bud development, in every leaf axil, but in accordance with



*Time of flower bud initiation in Hemerocallis. For further details see text.*

a plant's needs many of these remain dormant or as mere potentialities that are only called into activity in case of emergency. Each of these lateral buds that develop sets out on a terminal growth of its own and gradually builds the rather dense clumps that are characteristic of our most acceptable garden varieties. Natural size.

*G*, *Hemerocallis*, clone C-2 (Shull) X *Vulcan*, an unbloomed seedling as of October 29, 1941, at 18 months from seed. Twenty-one leaves were dissected off to expose the flower scape prepared for next season's bloom. Date of normal bloom is of course not known but parentage would indicate late June to early July in the latitude of Washington, D. C.

Here the entire growth from seed to the formation of a crown is seen and quite early in its development two underground stems or rootstocks have been given off in opposite directions thus marking it as a spreader or of the running type as distinguished from the clump type shown in *F*. Center (original seedling) plant carried twenty-two leaves; offshoot at right had fourteen and at left eight. One-half natural size.

*H*. Inflorescence from *G* further dissected by removal of three scales to disclose individual flower buds as well as less developed nascent branches. Five times natural size.

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## FLOWERING SEQUENCE OF DAYLILIES IN FLORIDA

JOHN V. WATKINS,

*Assistant Professor, Horticulture, University of Florida*

During the past eight years data have been carefully recorded for the genesis, climax and cessation of flowering of the species, the commercial varieties and the seedlings that are growing in the Daylily Display Garden on the campus of the University of Florida. There has been a marked annual fluctuation in the dates during the time that these records have been kept. Experienced gardeners know that minimum temperatures, precipitation, humidity and other factors have a very great influence upon anthesis, hence it is futile to suggest that calendar dates might mark the consistent blossoming of any given daylilies. The positions within the monthly columns in Plate 215 are arbitrary, therefore, and although they cannot be considered as accurate to the day, they are quite typical for normal years as indicated by the data at hand. It is hoped that this chart will be helpful to those gardeners who plan to acquire new daylilies.

The figure was designed with pointed ends to represent the beginning and ending, while the domed center is to depict the climax of flowering. Although anthesis is here portrayed as being about a month in duration, there is varietal deviation from this arbitrary period and it is merely an approximation. Well fed, long established clumps have extensive root systems and will flower over a longer period than will separate ramets that have not become settled.

A glance at the chart will show that most of the very early sorts bear blossoms of yellow or orange while most of the reds, purples and



bi-colors fall into the already overcrowded midseason group. Southern hybridizers will do well to point some effort toward the creation of heavily pigmented seedlings that will flower in February and March.

Clones, such as *Gold Dust* and *Sovereign*, derived from the class *Dihemera*<sup>1</sup> are deciduous, they have notoriously short periods of bloom, and they often produce scapes so short that the blossoms are borne just at the surface of the ground. These clones, although excellent for northern gardens are not recommended for peninsular Florida. On the other hand, such excellent evergreen varieties as *Aureole*, *Domestico*, *Emily Hume*, *Semperflorens* and *Wau-Bun* bloom early and may be showy for as long as two full months.

Many clones have a short second flowering period but the blossoms are likely to be smaller and much paler. In Florida, the mid-summer sun injures the dark pigments as it bakes through the tissues of the unopened buds, and it is essential therefore, that varieties with pink, red or purple pigments be evaluated before the middle of May.

It is interesting to compare Plate 215 with Figure 57 presented by Miss Kojan<sup>2</sup> in this publication in 1940. Clones that appear in both charts hold approximately the same positions, the only outstanding difference being that the Florida dates precede those of New York by two months.

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## THE VARIEGATED DAYLILY IN FLORIDA

JOHN V. WATKINS,

*Assistant Professor, Horticulture, University of Florida*

In 1939 several divisions of the variegated Daylily, *Hemerocallis fulva* clone *Kwanso Variiegatus*, were received from a grower in New England. In their permanent places in the University's Daylily Display Garden, these plants have succeeded in northern Florida. Known to horticulture for many years, the plant is to be found in gardens of both hemispheres.

Daylily hybridizers have noted seedlings with striped foliage from time to time, but for one reason or another these have not been perpetuated, and the only variegated clone in general culture is the one discussed herewith.

The leaves are handsomely striped with longitudinal bands of purest white, the flowers but sparsely produced are of the double Kwanso type that many people consider monstrous and unattractive. As in its all-green prototype, the foliage of the variegated form disintegrates in the autumn and does not reappear until the following spring is well under way.

<sup>1</sup> Stout, A. B., *Daylilies*, Macmillan, New York, 1934.

<sup>2</sup> Kojan, Selma C., *Flowering periods for clonal varieties of daylilies*. *HERBERTIA*, vol. VII, p. 209.

In common with most clones of *Hemerocallis fulva* the Variegated Daylily increases by stolons, new plants appearing at some distance from the crown. All too often these ramets revert to type and it is necessary to remove these non-variegated plants lest the clumps become predominantly green.

Because of its slowness of growth, its lack of winter foliage, its marked tendency to reversion, the Variegated Daylily, *Hemerocallis fulva* clone *Kwanso Variegatus* is of questionable value in Florida gardens.

### DAYLILIES IN GARDEN DESIGN

JOHN V. WATKINS,

*Asst. Professor, Horticulture, University of Florida*

It is generally agreed among discerning gardeners that herbaceous perennials should be subordinate to the more important woody species in the landscape picture. In the charming scene, shown in Figure 67, the bold clumps of *Hemerocallis* are supplementary to the thuyas and serve

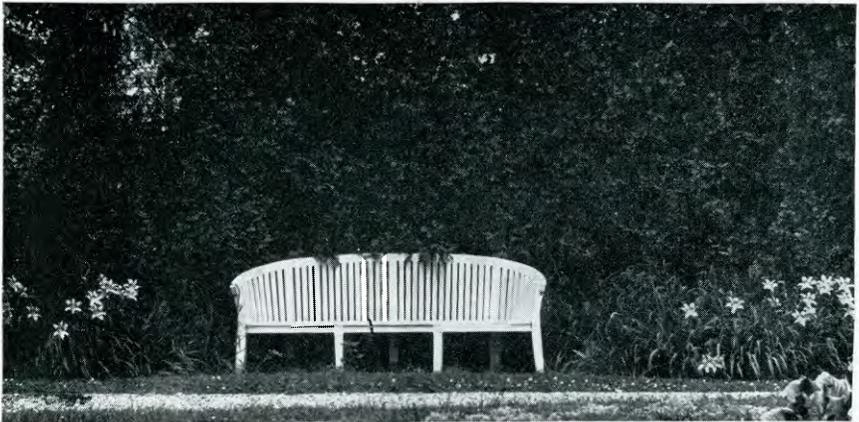


Fig. 67. Use of daylilies in landscape; the bold clumps of daylilies are supplementary to thuyas and serve as accessories to garden seat, the center of interest. Photo by Prof. John V. Watkins.

as accessories to the garden seat, which is, of course, the center of interest. The daylilies materially contribute toward good focalization and give a definite finish to the picture.

This is one of the most graphic illustrations of the correct use of daylilies that this writer has found and it is presented herewith as an excellent example of "what to do with my daylilies." Here, the designer has skillfully incorporated the important principles of good planting. Simplicity, unity, harmony, balance, and a good scale relationship are all present and all of these serve to create a picture that is beautiful and satisfying.

## WHY I AM INTERESTED IN DAYLILIES—1941 REVISION

ELMER A. CLAAR, *Illinois*

After reading my article in *HERBERTIA* for 1940 entitled "Why I Am Interested in Daylilies," I felt like the fellow who when inebriated went into a barroom and bellowed, "I can lick anybody in this bar." No one paid any attention to him. A little later he said, "I can lick anyone in this town." Still no one paid any attention to him. Then he boasted, "I can lick anyone in this state." Finally a little Irishman got tired of this and gave him a good trimming. After it was all over the big fellow said, "I think I covered too much territory."

I feel just that way about my article last year and I would like to amend a few sentences and take in just a little less territory. I am referring to this sentence: "Daylilies can stand neglect, insect pests, lots of rain, lots of drought and you don't have to have sprays or any special cultural requirement."

In June I met Mr. Edward Steichen and he told me that thrips were in his daylilies and were a serious pest. I saw thrips in Dr. Stout's garden. He said they were especially fond of *H. citrina* and *H. multiflora*. I did not see them or perhaps I did not recognize them in the other gardens that I visited. I also saw plenty of Japanese beetles in Dr. Stout's daylily garden. They eat the flowers.

This year was especially hard on all perennials. In the fall of 1940 it was unusually warm for a late period and vegetation was lush green. Then overnight the temperature dropped from around 70 F. to 10 F. above zero. It killed many perennials completely. Some of my daylilies were completely winter-killed, for example Mr. Sass' *Golden West*, Mrs. Nesmith's *Pink Charm*, Mr. Hayward's *E. W. Yandre*, *Minnie*, *Sally*, *Florida* and *Osceola*, Dr. Traub's *Granada*, *Victory Taierhchwang*, *Dr. Stout* and *St. Joan*. Some of them died back so badly that I thought they were dead and ordered new ones; but they did come up later on but did not bloom for me; for example, *Wolof*, *Vulcan*, *Chengtzu*, *Princess*, *Indian Chief*, *Duchess of Windsor*, *Pink Lustre*, *Emperor Jones*, and *Persian Princess*.

In spite of the possibilities of diseases in daylilies and some slight amount of winter-killing, I still find that I get a maximum amount of fun with a minimum amount of time in raising daylilies, and that they will grow in my garden under the trees, and that they are at their best when the heat and drouth of July and August are here and when other favorites are out of season.

## FOOD MANUFACTURE AND FLOWERING IN THE DAFFODIL

JOHN GRAINGER, *Huddersfield, England*

The fact that plants are capable of making solid food from the constituents of air and water is of fundamental importance to the human race, and in particular, to its executive officers, the gardeners. A full comprehension of the factors which affect this manufacture of food is a necessary equipment of any horticulturalist who wishes to control his plants by forcing, or who desires to excel his fellows with beauty or fullness of plant growth. There are perhaps few natural orders which provide such widespread opportunity for the expression of this skill as the Amaryllidaceae. Its members are carried from wild, untamed grandeur at one end of the earth to provide dignified and stately beauty at another; their tolerance of forcing practice in the noble bondage of glass-house culture only serves to extend their usefulness.

A study of the food-making capacity of the daffodil provides many instructive features for the practical gardener. The descriptions which follow relate to plants of the variety *King Alfred*, growing as nearly as possible free from horticultural restraint. They were, however, neither so wild nor so numerous as Wordsworth describes:—

*Ten thousand saw I at a glance,  
Tossing their heads in sprightly dance.*

The present investigation was inspired by a desire to know more about the food manufacture of the daffodil in relation to its flowering. A schedule of flower formation was described in the 1938 number of *HERBERTIA* by the present writer, but it was not then possible to align the stages of flower growth with food manufacture, since very little appeared to be known about the last-mentioned subject. The flowering of certain plants is directly controlled by their type of food manufacture or metabolism. Late chrysanthemum and Soya bean, for instance, flower in the short days of autumn because a delay in the nightly transport of food hinders the supply of carbohydrates to the growing point for some hours after the onset of darkness. (Grainger 1938) Other plants, such as the common English Coltsfoot, *Tussilago farfara* and *Saxifraga tridactylites* begin to form the first flower initials in the late months of autumn, when food manufacture by the leaves is at a minimum (Grainger 1939). The daffodil has obviously some connection with the last-mentioned types for its flower bud is made after leaf growth has ceased. This may, however, prove on investigation to be the time when most food is concentrated in the bulb.

## THE AMOUNT OF FOOD EXPENDED UPON FLOWERING AND FRUITING

It is commonly supposed that flowering and fruiting make a serious drain upon the food resources of a plant, but this is so only in a few species, and the daffodil is not one of them. (Table 1.)

These figures may be compared with the garden Lupin, *Lupinus polyphyllus*, on the one hand, where the very abundant fruits accounted for nearly 23% of the dry weight of the whole plant, and with the Wood Anemone, *Anemone nemorosa*, on the other, where the fruits of a colony of plants only required 0.32% of the total dry weight.

TABLE 1

*Distribution of dry weight in reproductive and non-reproductive parts of the Daffodil*

Date	Condition	Total dry weight of plant in grams	Dry weight of reproductive parts* in grams	Percentage reproductive dry weight of total dry weight
11 April 1939	Flowering	3.16	0.113	3.60
		4.21	0.12	2.85
		4.48	0.18	4.01
18 June 1939	Fruiting	18.22	0.72	3.95

\* Flower stalks of the daffodil contain chlorophyll and can presumably manufacture carbohydrate food, so the weights of reproductive parts are those of only the flowers and fruits.

TABLE 2

*Dry weights of various organs of the daffodil at different times of the year*

	Oct. 6	Nov. 15	Feb. 23	Apr. 11	May 23	Jun. 18	Oct. 1
	Grams	Grams	Grams	Grams	Grams	Grams	Grams
Roots	—	0.027	0.042	0.277	0.24	0.12	
Bulb	2.13	2.10	0.97	1.198	2.51	2.93	2.20
Leaves			0.32	1.042	0.83	0.53	
Flower stalk				0.53	0.62	0.72	
Flower				0.113	0.14		
Fruit						0.18	
Total	2.13	2.127	1.332	3.160	4.34	4.48	2.20

TABLE 3

*Amounts of total carbohydrate and of total nitrogen in various organs of the daffodil at different times of the year*

	Oct. 6		Nov. 15		Feb. 23		Apr. 11		Jun. 18		Oct. 1	
	% Total Carbohy- drate	% Total Nitro- gen	% Total Carbo- hydrate	% Total Nitro- gen								
Roots			3.06		25.58	3.56	14.20	2.82				
Bulb	76.25	2.94	73.46	1.00	61.48	2.92	55.48	1.70	88.56	1.19	75.16	2.99
Leaves					36.97	4.22	39.67	2.98	35.29	2.66		
Fl. stalk									44.16	1.97		
Flower							36.96	1.71				
Fruit									36.97	2.98		

The daffodil also shows another difference from many plants in that fruiting accounts for only a slightly higher percentage of total dry weight, than does flowering. It has, indeed, been found on one or two

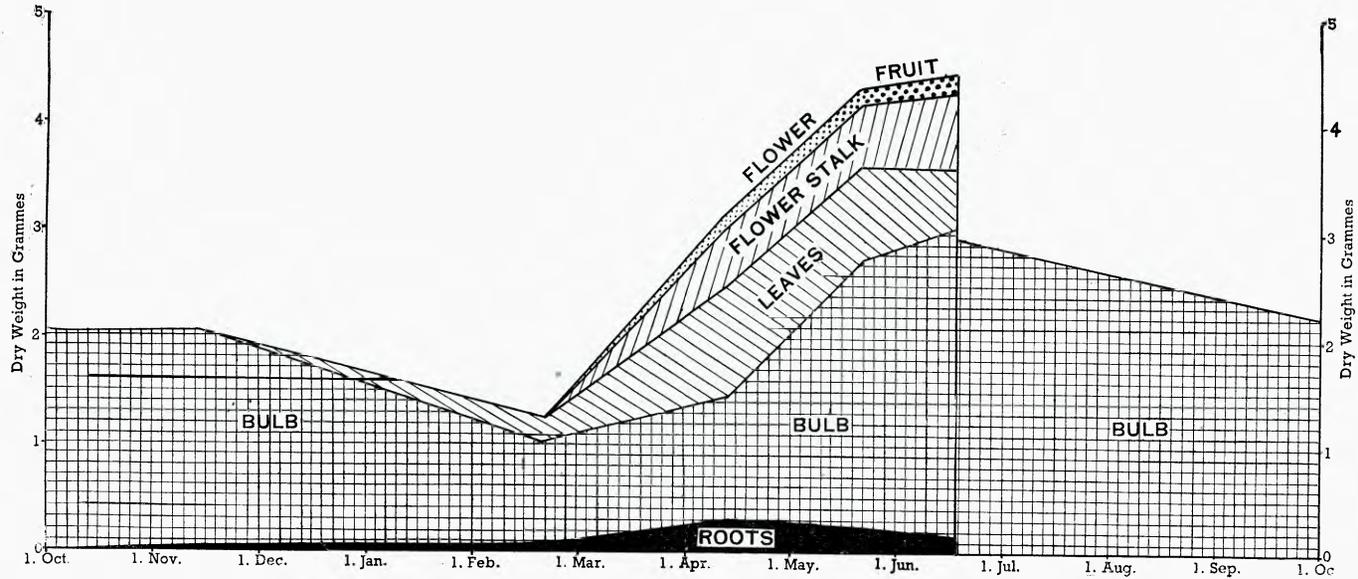


PLATE 216 A. Distribution of dry weight in the Narcissus plant through a perior of one year.

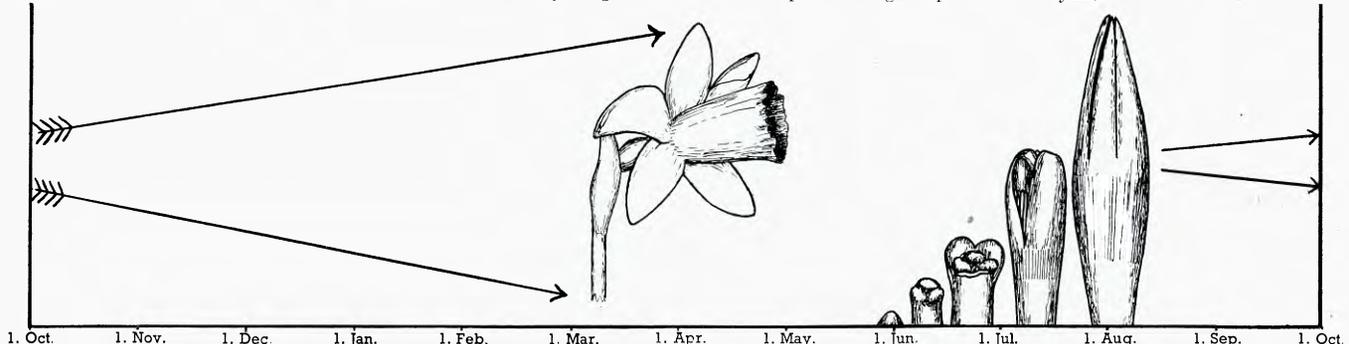


PLATE 216 B. Development of flower bud formation and of flowering in Narcissus. Figures representing development of flower initial in June and July are magnified seven diameters. The flower in March is half natural size.

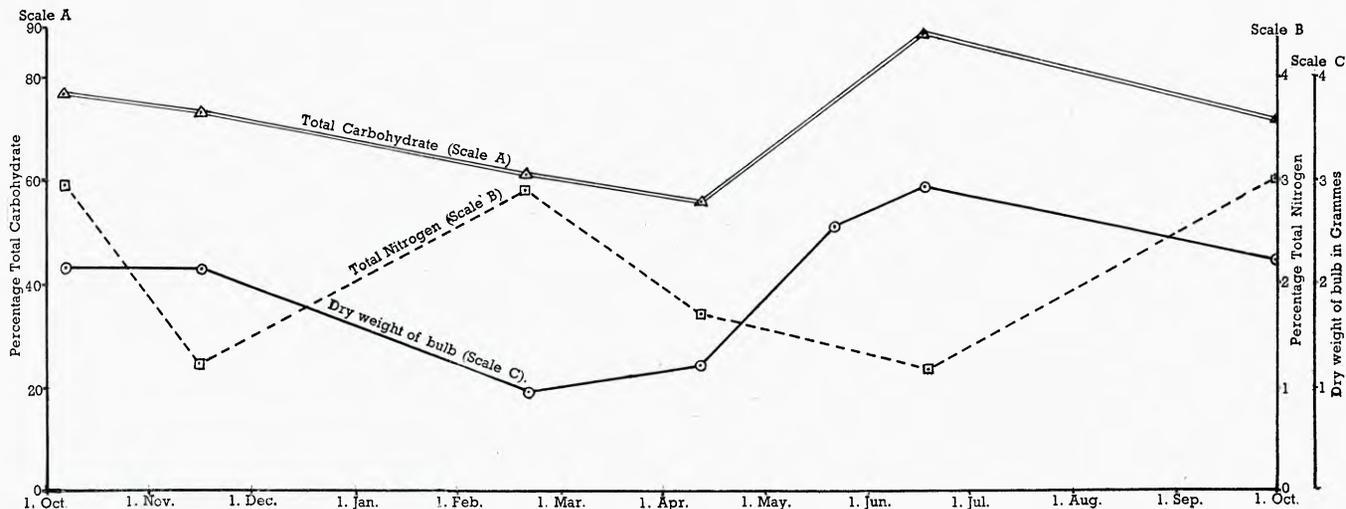


PLATE 216 C. Contents of total carbohydrate and of total nitrogen in the *Narcissus* bulb, compared with dry weight of the same organ.

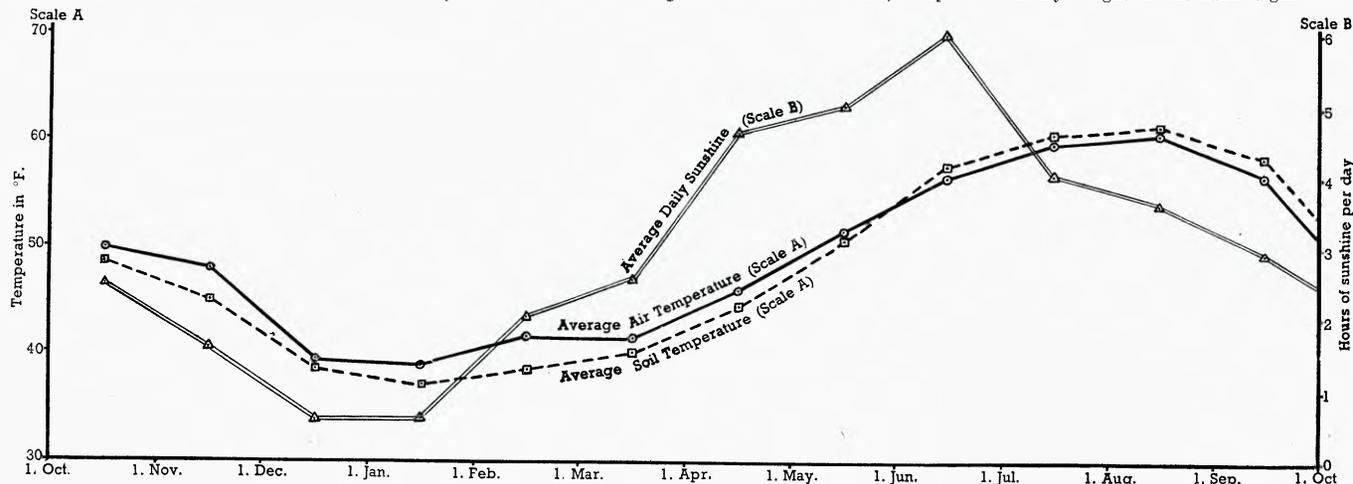


PLATE 216 D. Meteorological data relating to the growth of the *Narcissus* bulb. The air temperature is measured in a screen four feet from the ground, the soil temperature is that at a depth of four inches.

occasions that fruiting may account for even a lower percentage of the total dry weight than the corresponding flowering stage. This, however, is usually found on larger plants than those described in these experiments, and is due to the extra food made by the leaves while the fruit is developing. For comparison, the Evergreen Bilberry, *Vaccinium Vitis-idaea*, has 0.7% of its dry weight devoted to flowers, but 5.6% is accounted for by fruits; Rose-bay Willow Herb, *Epilobium angustifolium*, expends 6.5% of its solid substance upon flowering, but fruiting consumes 14.7%. Further data for other species are given in a recent paper by the present writer (Grainger, 1940).

More detailed studies have been made. Table 2 and Plate 216A show the distribution of dry weight in various organs throughout the yearly cycle of growth.

Plate 216A shows very graphically the development of the bulb at the expense of its stored food between mid-November, and mid-February, and the succeeding rapid growth until the middle of May. Thereafter, the dry weight of the bulb increases whilst that of the leaves diminishes by a similar amount, indicating a transfer of material from the leaves to the bulb during this period. Changes in dry weight of the flower stalk are also illuminating; this organ is green, and could presumably manufacture carbohydrate food in some degree. Plate 216A suggests, however, that there is no transfer of food from the flower stalk to the bulb between mid-May and mid-June, when the leaves confer a certain amount of dry weight upon the bulb. The flower stalk therefore stands suspect as a rather useless repository for a considerable amount of dry weight, when judged from the standpoint of preparation of the bulb for forcing. This knowledge suggests the practical treatment that when flowers are to be removed to conserve the bulb's energies for forcing, it would be better to nip them out at an early stage, before the stalk claims its large portion of dry matter from the general stock of the plant.

Comparison of Plates 216A and 216D shows that the phenomenal increase in dry weight of all organs of the plant which takes place between March 1st and June 1st. occurs at a time of year when the average daily sunshine is high, and the average temperatures of both air and soil are relatively low. Wasting processes (respiration) of the plant are greater than food manufacture from December to March, when there is little daily sunshine. The growth of leaves is initiated in December when the temperatures are minimal, and growth of all organs is arrested in June, before the temperatures are maximal. It therefore appears that the climate conditions which favour quickest growth of the daffodil plant are days with plenty of sunlight and relatively low temperatures of between 40° and 50° F.

An experiment was designed to test this point.\* Sixty bulbs were chosen for that small size which usually indicates absence of a developing flower. They were potted and grown outside until established, and were

\* Thanks to the help of Mr. T. F. Armstrong, head gardener of the Ravensknowle Park.

then divided into three groups. One group was grown in an experimental chamber with average temperature 62 degrees Fahrenheit, and 12 hours' daily illumination from a 100 watt electric lamp controlled by time switch. Plants in the second group were grown at the lower temperature of 55 degrees Fahrenheit with the same duration and intensity of artificial light. Those remaining in the third group were subject to the same lower temperature and a shorter duration of artificial light, namely 8 hours daily. The illumination was of 230 foot candles intensity round the tips of the leaves. The plants were grown in the chambers for 28 days, from April 1st to 29th, 1941. Ten plants were taken from each chamber at the end of this period, the bulbs and roots

TABLE 4

*Increase in dry weight of daffodil plants grown at different temperatures and varying durations of artificial light*

Group	Treatment	Volume of the bulbs of 10 plants, ml.	Total dry weight of 10 plants, grams	Grams of total dry weight per ml. of bulb volume.
	Before the experiment	145	25.6	0.176
1.	After 28 days at 62 F. with 12 hours' daily light.	186	36.7	0.197
2.	After 28 days at 55 F. with 12 hours' daily light.	143	31.1	0.217
3.	After 28 days at 55 F. with 8 hours' daily light.	170	33.2	0.195

were carefully freed from soil, and the dry weights of the bulb, roots and leaves determined for each plant.

It is somewhat difficult to compare the dry weights of a number of plants of varying size, but the volume of the bulb is roughly proportional to the total size of the plant. The results in Table 4 are accordingly expressed as grams of total dry weight per cubic centimetre of bulb volume.

The level of growth is low in the artificial conditions of the chambers, but the results confirm that food manufacture is significantly greatest in the second group where growth took place at the lower temperature and longer duration of daily illumination.

This conclusion does not at first appear to be in line with practical experience in forcing, where the temperature is at first low, and is later raised progressively as the leaves elongate and the flower appears. It is clear, however, (Grainger and Crawshaw 1939a) that the higher temperatures at the close of forcing favour the rate of *emergence* of the flower, and are not specifically directed towards food manufacture. It is well known that forced bulbs are greatly depleted of food reserves, and are either discarded, or have to be restored to forcing vigour by two or three years' vegetative growth. Full judgment cannot be passed on this matter in the absence of further data, but the experiments here reported suggest the possibility of providing a bulb with the necessary stores of food immediately after forced flowering by growing it at a

TABLE 5

*Diurnal carbohydrate metabolism of the daffodil*

Date & Time 1939	Total Solids % of fresh weight	Water % of fresh weight	Sol. Solids % of dry wt.	Insol. Solids % of dry wt.	Total Carbo- hydrate % of dry wt.	Soluble Carbohydrate % of dry wt.			Insol. Carbo- hydrate % of dry wt.
						Reduc- ing	Non-re- ducing	Total	
Jan. 28, 3.00 p. m.	14.66	85.34	34.70	65.30	38.25	10.6	18.3	28.9	9.35
Jan. 28, 6.00 p. m.	13.12	86.88	38.53	61.47	40.23	19.2	18.5	37.7	2.53
Jan. 28, 9.00 p. m.	15.34	84.66	40.09	59.91	41.20	11.3	23.5	34.8	6.40
Jan. 29, 1.00 a. m.	15.55	84.45	34.23	65.77	40.22	9.4	18.2	27.6	12.62
Jan. 29, 5.00 a. m.	14.79	85.21	35.92	64.08	39.51	8.9	17.2	26.1	13.40
Jan. 29, 8.30 a. m.	15.16	84.84	36.60	63.40	40.20	10.1	14.6	24.7	15.50
Jan. 29, 12.00 noon	14.81	85.19	42.00	58.00	38.55	11.2	14.3	35.5	13.05

relatively low temperature with good light, increased artificially if necessary. One or two florally unproductive seasons of resuscitation might thereby be saved.

Plate 216C shows the relation between dry weight of the bulb and its contents of total carbohydrate and total nitrogen. The changes of dry weight are fairly closely reflected by similar changes in the total carbohydrate as might be expected, since this kind of food accounts for such large percentages of the dry weight—nearly 90% when growth ceases in June. The total nitrogen appears to be organized upon opposite lines, being in general low when the total carbohydrate and bulb weight is high, and vice versa. The initial fall in nitrogen between October and November is probably due to its utilization in growth, but

the apparent minimum in June is possibly caused by the increase in bulb weight, while the actual amounts of nitrogen remain substantially the same.

The formation of next year's flower initial begins almost immediately after growth of the shoot is arrested at the beginning of June (Plate 216B.) This is also the time when there is most carbohydrate and least nitrogen in the bulb, and it would therefore appear to confirm the thesis of Kraus and Kraybill (1918) that a plant tends to flower when the ratio of carbohydrate to nitrogen is high. There is, however, no objection raised by the data here presented to the idea expressed by the present writer (Grainger 1939) that the total amount of available food in the growing point may be more important in some plants than the ratio between carbohydrate and nitrogen.

DAILY NUTRITION OF THE DAFFODIL

The solid substance of a Narcissus plant is trebled in three months between mid-February and mid-May (Plate 216A) and this can only be regarded as a considerable physiological accomplishment, for the size of the plant. Some investigation of the mechanism of this increase gives illuminating results. It might be expected that the capacity for manufacturing food and the ability to transport it would both be very efficient

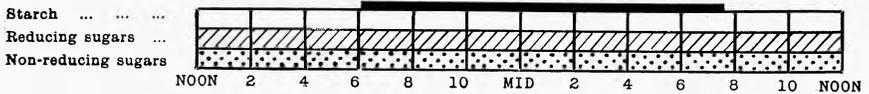


Fig. 68. The results of qualitative analyses for reducing sugars and non-reducing sugars in daffodil leaves on Jan. 28 to 29, 1939. Shading and dotting indicate the presence of the respective sugars; samples were taken at approximately three hour intervals. Duration of the hours of darkness is shown by the thick black line above the diagram.

systems. Fig. 68, Table 4 and Plate 217 show that the system of transport is indeed a good one. The presence of either reducing or non-reducing sugar appears to be a necessity for adequate transport, and both can be detected qualitatively through the whole 24 hours in Daffodil leaves (Fig. 68). Table 4 and Plate 217 demonstrate the quantitative dealings in carbohydrate of daffodil foliage through a period of 24 hours in January 1939.

Many plants show a daily fluctuation of total carbohydrate expressed as a percentage of the dry weight, (Grainger, 1939) thus providing evidence of transport of this kind of food away from the leaves during the night. Several plants with completely mobile carbohydrates, however, exhibit a uniformity of total carbohydrate content throughout the whole 24 hours, and when this is combined with the qualitative demonstration of soluble sugars through the day and night, it represents an organization where the carbohydrate is completely mobile. The daffodil has this arrangement (Plate 217A and Fig. 68). Figures and curves which portray the various carbohydrate fractions in Table 4 and Plate

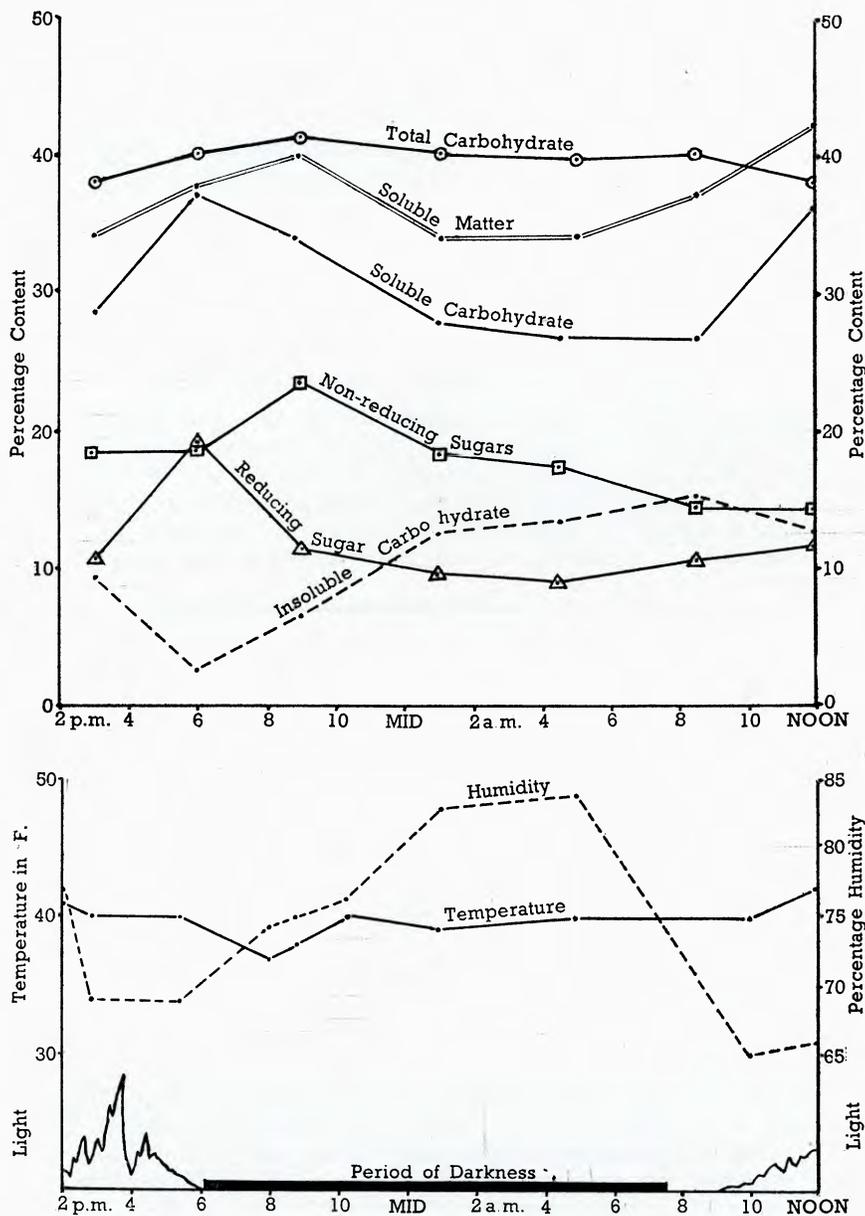


PLATE 217. Upper, quantitative estimations of carbohydrate fractions in *Narcissus* leaves. Jan. 28-29, 1939; lower, meteorological information for the same period.

217 give some indication of the mechanism of transfer. Curve E Plate 217 showing reducing sugars, is practically the inverse of Curve F, showing the insoluble carbohydrate. This suggests that the reducing sugars are derived directly from the insoluble carbohydrate. A peak on Curve E (reducing sugars) at 6 p.m. is followed by a maximum upon Curve D. (non-reducing sugars) further suggesting that the reducing sugars are transformed to the non-reducing form which is presumably the sugar of translocation in the daffodil. The general correspondence between curve B, (Plate 217) showing soluble solids as determined by weights of the residue after extraction of the soluble matter, and Curve C, obtained by sugar estimations, provides a check upon the qualitative changes.

It can therefore be stated that the daffodil exhibits complete mobility of its carbohydrate, a fact of prime importance to the successful accomplishment of the concentrated growth which occurs between March and June.

#### DISCUSSION

An important feature of the results here presented is the demonstration that daffodil plants, which make their flower initials when leaf growth is absent (Plate 216A and 216B), really begin floral formation at a time of maximum carbohydrate content of the bulb (Plate 216C). It is also a time of high ratio between total carbohydrate and total nitrogen, but the author suggests, upon evidence from several other plant species, that this is not necessarily causal. Flower initiation certainly appears in general to take place only when there are adequate supplies or stores of food, and the present results show that the daffodil, making its flower initial at the beginning of the dormant period, has then indeed the highest content of carbohydrate food in the bulb of any time during the year.

The daffodil has some important limitations; it cannot have more than a certain number of roots, and as these never branch, the area of water intake is limited. This is perhaps the most potent cause of the arrest of growth in June, for at this period, water contents of soil are lower than in the months when growth is taking place. There is also another cause, for the yearly increment of a bulb is also limited (Grainiger 1938a), and when this combination of scales and swollen leaf bases is filled with carbohydrate (to the extent of nearly 90% of its dry weight in June) no further growth would be possible.

#### SUMMARY

The experiments here reported are for the Daffodil variety *King Alfred* grown and flowered under natural outdoor conditions at Huddersfield, England. They were planted Oct. 6th, flowered March 26th in the following year; the bulbs were lifted June 18th and were planted again on Oct. 1st.

*Practical*

1. It is shown that the flower stalk claims a large amount of dry weight which is of little use to the bulb. Removal of the flower from bulbs required to be built up for forcing should be done at an early stage, in order that a minimum of dry weight shall be locked up unnecessarily in this organ.

2. A suggestion is made that a relatively high daily average of sunshine and a relatively low average temperature, between 40 and 50° F. provide the external conditions which favour the most rapid food manufacture of the daffodil. This suggests the practical possibility that the food reserves of these plants might be built up faster, immediately after forcing, by providing the best conditions for food manufacture. Experiments are in progress to test this possibility.

*Physiological*

3. Formation of the flower initial in the daffodil begins at the cessation of growth in early June, when there is a large amount of carbohydrate in the bulb (nearly 90% of its dry weight), and but little nitrogen in proportion. Flower initiation during the dormant period of the bulb is therefore accomplished under optimal conditions with regard to the total carbohydrate food available.

4. Evidence for the complete mobility of carbohydrate in daffodil leaves is presented. This would account for the tripling of dry weight of the plant in three months, between mid February and mid May. Reducing and non-reducing sugars are detectable qualitatively throughout the whole 24 hours of one day, and quantitative estimations confirm the fact. The mechanism of transfer seems to be that non-reducing sugar (sucrose) is the sugar of translocation, and is formed from reducing sugars derived from the insoluble carbohydrate.

## APPENDIX

*Methods used in the determinations*

Dry weights were obtained by heating the tissues to 100° C. in a water-jacketed container for 30 mins. and then at 65° C. to constant weight. The dried tissue was powdered and preserved for analysis.

Total carbohydrate was estimated by hydrolysing a weighed portion of the dried extract with 3% sulphuric acid for 3 hours. The mixture was then neutralised with sodium carbonate, filtered, washed with distilled water and made up to a standard volume. Carbohydrates were estimated in this liquid by the method of Willaman and Davidson (1924). Soluble material was extracted from a separate weighed portion of dried material by cold 95% alcohol, acting for at least 36 hours. The mixture was then filtered, the residue washed with alcohol and the filtrate made up to standard volume with more alcohol. Reducing and non-reducing sugars were estimated by the respective techniques outlined by Willaman and Davidson (1924). Total nitrogen was obtained by a micro method modified from that of Pregl (1930).

The meteorological data for Plate 216 are from routine observations made at the Ravensknowle Meteorological Station, and the writer wishes to acknowledge the kind assistance of his colleague Mr. E. W. Aubrook in this connection. The data for Plate 217 were obtained by mercury thermometer and by spinning hygrometer, but the light record is from a photoelectrical apparatus.

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## CULTURE OF NARCISSUS SEROTINUS

DREW SHERRARD, *Oregon*

The autumn-flowering daffodil, *Narcissus serotinus*, is a small silvery white star, blooming on a slim stem six inches tall. As the flower ages, the stem increases in height to eight or ten inches. (See Plate 218.)

Shaped like the shallow-cupped large daffodils, this miniature has a yellow cup so shallow that it barely rises above the white perianth. The one leaf usually equals or exceeds the flower stem in height by the time the flower is well open.

Having lost my first bulbs by freezing, I have learned not to risk them outside in Oregon. Instead they are grown in a pot, and spend the spring and summer outdoors but are brought inside in October when the buds are showing. This makes it possible to enjoy their blooming at close range, and also their fragrance, for this is a sweet-scented daffodil. The flowers pass, and seeds form and ripen on a sunny window sill.

As soon as spring is well advanced, the pots are taken outside and the bulbs ripened off. Repotting is done when the bulbs are dormant, and the pots left without watering till autumn rains start them into root



The Oregonian, Portland, Oregon

*Narcissus serotinus*

See page 145.

growth. I have used a light loam, with sand and leafmold added. Young bulbs have but one flower on a stem, but older ones produce two or three on a stem.

#### NOTES ON HARDINESS OF AMARYLLIDS

BENJAMIN G. FERNALD, *Virginia*

I have only recently become a member of the Society, but have acquired a complete file of the annual publications, and I have read with much interest all references to the outdoor hardiness of members of the Amaryllis family. Of course, certain members of this family have been grown for years almost all over the country without any ordinary gardener having any idea that they were Amaryllids; e.g., daffodils and daylilies. My acquaintance with gardening of any kind is hardly more than ten years old, and started through accident rather than intention. Having read an article by a lady gardener of much experience in *Garden Gossip* about how many plants had proven hardy for her in middle Virginia, I searched around among catalogs and bought as many of the ones she mentioned as I could locate and a good many others. As might have been expected, her experience had been acquired during a fifteen-year period of mild winters, and the year after I planted my bulbs we had the hardest winter for many years, and since then every other winter has been as severe or worse. My innocence will be understood when I say I planted outdoors in a moderately protected situation freesias, babianas and ixias. I also secured a dozen bulbs of *Amaryllis* hybrids and five varieties of *Crinum*, viz., *Powellii album*, *Kirki*, *giganteum*, *americanum*, *frimbriatulum*, also *Ismene calathina*. My recollection now is that the tender bulbs were planted in the fall, and the *Crinum* in the spring, but as ten years have elapsed, I am not sure; in any event, I recall that in spite of the very severe winter a few of the freesias and babianas actually bloomed, and all the ixias, also several varieties of the *Ornithogulum* group. The ismenes lived but did not bloom. The *Amaryllis* and the *Crinum* all bloomed, but only *Powellii album* survived, as did the hybrid *Amaryllis*, and all are still going strong after many transplantings; also, *Sternbergia Lutea*, *Lycoris radiata* and *L. squamigera* are as hardy as oak trees. *Amaryllis advenum*, (which I purchased as *Habranthus miniatus*) *Zephyranthes candida* and *Z. grandiflora* (*syn. Z. carinata*) are also perfectly hardy without protection, although the latter does better with a winter mulch. In fact, I generally wait until the first freeze and put a heavy coating of stable manure over all the plants whose foliage is killed by freezing. This reduces the damage to the bulb neck, prevents heaving and thoroughly saturates the soil with fertility during the winter rains and snows. All of this mulch is removed in the early spring.

Another member of the family which has proven to be hardy without protection is *Cooperia pedunculata*. *Sprekelia formosissima* has proven to be reasonably hardy, although in a very bad winter I lost part of the bulbs. Still another member is *Chlidanthus fragans*. This is entire-

ly hardy without protection, but splits up and multiplies so rapidly that I believe it advisable to dig both it and *Sprekelia* every fall along with *Ismene calathina*, and replant in the early spring.

Among the various members of the family listed above, many valuable from the floral standpoint in beds, are not suitable for cutting, others can be cut but do not last long enough to make it worth while. *Lycoris* species are about as longlasting after cutting in this hot climate as any flower I can recall. And they are freer from disease and require less spraying, working, watering, bulb dipping and the other burdens imposed on gardeners than any competitive flowers. Because of the relatively little garden labor required to achieve moderate success, the Amaryllis family interests me very much, and I am experimenting with a number of kinds other than those mentioned and will report on them later.

In giving this report on hardiness, I wish to explain specifically that my experiments were conducted on the north bank of the James River a few miles above Newport News, Virginia, and on the north bank of the York River diagonally opposite Yorktown, Virginia. Both of these locations are outside the long tongue which runs up the Coast, and according to government charts, has virtually the same climate as the Gulf of Mexico. As a clue to plant hardiness in this climate, I might mention that fig and Crepe Myrtle bushes have been in the past thirty years killed back to the ground, but put up new growth. I believe the proximity to relatively large bodies of salt water is favorable to semi-tender plants and that, e.g., the climate of Wilmington, North Carolina is more nearly like that of Atlantic City, New Jersey, than it is like that of Asheville in its own state. For this reason, hardiness notes with no more definite location than the name of a State may be very little help in guiding an experimenter. In my observation, the depth to which the ground is frozen depends on the duration of the freezing weather as much as the lower thermometer reading. Some bulbs, such as *Narcissus*, can be frozen stiff above ground without roots or foliage, and subsequently planted and grow and bloom. Other bulbs can have all the foliage frozen off, and themselves frozen stiff and survive if they had a well established root system before they were frozen. I have not found the depth of bulb planting to have any influence on hardiness.

One of the reasons for the infrequent use of members of the Amaryllis family (not counting daylilies and daffodils) in garden planting is that so few of them have any popular non-botanical name which is standard and well known. When visitors point at a bed of a variety in bloom and ask what it is, and I can tell them that it is Evening Star, there is some chance of their remembering it, but if I tell them that it is *Cooperia pedunculata*, it is easy to see that they haven't the faintest idea of even trying to remember the name. In my experience, aside from the large Hybrid *Amaryllis* which are generally known and recognized as such from seeing them growing in pots or florist's show window, all specimens of *Crinum*, *Lycoris* and *Hymenocallis* are called lilies. Perhaps, the visitors are correct. According to the most general meaning

of the word "lily", as in "lilies of the field" in the Bible, it is equivalent to "flower". In the somewhat more restricted sense it is used for flowers that are liliium-like—various amaryllids, irids, etc., and in the most restricted usage it refers to liliiums which are species of the genus *Lilium*. I believe we need someone with a good imagination to give a new set of names to the members of the family which may become popular and then do some propagandizing to make them so. This is as essential as the establishment of the fact that many of them are perfectly hardy over a large part of the country in spite of the fact that most of the bulbs are sold by catalogue houses who practically always refer to them as tender bulbs for house culture.

## THE DESERT LILY, *HESPEROCALLIS UNDULATA*

LESTER ROWNTREE, *California*

Even old timers are unable to predict a good Desert Lily year. Numerous blooming plants with tall well flowered stems do not always follow a rainy winter. Last winter's rains were record breaking but in April, when, after a year's absence from California, I got back to some of my happy hunting grounds in the desert, I found *Hesperocallis undulata* puny and few-flowered. It may not be the amount of rain after all but the *time* when the rain comes, that affects the season's growth and bloom of most California native plants. In order to function at their best some of them must have the moisture just when they need it. If it is a winter deluge that produces bloom, last spring should have been a banner one for wild display. Instead, it brought a superb show of many species of flowering bulbs, while the performance of others, as well as many annuals and herbaceous plants was barely normal.

Like much other California vegetation, the Desert Lily has a short and vigorous growing season. The leaves spear the desert floor in February. By early May every sign of life—stem, leaf and even seed pod—has vanished. Between its appearance and disappearance, a great deal has been accomplished in a short time. The narrow luminous basal leaves of iridescent blue-green, leathery, wavy and white-margined, lengthen to almost two feet, and arch to touch the earth with their points. The bluish flower stem thrusts erectly upward to over eighteen inches (See Plate 219). Buds form, expand into flowers and the flat seeds, packed tightly in rows, go jet black in their three-lobed subglobose capsules.

Sometimes the stem has one or two side branches. The flowers on these expand concurrently with those on the main stem. Only a few blooms come out at a time and they follow no regular order of opening although the lower buds usually break first. Fifteen buds and flowers is a good average and on one or two plants I have counted sixty. The lovely flowers keep coming out during the day. One afternoon I watched five blooms, on the same raceme, expand one after another, all within an hour. If the stem is picked and not plunged, the flowers come out just as though the stalk was either placed in water or still on its bulb.



Harry H. Haworth, Pasadena, Calif.

*The Desert Lily, Hesperocallis undulata*

The flowers usually remain out for two days. The petals are white and waxy with slightly waving edges. Down the middle of the reverse runs a broad stripe of a shade of light green containing both blue and gray; dark enough to show through to the inside of the flower and very much in evidence on the long upward-pointing buds. Inside the flower, the waxy filaments tipped with golden anthers are exceeded by the white pistil.

Though *Hesperocallis undulata* is fond of open sun-scorched places, it is found consorting with many desert plants. It likes flat sandy spots with the attending Burro-weed, *Franseria dumosa*, and atriplex and *Parosela* species. It has a preference for Mesquite, *Prosopis chilensis*, crowned hummocks. It has an inclination for sandy washes, especially those where a thin layer of clay has covered the top during rains and at the time of the plants flowering is dry enough to crack, peel off and curl up. Perhaps the unusually heavy rains of last winter left too thick a crust over the sand, for I noticed that many of the lily spears had not been able to penetrate it. Others had pierced the surface but seem to have spent their strength doing so for they began blooming when only a few inches high.

California boasts many superb stands of Desert Lily, but the bulb reaches the height of its development in southwestern Arizona and is especially abundant in a tiny range of mountains and an adjacent valley not far from the California border. The Indians call the lily, Ajo, which is Spanish for garlic, and use the bulb for food, and have given its name to the little mountain range as well as to a nearby junction.

Even though the bulb has a slight taste of garlic, the flower compensates with its delightful fragrance. My first Desert Lily bloom was found by literally following my nose. I pointed, hunting dog fashion, not toward the scent of garlic but at a strong and exotic fragrance, and moving in that direction, arrived at my lily, shining there in the moonlight.

I have never been successful in growing *Hesperocallis undulata*. That does not mean that it cannot be grown in captivity. The trial I gave it in Southern California was not a fair one and it would be hopeless to try it here on the fogbound Monterey Peninsula, though I long to experiment again.

I think the bulb would stand a good deal of cold. It can get bitterly cold at night on the Ajo Mountains. But it is a dry coldness and *Hesperocallis undulata* must not have dampness and cold at the same time. If the bulb were to be grown in a container that receptacle should be very deep as the lily bulbs are sometimes two feet beneath the surface. I would try one part clay and the rest sand and put several inches of small stone at the bottom of the pot or can. Once a week during the period of growth water should run through the container but no drop of it should remain there. There would be no good in attempting to grow the bulb unless it could be given intense dry heat during growth and for at least a month after all signs of life above ground had disappeared.

In the long run it would be simpler to pick up and move on to the desert.

THE STAR LILY, *LEUCOCRINUM MONTANUM*KATHLEEN N. MARRIAGE, *Colorado*

In fields of many prickles, in sandy waste places, beside those entrancing little by-roads of allure, this Star Lily appears when it is "Springtime in the Rockies." It is especially plentiful and at its loveliest on the mesa above Colorado Springs in such company as *Yucca glauca*, Cacti (*Opuntia* and *Echinocereus* species), *Argemone intermedia*, *Mentzelia nuda*; surprisingly thorny associates for a plant of such refinement, but the thin soil, extreme drainage, and sparse rainfall are sufficiently inhospitable to grass to permit these lovers of arid places plenty of elbow room.

Late April and through May *Leucocrinum montanum* blooms, the younger plants first, the older clumps later. Soon after Spring rain or snow, both foliage and flowers seem to emerge at once; long linear glaucous leaves radiate from the fleshy rootstock, the star-shaped fragrant glistening white flowers, with attractive yellow stamens rise from the crown, their long tubes (2 to 4 inches long) serving as a "stem." (See Plate 220.) In common with other long-tube beauties of the wild, a major operation is necessary in order to get at the seeds of this Lily. Several black seeds are contained in a transparent sac in the crown of the plant. The sac disintegrates about six weeks after the flowers have faded, so that the correct timing of the operation is important.

Reginald Farrer wrote "this Lily of the Mountains . . . is a most entrancing species, worth any comfort that its fleshy roots exact. . . and the apple of the eye should not be more cherished." It is interesting to note that the Star Lily thrived in a Yorkshire garden. It comes readily from seed, transplants willingly, grows happily, and blooms profusely, when planted in extremely porous soil—or just gravel—in full sunshine.

Here in our garden in Colorado Springs it is happy, and it is reported to be growing and blooming well in sunny rock gardens in New York State and in Virginia.

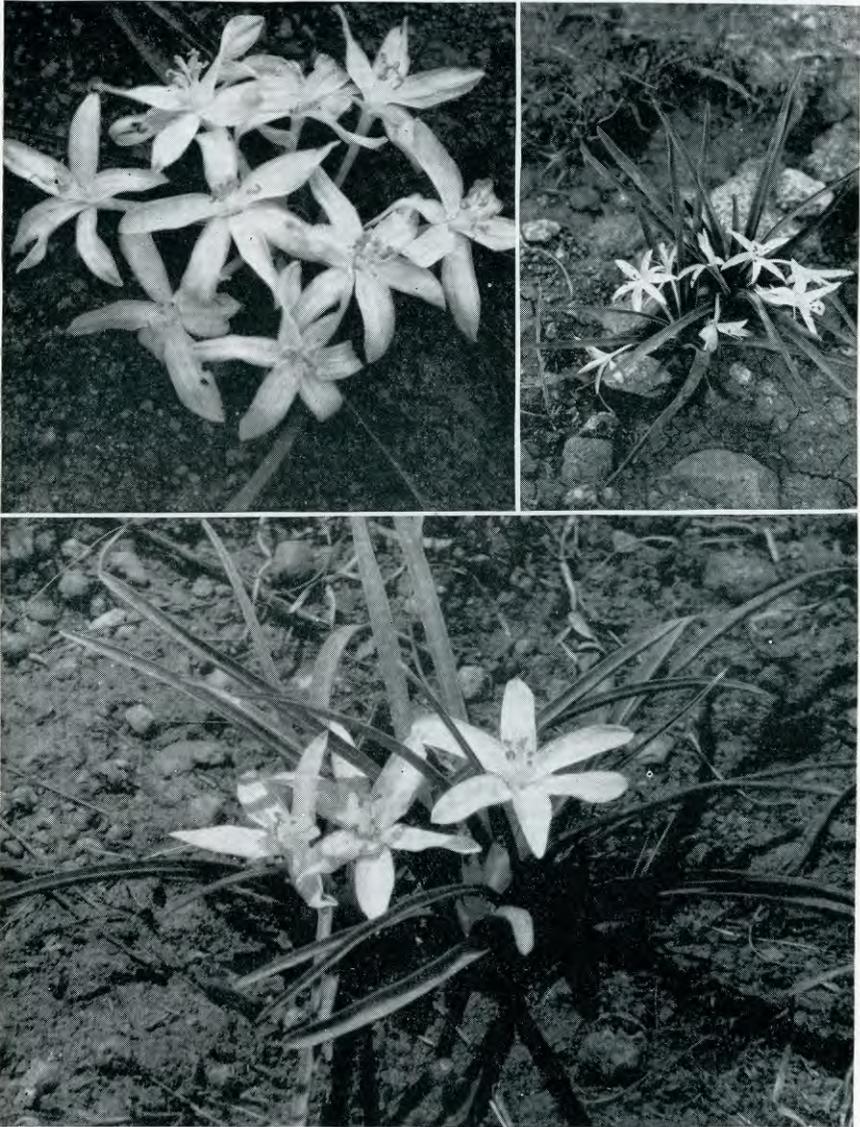
The whole top disappears completely about a month after flowering, and remains out of sight till the following Spring.

*Colorado Springs, Colorado,*  
*November 7, 1941.*

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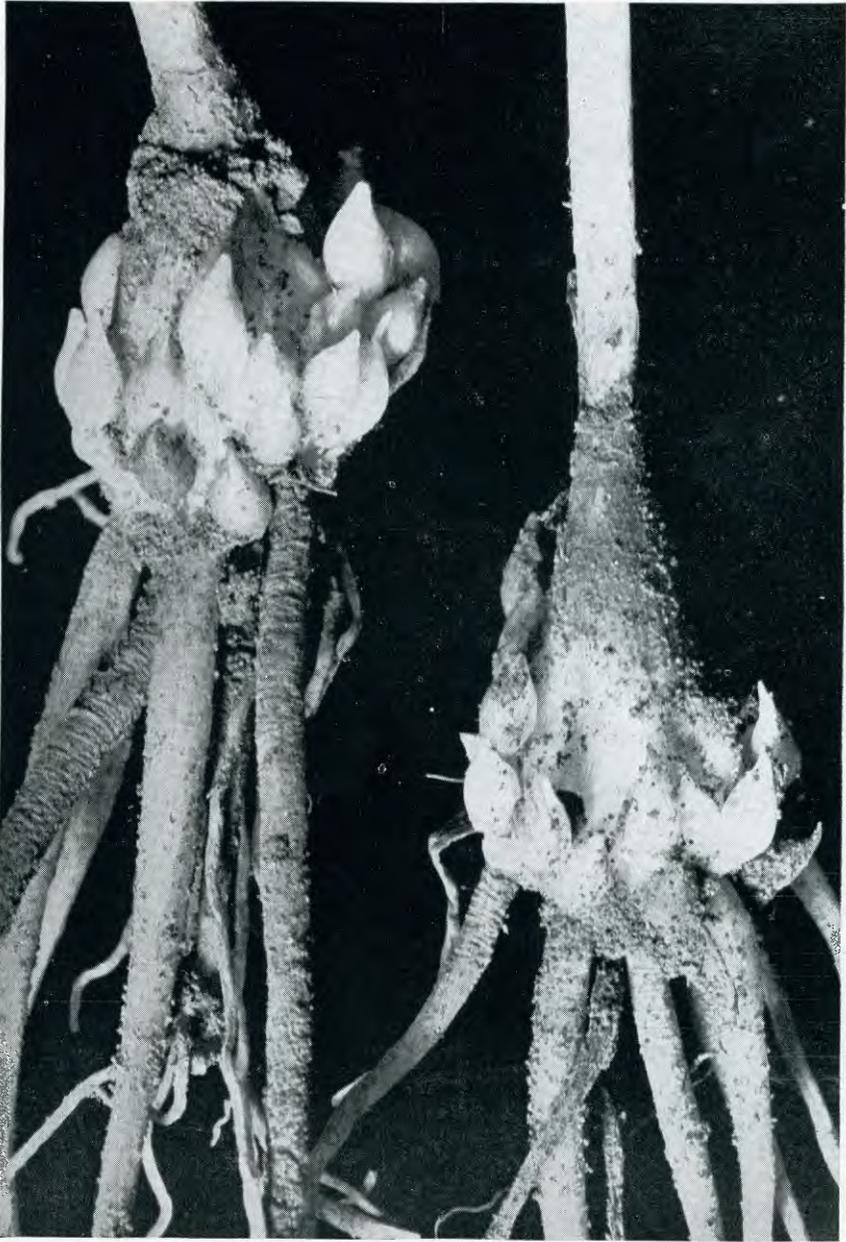
 PROPAGATION OF CLIVIAS BY LEAF CUTTINGS

(*Abstract*). According to V. T eran (Bouturage de Glaieule et de Clivia; Bul. Cercle d'Arboric. de Belg. 1899, page 86), clivias may be propagated by means of leaf cuttings. Apparently in a greenhouse a number of *Clivia* plants had been trimmed and the leaves left on ashes in a bench. Later it was observed that tiny plants had formed at the bases of the leaves.



Kathleen N. Marriage, Colorado Springs, Colo.

*The Star Lily, Leucocrinum montanum; upper left, under cultivation; upper right and lower, in its native habitat.*



W. M. James, Santa Barbara, Calif.

See page 156.

*Nothoscordum inodorum*, showing mother bulb and bulblets; X2.  
Plate 221



W. M. James, Santa Barbara, Calif.

See page 156.

*Clump of Nothoscordum inodorum*

Note. *Nothoscordum inodorum* has priority over *N. fragrans*. Readers should make corrections on page 156.

Plate 222

NOTHOSCORDUM FRAGRANS<sup>1</sup>W. M. JAMES, *California*

Seeds of *Nothoscordum fragrans* were obtained from an American seedsman in 1931. There seems to be a little uncertainty as to its habitat. In the Bulb Book, John Weathers lists it as North American. Bailey's Cyclopedia of Horticulture lists it as subtropical American. Regardless of where it is native, this bulb has proved that it can be a troublesome pest under California conditions.

No record was kept of the time required for the seedlings to grow to flowering age. After flowering two or three times the bulbs were dug very carefully and discarded. At the present time, almost desperate efforts are still being made to get rid of plants which show up in widely separated places.

One illustration (Plate 221) shows the large number of small bulblets which are produced, and all seem to grow under the most trying conditions. The other picture (Plate 222) shows a clump of plants which developed in three or four years after what proved to be a careless attempt to destroy a chance seedling. There are also hundreds of tiny seedling leaves among this group which do not show in the picture. The flowers produce seed very freely which seems to germinate anywhere and everywhere.

Unless it could be used for hybridizing, *Nothoscordum fragrans* seems to have no value whatever in the garden in California. The flowers do have a strong, pleasing fragrance, but they are inconspicuous and its faults offset any desirabilities the plant may have, at least in this locality.

## HAEMANTHUS KATHERINAE

W. M. JAMES, *California*

*Haemanthus Katherinae* is from the edge of the tropics in the Province of Natal, South Africa, where there is summer rain and winter drouth. The light green leaves are 6 to 9 inches across and as much as 3 feet long, narrowing into a comparatively short, spotted sheathing stalk. The bright, orange red flowers are in a close umbel 6 to 10 inches in diameter on a 3 to 4 foot stalk. These measurements are larger than those given in most reference works. They were taken on plants grown in Santa Barbara from seeds imported from South Africa. On six umbels which were counted, the number of flowers varied from 77 to 154, with an average of 109. In Santa Barbara it is almost evergreen,

<sup>1</sup>Editors Note—It is suggested that others report also on this species. *Nothoscordum bivalve* has proved to be a charming pot plant, but is a weak grower. Hybrids between it and *N. fragrans* would most likely be worth while. See article by Wyndham Hayward, *Herbertia* 4: 235-236, 1937.

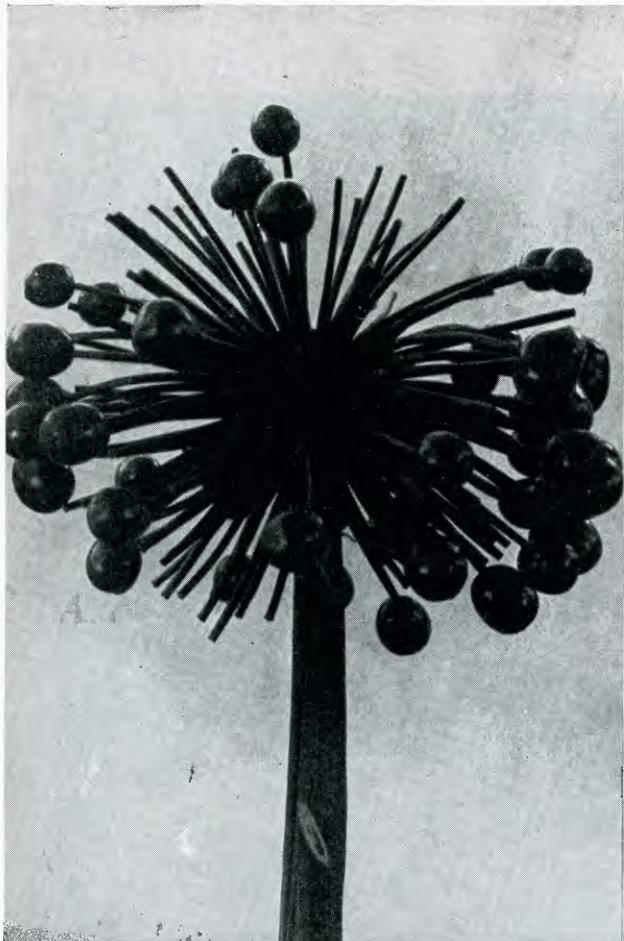
The chromosomes of *N. fragrans* are relatively large—the longest are 23 microns in length. For classroom study and for use as a test object by the scientist, the species has distinct value.

—Hamilton P. Traub.



W. M. James, Santa Barbara, Calif.

*Haemanthus Katherineae*; row of plants viewed from above.  
Plate 223



W. M. James, Santa Barbara, Calif.

*Haemanthus Katherinae*; left, umbel showing fruits; right, close up of inflorescence and leaves.  
Plate 224

the new foliage breaking through a crack in the leaf stalk near its base and often becoming quite well developed before the old foliage dies. (See Plates 223 and 224.)

Although this *Haemanthus* is practically evergreen, it is not proving difficult to transplant. Last winter the tops and most of the roots were cut from three bulbs in January when the foliage showed no signs of turning yellow. These bulbs were kept in dry storage for three months and were then planted with the rest of the stock, all of which had well developed new leaves. The three bulbs produced flowers about the same as those of the other bulbs, and developed good foliage, although it was only about one-half as large as usual. This should indicate that seed stores and nurserymen will have little difficulty in handling these bulbs.

*Haemanthus Katherinae* apparently prefers to grow in fairly dense shade, and a sandy loam soil with plenty of leaf mold. It will probably stand only light frosts. This plant was introduced to cultivation in 1877 and should be better known at the present time, as it is not difficult to grow and has a beautiful and striking appearance either in pots or in the garden.

#### EARLY RECORDS OF AMARYLLIDS IN CALIFORNIA

H. M. BUTTERFIELD, *Specialist*

*Agricultural Extension Service, University of California*

Sometime ago I was asked to supply an article for "HERBERTIA" on the early records of Amaryllids in California. I hesitate to write any extensive article on this general subject of *Amaryllis* and related bulbs, because I do not claim to be an authority on this subject. About all I can do is to refer to certain listings. Whether or not the bulbs listed can be identified accurately today is a question which can not be completely answered, although in most cases I believe that we know fairly well what the bulb listed is.

It is practically impossible at this time to say much about the origin of the Cape Belladonna lilies (*Callicore rosea*) imported into California before 1850. One story goes that the daughter of the first governor of California living in San Jose was given one of these Belladonna lilies by a sea captain who imported the bulb from abroad. This was about 1850.

Colonel J. L. L. F. Warren of Sacramento, an experienced nurseryman who came from Massachusetts in 1849, issued a catalog in 1853 in which he listed *Amaryllis belladonna*, very likely the common Cape Belladonna Lily, *Callicore rosea*, still grown in California. He also listed *Amaryllis braziliensis* or Brazil lily, which may possibly be *Eucharis grandiflora*. His *Amaryllis formosissima* or Jacobean Lily is now referred to as *Sprekelia formosissima*. *Amaryllis Johnsonia*, which he described as scarlet and white, is doubtless the hybrid *Amaryllis*, clone *Johnsonii*, known in his day as *Hippeastrum Johnsoni* (= *Amaryllis Johnsoni*).

William C. Walker of San Francisco simply listed *Amaryllis* without specifying what kind he had. He also listed *Sprekelia formosissima*. This was in 1858. Perhaps the most notable early nurseryman specializing in bulbs here in central California was Stephen Nolan who had a nursery in Oakland on Telegraph Road about where 34th Street has been cut through. In attempting to trace back the origin of these bulbs it is very important that we know something about the man who operated the nursery because this may give some insight as to sources from which he secured his bulbs. William C. Walker lived for a time in the southern states before coming to California in 1849 and I doubt if he would be so likely to secure interesting bulbs as Stephen Nolan. Stephen Nolan was born in the Island of Jersey, served his apprenticeship in English gardens and came to California by way of Australia. He had a wealth of experience and was familiar with the leading bulbs grown in California from 1850 to 1860. In his catalogue for 1871 which is the only catalogue of his I have seen, he listed the following bulbs and I will list them as he gave them even though we know now some should be listed under different species and some of them we list under other genera.

- Amaryllis aulica* (*Amaryllis aulica*)
- Amaryllis belladonna* (*Callicore rosea*)
- Amaryllis Coccinea* (*Haemanthus coccinea*)
- Amaryllis corusca* (*Nerine corusca*)
- Amaryllis fothergilli* (*Nerine Fothergilli*)
- Amaryllis johnsonii* (*Amaryllis Johnsonii*)
- Amaryllis longiflora alba* (*Crinum?*)
- Amaryllis longiflora rosea* (*Crinum?*)
- Amaryllis spectabilis* (*Callicore spectabilis tricolor*)
- Amaryllis bicolor* (*Callicore bicolor?*)
- Amaryllis pallida* (*Callicore pallida*)

The reader will at once note that some of these bulbs just listed are not considered *Amaryllis* at the present time. This is due to the fact that all have been segregated as separate new genera leaving in *Amaryllis* Linn. only one group with *Amaryllis belladonna* Linn (Syn. *Hippeastrum equestre* Herbert) as the type. See Uphof's article in 1938 HERBERTIA for details. In most cases we know fairly well what flowers he offered for sale. I might also add that Mr. Nolan listed *Crinum amabile*, *Lycoris aurea*, and *Vallota purpurea*, now usually listed a *V. speciosa*. He also listed *Sprekelia formosissima*, *Nerine flexuosa*, *N. sarniensis* and *Pancratium*. The "*Amaryllis*" were listed from \$1 up to \$2.50 in 1871. I am inclined to believe that this was per bulb since he specifically stated in other cases the price was for a dozen. Mr. Nolan had the longest list of bulbs of any of the early nurserymen that I have a record of. He continued in business until 1879 and has been credited with having had the best bulb collection on the Pacific coast in his day.

James Hutchison, early nurseryman of Oakland, also listed certain amaryllids. I have seen his catalogs for 1874 and 1878 in which he included *Vallota* at 50 cents to one dollar each. He also listed what he called *Amaryllis lutea* at 75 cents, and now properly known as *Sternbergia lutea*. The Atamosco Lily, which he listed at 50 cents each, is now known as *Zephyranthes atamosco*. A white-flowered form of the Zephyr Lily was listed by him at 75 cents each. This is probably *Z. candida*.

These four nurserymen just listed would likely account for most of the bulbs distributed in San Francisco, Oakland and Sacramento, in early days. However, there were still other dealers who occasionally imported bulbs and sold these in San Francisco either at auction or in small lots, advertising these from time to time in the "California Farmer." As first stated, it is almost impossible for us to fully determine the nature of these different bulbs at the present time even though we may know the name under which they were listed.

The amaryllis and its relatives have found a congenial home in California during a period of about 90 years and popularity is increasing. Growers of the present day should profit by the experience of early pioneers, as brought out in these early records. We may also hope that future generations will look back to the important work which many present-day enthusiasts are carrying on with amaryllids.

## STINSON AND HIS ALSTROEMERIAS

L. S. HANNIBAL, *California*

Until recently the writer had casually associated *Alstroemeria* with sub-tropical plants; this probably being due to the fact that several of our best known forms come from Brazil. However, during a recent trip up the Pacific coast to Vancouver a stop was made at Seattle, where Mr. H. L. Stinson showed us what actually could be done. I believe he has some 23 named forms, both species and hybrids, and practically all were in bloom. But the pleasant surprise was that actually many of the types were far better suited to the mild summer climate of Seattle than one would suppose. In fact, the growth of all the hardy types exceeds any ever observed in the San Francisco Bay area, or in southern California, bar none. The largest and best display was made by the *A. chilensis* and *Ligtu-Angustifolia* forms which stood on scapes 4 or more feet high with umbels from 12 to 18" in diameter. The flowers were large and the color variations presented a bright kaleidoscope ranging from the light pastel shades into numerous rich yellow, orange, pink and red tones. As a unit, the mass color effect banked by a background of tall evergreen trees was indeed one not to be soon forgotten.

Questions concerning this wide range of color can be explained on the basis that a number of the so called species are normally quite variable both in color and form, and that many also readily interbreed. The largest group which intercross includes *A. Haemantha*, *A. Chilensis*, *A. Ligtu-Angustifolia*, *A. versicolor*, and probably several lesser known

forms. Seedlings of a number of crosses were apparently present in Mr. Stinson's garden giving rise to many beautiful plants—any of which would be a treasure for a flower lover's garden.

This feature of ready interbreeding also exists in the wild. As one travels from one district to another in South America one form of *Alstroemeria* will often progressively intergrade into another. A number of the so-called species are apparently only varieties. This condition makes classification quite difficult and highly perplexing, for often a described species cannot be relocated in the wild—only near types can be found.

As indicated above not all *Alstroemeria* species will hybridize, several subgenera exist—one perhaps including the above forms. Another consisting of a semi-evergreen group which is represented by *A. aurantiaca* (also known as *A. revoluta*) and its hardy orange form *A. a. major*. A wide range of color extending from light yellow to deep orange is possible wherever these two cross. A double form also exists.

*A. psittacina* (syn. *pulchella*) is a representative from another group. In some respects this species is more nearly allied to *Bomarea*, having a chromosome count of 9, instead of 8 which is normal for most of *Alstroemeria*. The dark red flowers with their green tips, which are more exotic than attractive, also remind one of some of the *Bomarea* species. The *A. inodora* (USDA#28871) which was released to our Society several years back apparently is a variation of *A. psittacina*. The same applies to *A. brasiliensis*, a wine-red form.

An interesting single flowered type is represented by the low growing, but beautifully marked, *A. pelegrina*. This species and its forms resent cold weather and Mr. Stinson has not had much success with it. However, it is well adapted to the dryer areas of southern California where it is quite popular as it spreads quite rapidly and never fails to bloom.

Since visiting Mr. Stinson a discussion has been raised regarding the general horticultural possibilities of *Alstroemeria* in the United States. The following discussion is a brief summary of the observations of several members of the *Alstroemeria* Committee, who hope it may be of value to the members of the Society and also to others. The problem of greatest concern undoubtedly is just how hardy the various species and forms are. Excluding *A. pelegrina*, all of the types mentioned above can stand some freezing, and apparently occasional winter snows or cold spells cause no harm if frost does not penetrate to the root level. Some later observations of *A. Aurantiaca* growing in an open garden in Victoria, B. C. seemingly verify this. According to Major Pam (Herbertia 1940, page 41) several *Alstroemeria* species survived a freeze of -2 F in the open during the cold spell experienced in England in the winter of 1939-40. On checking over Herbert's *Amaryllidaceae* (1837, page 102) it is also apparent that several species are definitely classed as alpine. However, not all *Alstroemeria* species are of this character. Notably, *A. pelegrina* objects to frosty ground, and *A. violacea*, (Brydon, Herbertia, 1940, page 204), a very beautiful species with large dark

violet-blue flowers, is very sensitive to the slightest frost. The latter even required greenhouse protection in the nearly frost free area about San Francisco Bay. Unless hardy hybrids of *Violacea* can be developed, (so far apparently impossible), this plant will have little garden value.

Of all the *Alstroemerias* in cultivation, *A. psittacina* is apparently one of the most versatile plants known. It thrives in warm climates as well as the cold. Mr. Hayward reports that it is the only one that grows satisfactorily in central Florida of those tested up to the present. This is of interest since there are not many plants which tolerate such a wide divergence of climatic conditions. Apparently the forms of *A. chilensis* and *A. Ligtu-angustifolia* are not so versatile, they grow well in some citrus areas, but the Florida summer rains are objectionable as these plants require a near dry rest soon after blooming. The nearly ever-green *A. psittacina* and *A. aurantiaca* are perhaps the best adapted to the citrus areas of the East coast. However, Mr. Ruckman reports that the *A. chilensis* and *A. Ligtu* forms do quite well in New Jersey. We can expect good growth there since in this area the late summers are quite dry and the plants can go into their required dormant rest period shortly after blooming. Unfortunately for *A. pelegrina*, Eastern conditions are anything but satisfactory, and unless its special requirements are met with, it will not last long. It is a plant best suited to regions of warm dry summers.

The two common groups, "Aurantiaca" and "Chilensis—Ligtu-Angustifolia", give the most promise of becoming garden favorites. The members of the "Aurantiaca" group do best in a natural setting, and in mild climates bloom several times a year. The numerous members of the "Chilensis" group are better suited to a semi-formal bed. The variety of forms gives many possibilities in breeding for color and size. Those having *A. versicolor* blood are often only a few inches high and make excellent low border plants for early summer bloom. *A. haemantha* hybrids are yellow to orange-red, and 3 to 4 feet high, while the *Ligtu-Angustifolia* strains are best known for their large umbels showing pastel shades of pink and rose-red. With careful breeding of the latter even white flowering forms have been produced, but for some reason the flowers and umbels are smaller and the plants lack vigor.

In warm areas the blooming period of most *Alstroemeria* species is short, lasting some six or eight weeks during the months of May and June. But in cooler areas such as Seattle or Pennsylvania we can expect an extended flowering season beginning in late June and lasting through the mid summer.

Soil conditions are not critical in the case of *Alstroemeria*. A moist well-drained sandy loam is desirable, but a number of species thrive in deeply mulched clay loams. Full sun is desirable in the Northern areas mentioned, but part shade is very essential in central and southern California, and the same apparently applies to the East coast citrus areas.

The seeds germinate best in a sandy loam containing ample humus or peat. If the seed flat is kept near 45° F during the winter nearly all

seeds will sprout in the spring as temperatures approach 55° to 60° F. The plants often bloom the first year, but the best display is had with full growth which often takes several years.

One year old plants preferably grown in sunken pots are best suited for transplanting or shipment. In this case the root system is small and compact and does not break up as readily as in the larger clumps. In frost free areas planting of the dormant root clumps is advisable in the fall; in colder regions the most favorable time is apparently the early spring directly after the ground thaws. So far as known the plants are free of pests, and with the exception that mice eat the roots, seldom have cause to die out.

With regard to inquiries regarding Mr. Stinson, one could best place him by saying he has much in common with a well known friend of his—i.e., Harry R. O'Brien, the "Plain Dirt Gardener". Apparently the rose bug which bit O'Brien passed Mr. Stinson by. He succumbed to the *Amaryllis* bug. Unfortunately Seattle climatic conditions are anything but favorable for a malady of this sort; during the winter for hot house culture is the only solution. Perhaps it was the need of more space (the greenhouse being packed three deep), or the quest for hardier material, that shifted Mr. Stinson's interest to *Alstroemeria*—at least from his earlier accounts in *Herbertia* we know he began in earnest. To assemble the number of species and forms he now has required a great deal of active effort on his part—contacting domestic and foreign seed firms, botanists, missionaries, and other parties, often with disappointing results. But his results are well worth his patience. For at present the many plants occupy a large bed situated on the South-eastern slope of a rolling hill. Conifers bound the open glade and the native ferns, which are a persistent pest in that country, mingle with the alstroemerias adding beauty to the garden, but making weeding a full time summer job for all the family.

In addition to collecting and breeding, Mr. Stinson has also been making translations and copies of material published on *Alstroemeria*. This also has had its problems. Some of the obscure early Latin publications have been difficult to locate and copies are not easy to obtain. The work is nearing completion, but there is still much to be done. The task has been far greater than anticipated. Unquestionably too much credit cannot be given Mr. Stinson and family for their untiring efforts in this very interesting study. May success be with them.

#### AMARYLLIDS IN PALM BEACH GARDENS

KARL J. EASTON, *Florida*

Palm Beach, Florida, the Mecca of American and International Society, is an island extending along the Atlantic Ocean and between a body of water known as Lake Worth (part of the Inland Waterways) which separates the Town of Palm Beach from West Palm Beach. The latter being the business and industrial center of the Palm Beach County area.

The society resort is exclusive, expensive and beautiful beyond the average person's realization. Its homes are surrounded by high, vine covered, cement or brick walls; and within their confines one finds a garden paradise that only "Mother Nature" can provide; of course along with this there is a tireless effort in care and cultivation with an expenditure of considerable money for the specimen plantings.

The amaryllids are found to some extent, especially those of decorative value, or any that bloom during the winter period. The Palm Beach season is short, lasting from December to April and estate owners plant those blooming during that period. This naturally excludes many of the most beautiful within the amaryllid classification, that would be used if owners were here during their time of blooming.

Those amaryllids used must be specimens, well grown and if expensive so much the better. One Palm Beach resident a few years back used *Clivia* as a walk border, which caused considerable comment—it was an expensive planting. *Clivias* here, unless shaded and well cared for, do not do as well as in California.

Nearly every Palm Beach Patio has *Strelitzia reginae*, the Bird of Paradise flower, and of course its cousins the banana. They are used around shady pools, walks, yards, corners, or shady nooks festooned with flame vines and *Bougainvillea*. Grouped about lily pools the Shell Lily of the ginger group is used. The fancy leaved caladiums in most every color and combination are used to lend color and are grouped among other plantings as edgings. *Crinum*, the larger decorative species, are welcomed. *Hymenocallis*, the Spider Lily, are group planted here and there, doing well almost any place. The calla in the yellows and whites are most favored by estate owners, especially edged with flowering begonias. The hybrid *Amaryllis* is gradually growing in favor, especially with the Palm Beacher who stays on and spends the late spring in his or her Southern home.

*Amaryllis equestre* grows like a weed and sometimes blooms very early. They are liked for that and it is a favorite in yard planting with those who admire its rich orange bloom with yellow center. A few of the liliiums are grown, the Philippine Lily (*Lilium formosanum*) and the Easter Lily (*Lilium longiflorum*). The former doing best in moist, well drained borders where they are tucked back against a wall among other shrubs. Its long stems and foliage are most attractive and lend a fragrance to the garden comparable with the finest varieties grown in Northern gardens. Here little attention is necessary in the culture of the Philippine Lily, while the Easter Lily demands a sunny to semi-shady location in rich soil with not so much moisture.

Rain Lilies are appearing more and more in plantings, and are used mostly for their attractive foliage in edgings along flag stones, walks and the Patio. *Zephyranthes grandiflora* and *Z. rosea* are mostly found with *Z. citrina*, *Z. ajax*, and *Habranthus robusta* in the next places for honors.

In estate "half-shades" and greenhouses one usually finds orchids for the orchid has always been the aristocratic flowering plant. They tell me that orchids are going to be a house plant within a few years as

the price is going down and the culture is better understood. Among the amaryllids so treated *Eucharis* takes first place. Every owner has them and usually they are finely grown and along with the callas are probably the most favored in the average Palm Beach home. Occasionally an owner, if especially interested in the amaryllids, grows *Haemanthus*, and *Agapanthus*.

Palm Beach gardens are generally elaborately planned and constructed and well cared for. The greenhouses and "half-shades" are built to blend in with the grounds and buildings of the estate. Each estate has its gardener or caretaker. If a caretaker, he must understand plants and plantings as from year to year much changing around takes place.

Each owner wants the finest of plants and flowers and usually has them. To see Palm Beach from the inside horticulturally is much more interesting than the imposing exclusiveness one senses when passing along in front of the villa. Of course, one must know either the owner, gardener or caretaker to even get a look.

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#### HARDY AMARYLLIS

HAMILTON P. TRAUB, *Maryland*

In the late summer of 1940, a number of large bulbs of *Amaryllis advena*, of the pink and ox-blood red varieties, were planted out of doors at Beltsville, Maryland in gravelly clay soil. These plants bloomed profusely soon after planting and later produced foliage. The bulbs had been secured several years ago from Rev. C. W. Hall of Austin, Texas, and had thrived and bloomed annually for a number of years at Mira Flores, Orlando, Florida.

As a hardiness test these bulbs were left out of doors through the winter of 1940-41. Inspections at various times during the winter and spring showed that the foliage remained green and was not injured although the temperature dropped to  $-4$  degrees F. ( $= -20$  degrees C.). This would indicate that perhaps others of the reported 40 species of the linear-leaved, small-flowered *Amaryllis* may prove hardy in the upper South and even farther North. How far north this limit might be can only be determined by extensive experiments. This would be a particularly interesting field for the members of the Society living in the South and less extreme North. There are both spring and fall flowering species, and a great many color variations—yellow, pink, scarlet, vermilion, pomegranate red, purple, violet-purple and bi-colors: white with red, yellow with red and yellow with orange, as shown in Table 1.

Table 1 is incomplete in some particulars mainly due to the habit of a certain type of herbarium taxonomist who cares little for such details as time of leaf and flower appearance. These details are usually omitted in the Latin diagnosis and thus do not appear in the translated descriptions. Information leading to the completion of the table is urgently needed and should be reported in HERBERTIA.

As to blooming season there are spring, summer and fall flowering species. In many species the foliage is contemporaneous with the flowers. The group presents a veritable challenge to the plant breeder.

TABLE 1. Color, flowering season, time of foliage appearance and habitat of the linear-leaved, small-flowered *Amaryllis* species.

Species	Habitat	Color	Time of Flowering <sup>1</sup>	Time of Foliage appearance
<i>Amaryllis Jamesonii</i>	Argent.	red	fall	?
<i>Amaryllis Bertrouana</i>	Chile	purple	July	?
<i>Amaryllis Bagnoldii</i>	Chile	yellow, tinged red	?	?
<i>Amaryllis bifida</i>	Argent.	bright red	fall	n.c.w.f. <sup>2</sup>
<i>Amaryllis advena</i>	Chile	yellow or red	fall	n.c.w.f.
<i>Amaryllis pulchra</i>	Argent.	?	?	?
<i>Amaryllis marginata</i>	Argent.	?	?	?
<i>Amaryllis ananuca</i>	Chile	deep lemon; veins red	?	c.w.f. <sup>3</sup>
<i>Amaryllis consobriniana</i>	Chile	scarlet & yellow	?	?
<i>Amaryllis Moelleri</i>	Chile	rose red, white base	?	c.w.f.
<i>Amaryllis lineata</i>	Chile	yellow, marked red	fall	?
<i>Amaryllis rosea</i>	Chile	bright red	summer	c.w.f.
<i>Amaryllis chilensis</i>	Chile	red or yellow	spring	c.w.f.
<i>Amaryllis soratensis</i>	Boliv.	?	fall	?
<i>Amaryllis andicola</i>	Chile	bright violet	July	?
<i>Amaryllis splendens</i>	Chile	yellow & vermilion	?	?
		orange	?	?
<i>Amaryllis flava</i>	Chile	yellow	?	?
<i>Amaryllis purpurata</i>	Chile	purple	?	c.w.f.
<i>Amaryllis montana</i>	Chile	yellow	?	?
<i>Amaryllis pratensis</i>	Chile	bright red	?	c.w.f.
<i>Amaryllis atacamensis</i>	Chile	violet-purple	?	?
<i>Amaryllis Bakeri</i>	Chile	yellow	?	c.w.f.
<i>Amaryllis uniflora</i>	Chile	red	?	n.c.w.f.
<i>Amaryllis rhodolirion</i>	Chile	bright red	?	n.c.w.f.
<i>Amaryllis modesta</i>	Chile	white, red keel	?	n.c.w.f.
<i>Amaryllis araucana</i>	Chile	rose	?	c.w.f.
<i>Amaryllis coloniana</i>	Chile	red & yellow	spring	c.w.f.
<i>Amaryllis Popetana</i>	Chile	pink	summer	?
<i>Amaryllis gladioloides</i>	Argent.	red	summer	?
<i>Amaryllis granatiflora</i>	Uruguay	pomgranate red	?	?
<i>Amaryllis bonariensis</i>	Argent.	purple	?	?
<i>Amaryllis Gayana</i>	Argent.	purple	?	?
<i>Amaryllis Herbertii</i>	Chile	bright red	?	c.w.f.
<i>Amaryllis Elwesii</i>	Argent.	yellow & red	fall	c.w.f.
<i>Amaryllis tenuiflora</i>	Chile	?	?	?
<i>Amaryllis Philippiana</i>	Chile	scarlet	?	?
<i>Amaryllis laeta</i>	Chile	scarlet	?	?
<i>Amaryllis fulgens</i>	Chile	scarlet, tube yellow	spring	?
<i>Amaryllis bicolor</i>	Chile	red & yellowish-green	spring	c.w.f.
<i>Amaryllis phycelloides</i>	Chile	red & yellow	?	c.w.f.

<sup>1</sup> For northern hemisphere.

<sup>2</sup> Not contemporaneous with the flowers.

<sup>3</sup> Contemporaneous with the flowers.

This note is written in the hope that the members of the Society in the South and North will take these promising subjects under their wings. *The very great need is for the introduction of species.* At present there are only two or three species that are usually met with—*Amaryllis advena*, and *A. pratensis*, and possibly *A. bicolor*. Those who have had success with this charming subject should report in HERBERTIA.

## CRINUM SCABRUM

WYNDHAM HAYWARD, *Florida*

The illustration of *Crinum scabrum* (Figure 69) shows the somewhat spectacular nature of this flower. The bloom comes in the "Milk and Wine Lily" group of crinums, so common in old Florida gardens and country yards. The bulb is large, and may weigh several pounds in big specimens. It grows in medium light upland soil as well as the heavier types. The blooms come in late spring and early summer in



Fig. 69. *Crinum scabrum*; photo by Wyndham Hayward.

Florida, and are several to many in an umbel, a foot or slightly more tall. The foliage of this species is more or less deciduous in Florida being very tender to frost, but the bulb remains uninjured, and grows thriftily after warm weather comes again. The bulb itself has brown scales, and is nearly round in shape, with a short "bull-necked" appearance. The species seeds well, and should be of value in hybridizing. The plant pictured came from the gardens of the late T. L. Mead of Oviedo, Fla., during his lifetime.

## 7. THE SOCIETY'S PROGRESS \*

## SECRETARY'S MAIL BAG

From Perry Coppens of Flanders Farm, Milford, N. J., comes a handsome photograph of a plant of *Cybistetes longifolia* (= *Ammocharis falcata*) in bloom. It shows a very attractive close-set umbel of flowers in spectacular array atop a short stem. The leaves are typically sickle-shaped as in this group. We hope this photograph can be reproduced for the benefit of all readers of HERBERTIA in the next issue.

In the September 1941 issue of "Nature Garden Guide," a bi-monthly publication of the School Garden Association of New York, there is an extended reference to *Amaryllis* under the topic, "Bulb Culture for Schools." The item includes simple directions for culture, and the statement that "the School Garden Association recommends the *Amaryllis* for teachers' use."

Nowhere in Florida had there ever been seen, and probably never in the entire southeast before, such a display of the new Daffodil hybrids as that shipped by air mail to the National Amaryllis Show in Florida last spring, by the Oregon Bulb Farms, Sandy, Ore., Jan de Graaff, president. They were a veritable revelation of the progress being made in the development of this popular flower. The marvel of the exhibit was the fresh, beautiful texture of the flowers after their 3,000-mile air express journey in a box.

Dr. Liberty Hyde Bailey, an old friend of the American Amaryllis Society, was kind enough this year to write a few words of greeting for the readers of 1941 HERBERTIA, which appear in the forepart of this volume. Dr. Bailey said he would have written more, but that he was packing to make another extended trip out of the country on his palm botany explorations. His zeal and enthusiasm for the great worlds of plant science and horticulture at his advanced age, is an inspiration to many younger horticulturists who sometimes find their hopes and courage dimming these days.

*Lycoris aurea*, the St. Augustine "Hurricane Lily," appeared on the New York florists wholesale market in early fall of 1941, the spikes of beautiful golden flowers being priced at about 50 cents each, which means that retail buyers paid a dollar or more. Not a bad profit from bulbs which have sold at about a dollar each when they were available. Recently, however, large bulbs have become scarce, due to the popular demand for this interesting subject. They will probably see a sharp rise in price for a few years. John R. Heist of St. Augustine reports that a friend of his experimented with the flowers this season and was

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\* The material in this section was prepared by the wide awake Secretary of the Society, Mr. Wyndham Hayward. The Society has been most fortunate in being guided through its infancy and now to a robust coming of age by the brilliant and unselfish Secretary whose interest and enthusiasm never lag. We all owe him a very great debt of gratitude for a very difficult task exceedingly well done.—Hamilton P. Traub.

more than moderately successful in shipping the blooms as far as New York. This bulb is a highly desirable item, and a good investment, in gardens of the deep South, too.

Mr. Heist also reports that some of his *Callicore rosea* (Amaryllis Belladonna, Herb.) bloomed this season in Florida, a most unusual thing. Out of hundreds of bulbs of this plant grown in Florida only one or two have ever bloomed after the first year, in the writer's experience.

Dr. H. Harold Hume of Gainesville, Fla., the dean of Zephyranthes enthusiasts, advises us he has just about finished the compilation of material for the treatment of the Mexican species in this delightful genus, which will form another interesting section for some future issue of HERBERTIA. Dr. Hume, as dean of the College of Agriculture at the University of Florida, is a very busy man, and does not have all the time he would like to spare for his monographic work. And there are so many species of Zephyranthes.

Articles for the English section of HERBERTIA this year traveled by Trans-Atlantic Clipper air mail to the United States in duplicate for absolute safety. A number of letters have been lost in recent times by the Society's officers in the mails between Europe and America, which can only be accounted for through "enemy action."

Herman Brown, orchardist and Amaryllis fancier of Gilroy, Calif., sends us some clippings from the San Jose (Calif.) Mercury Herald with an account of the "open house" given by Mr. Brown at his Amaryllis farm last April, attended by thousands of flower lovers. The piece is illustrated with a photograph of Mr. Brown with some of his choice blooms. Mr. Brown is particularly proud of some pure white Amaryllis he was fortunate enough to import from Holland just before the present war.

Major Albert Pam, our English Corresponding Member, calls our attention to the "very interesting account of the genus *Hemerocallis*, and list of species, published by G. P. Baker in the Journal of the Royal Horticultural Society in 1937." He adds, "I do not think that you could find a better account or get anyone to improve on it."

Sir Arthur W. Hill, director of the famous Kew Gardens, near London, England, died in a "riding accident" in England in November 1941, according to advices reaching the United States. Sir Arthur was a plant scientist of world renown, and a helpful correspondent and adviser of the American Amaryllis Society on various occasions since its organization. He wrote the introduction to the 1937 HERBERTIA, the issue commemorating the 100th anniversary of William Herbert's "Amaryllidaceae." In his death the world of plants and gardens suffers a loss that will be deeply felt. The Society has often benefited by his courtesies.

Major Pam reports that a large part of his noted plant and bulb collection under glass was damaged or destroyed by bombs, a German plane dropping a large one right on the greenhouses at his country estate "Wormley Bury," in Herefordshire. His staff of gardeners has been reduced by the war from ten or twelve to the head gardener and daughter, and one young man. Major Pam, despite the loss to his plants, etc., is to be congratulated that his family and servants in his country house only a few hundred feet away escaped harm. The loss experienced by British horticulture in the destruction of a large part of the Pam greenhouse collection is irreparable, and stands as one of the outrages endured by civilized man due to Nazi total war.

Major Pam has promised to compile an interesting article on the color plates and prints of various Amaryllids in the great books and magazines of some 150 years ago, when the color illustrations of flowers were at their classic best in published works. He has a collection of these early botanical and horticultural works in his library, and will make his observations on first hand research.

Arthington Worsley, dean of the Amaryllid fraternity, reports a cold winter at Ventnor, Isle of Wight, where he is now living, for the season 1940-41. He reports himself and family safe so far from German bombs, but bulbs and plants in his garden were frozen back if not killed outright in many instances. He reports *Crinum*s and *Agapanthus* doing well there nevertheless. Because of the food rationing, he has lost several stone in weight, he reports. In his 80th year his horticultural enthusiasm is unabated.

Mrs. J. W. Archbell of Natal, South Africa, writes interestingly of *Tulbaghia*, a rare amaryllid related to *Agapanthus*. This is a novelty in American gardens, although a few California dealers are experimenting with it. The foliage in at least one species has a garlic scent when crushed.

E. P. Killip, associate curator, Division of Plants, Smithsonian Institution, Washington, D. C., reports under recent date that he is still engaged on his monograph of the genus *Bomarea*, and that material is still coming in from Central and South America, much of which represents undescribed species. So at least in *Bomarea* there is still "something new under the sun."

"*Es una bella e interesante revista que leeré con placer,*" writes Dr. R. A. Philippi, of the National Museum of Natural History, Santiago, Chile, in reference to the 1940 HERBERTIA, on receipt of his copy last spring. Dr. Philippi wrote an interesting biography of his noted grandfather, pioneer Chilean Amaryllid botanist, for the previous issue.

The Washington Post of June 15th, 1941 contained an item concerning Peru's "Fiesta de Amancaes," celebrated on St. John's day, June 24, on the outskirts of Lima. It is one of South America's most colorful fiestas, and is held on the Pampas de Amancaes, which is

correspondence and business affairs which seem unavoidable in these hectic times. Mr. R. W. Wheeler of Winter Park, Florida, treasurer of the Society, has rendered noble service in the cause of flower shows of the Society, and in managing technical details of business administration. President E. G. Duckworth remains a source of quiet inspiration for sound workmanship and unflagging enthusiasm.

Mr. W. M. James of Ojai, Calif., deserves a special bouquet of words for his continued labors in behalf of the Society and cheerful cooperation. Mr. Harry L. Stinson, Seattle, Wash., Mr. L. S. Hannibal, Concord, Calif., Major Albert Pam, and Mr. Amos Perry, of England, Dr. V. T. Stoutemyer, Greenbelt, Md., Mr. Elmer A. Claar, Chicago, Ill., Prof. E. L. Lord, Orlando, Fla., Mr. Howard Eric and T. H. Everett, New York, N. Y., Cecil Houdyshel, La Verne, Calif., are others who have lightened the secretary's labors with their aid. There are others, just as deserving, who must remain anonymous for want of space, but to whom your secretary sends his humble blessing.

As in the past, the secretary appeals for your continued support, financially and spiritually, in the Society's affairs. Promote the Society as never before in these difficult days, and with your good will we may emerge from this darkened hour of world travail all the stronger. "Ave," as the Latins said, but let it not be "Vale" yet.

November 1, 1941  
Lakemont Gardens  
Winter Park, Fla.

WYNDHAM HAYWARD,  
Secretary.

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#### REPORT OF TRIAL COLLECTIONS COMMITTEE

The Trial Collections Committee reports the smallest number of accessions during 1941 in the history of the Society for a similar period, this being due mostly to the difficult mail situations, especially in regard to the importation of material from abroad. Mr. W. M. James of Ojai, Calif., a director of the Society is cooperating in the growing and propagation of items in the Society's collections, for ultimate distribution as premiums to members.

Members are urged to remember the Society with sample lots of seeds or rare bulbs of new and unusual amaryllids which they may come upon anywhere.

A-296—Seeds of *Amaryllis ambigua* X *A. johnsonii*, from L. S. Hannibal, Concord, Calif.

A-297—Seeds of *Crinum* sp. from L. S. Hannibal, Concord, Calif.

A-298—Bulb of *Callicore rosea* variety, from L. S. Hannibal, Concord, Calif.

A-299—Bulb of *Crinum* sp., possibly white type of *C. Moorei* from Frank Leach, Piedmont, Calif.

A-300—Seeds of some amaryllid, from Mendoza Province, Argentina, August 1941. Collected by Dr. Alberto Castellanos, in January 1941.

A-301—Two bulbs of *Amaryllis Alberti* (double flowered form of *A. belladonna* Linn.) from Mrs. W. E. MacArthur, Jacksonville, Fla.

A-302—Seeds of *Bomarea frondea*, from Colombian Andes, obtained from a collector in exchange. Distributed to several members.

A-303—Seeds of *Crinum sp.* from Gold Coast, West Africa; collected by Major E. Milne-Redhead of the South African Forces, British Empire Army.

A-304—Bulbs of *Nerine angustifolia*, from Dr. Dyer, Dept. of Agric. & Forestry, Union of South Africa, Pretoria.

A-305—Bulbs of *Nerine appendiculata*, from National Botanical Garden, Kirstenbosch, Cape Town, Union of South Africa.

A-306—Bulbs of *Nerine Masonorum*, from National Botanical Garden, Kirstenbosch, Cape Town, Union of South Africa.

—W. Hayward.

### NOTICE OF 1942 NOMINATIONS

*To the members of the American Amaryllis Society:*

As approved by Article 5, Section 1, of the By-Laws of the American Amaryllis Society, which specifies that the secretary shall send to all voting members not less than 90 days before the date of the annual election, a list of the offices to be filled and the names of those whose terms expire, this information is hereby incorporated in the data below, and same will take the place of a mailed notice to the members to this effect for the 1942 election:—

President .....	Mr. E. G. Duckworth
Vice-Presidents .....	Mr. T. H. Everett
	Mr. E. A. McIlhenny
	Mr. Fred H. Howard
Secretary .....	Mr. Wyndham Hayward
Treasurer .....	Mr. R. W. Wheeler
Director-at-large for 3 years .....	Dr. H. P. Traub

Article 7, Section 1 of the Constitution, provides that any voting member may submit to the Secretary, not less than sixty days before the annual meeting, nominations for officers and directors. These shall be submitted to a nominating committee, who shall select the candidates for the final ballot.

The Annual Meeting of the Society in 1942 will be held on the second Wednesday in April, as provided by Article 10, Section 1, of the Constitution, this being April 8, 1942. Therefore the names of nominees must be submitted by the voting members to the Secretary before February 11, 1942.

WYNDHAM HAYWARD,  
*Secretary.*

October 1, 1941,  
Winter Park, Florida.

The Secretary would like to take this opportunity of calling to the attention of members again the desirability of adding new members and enlarging the field of the Society by bringing it to the attention of horticulturists and garden lovers everywhere. The 1941 Year Book, we hope, will be considered a notable example of the Society's constant efforts to bring together the latest research, the newest accurate and useful information and interesting illustrations concerning the important Amaryllis family. The income of your Society is used solely for the publishing of its Year Book, the holding of Amaryllis exhibitions, and generally supporting the other worthy aims of the organization.

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1941-42

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## PUBLICATIONS OF THE AMERICAN AMARYLLIS SOCIETY

A complete file of HERBERTIA, the year book of the American Amaryllis Society, is indispensable to all who are interested in Amaryllids. A limited number of copies of the following are still available:—

VOLUME 1 (1934). Containing the biography of Henry Nehrling, and many valuable articles on amaryllids; with a portrait of Henry Nehrling and 16 other illustrations; a total of 101 pages.

VOLUME 2 (1935). 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). Containing the autobiography of Arthington Worsley, and important articles on description, genetics and breeding, physiology of reproduction, and amaryllid culture; with 3 portraits of Arthington Worsley, one color plate and 30 other illustrations; a total of 151 pages.

VOLUME 4 (1937). 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). Containing the autobiography 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 amaryllids 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 *Gilliesiae* 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. proceras*; and many other important articles

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