HERBERTIA

1940

HERBERTIA

VOLUME 7

DEDICATED TO

LATIN AMERICA

EDITED BY

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THE AMERICAN AMARYLLIS SOCIETY

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INTRODUCCION

El hecho de que esta edición de HERBERTIA sea dedicada a la América Latina está muy justificado puesto que esta parte del mundo aparece ser uno de los centros propagadores más importantes de Amaryllidaceas.

De los 51 géneros de bulbos amarilídeos identificados por Baker en 1888 entre los cuales está el *Ixiolirion*, 18 gínetros o sea un 35 por ciento son oriundos de la América del Sur, la América Central, México y las Antillas; 4 géneros *(Crinum, Zephyranthes, Cooperia y Hymenocallis,)* o sea un 8 por ciento, se encuentran así mismo en la América de Norte al norte de México, esto es en el resto del Nuevo Mundo. Naturalmente, este as un cálculo verdaderamente conservador pues Baker suprimió algunos géneros que han sido recobrados de nuevo, a saber: *Ismene, Pyrolirion, Argyropsis* y *Habranthus,* siendo éste último el único que se encuentra fuera de la América del Sur.

La Sociedad Amaryllis Americana ha realizado una labor precursora de gran valor al escoger este extenso y bello grupo de plantas como digno de especial atención. Gracias a este patrocinio, y con la cooperación de las Américas así como también de entusiastas extrajeros, el progreso de las Amaryllidaceas está asegurado. Hacia este fin recomendamos tanto a los botánicos como a los horticultores de la América Latina que hagan uso de esta magnífica oportunidad dando a la publicidad en HERBERTIA artículos acerca de las Amaryllidaceas, colaborando de este modo a la realización de los objetivos de esta sociedad.

Es de interés primordial el hecho de que en varias ediciones de HERBERTIA hayan aparecido importantes contribuciones de la América Latina. Así mismo vemos en la actual edición Latino Americana una excelente biografía del gran botánico Dr. Rudolph Amandus Philipp, cuyo nombre estará ligado eternamente al descubrimiento de muchas especies de Amaryllidaceas. El Sr. Castellanos ha contribuído también con unos datos biográficos del fenecido Dr. Holmberg, gran hombre de ciencia quien hizo un estudio especial de las Amaryllidaceas.

Está pues muy justificado el hecho de que en esta edición se publique la descripción original de *Amaryllis aglaiae* Castellanos, oriunda de la América del Sur.

Como conclusión y en nombre de los países miembros de la Unión Panamericana deseo extender mis felicitaciones más cordiales a los miembros de la Sociedad Amaryllis Americana por la excelente y desinteresada labor realizada.

—L. S. Rowe,
Director General
Unión Panamericana

2 Octubre de 1940.

INTRODUCAO

É apropriado que esta ediçao da HERBERTIA seja dedicada à América Latina, visto que esta parte do mundo parece ser um centros propagadores mais importantes das Amaryllidáceas.

Dos 51 gêneros de amarilídeas bolbosas identificados por Baker em 1888, entre os quais está o Ixiolirion, 18 gêneros, ou seja 35 por cento, sao oriundos da América do Sul, América Central, México e as Antilhas; 4 gêneros *(Crinum, Zephyranthes, Cooperia e Hymenocallis)*, ou seja 8 por cento também sao encontrados na América do Norte ao norte do México, isto é, em outras regiões do Novo Mundo. Naturalmente, êste é um cálculo bastante conservador, sendo que Baker suprimiu alguns gêneros que recentemente têm sido restabelecidos, a saber: Ismene, Pyrolirion, Argyropsis e Habranthus, todos os quais, com a exceçao do último, sao encontrados sómente na América do Sul.

A Sociedade Amaryllis Americana tem realizado um trabalho pioneiro de grande valor em se dedicando ao estudo dêste extenso e belo grupo de plantas. Devido ao seu patrocínio, e com a cooperaçao das Américas assim como também de entusiastas estrangeiros, o progresso das Amaryllidáceas está assegurado. Visando o mesmo fim, convidamos tanto os botânicos os horticultores da América Latina a aproveitarem a oportunidade que se lhes apresenta para publicarem na HERBERTIA artigos sôbre as Amaryllidáceas, colaborando dêste modo na realizaçao dos objetivos desta sociedade.

É interessante notar que várias contribuições valiosas procedentes da América Latina têm aparecido em outras edições da HERBERTIA, e que a presente publicaçao latinoamericana contem uma excelente biografia do grande botânico, o dr. Rudolph Amandus Philippi, cujo nome será para sempre ligado com o descobrimenta de muitas espécies de Amaryllidáceas. O sr. Castellanos contribuiu também com uma resenha biográfica do falecido dr. Holmberg, cientista de grande destaque que fez um estudo especial das Amaryllidáceas. Aparece pela primeira vez nesta ediçao, muito oportunamente, a descriçao da *Amaryllis aglaiae* Castellanos, oriunda da América do Sul.

Em conclusao e em nome dos países membros da Uniao Panamericana desejo extender as minhas mais cordiais felicitações aos membros da Sociedade Amaryllis Americana pelo excelente e desinteressado trabalho realizado.

—L. S. Rowe,
Director Geral,
Uniao Panamericana

2 de Outubro de 1940.

INTRODUCTION

It is quite fitting that this issue of HERBERTIA should be dedicated to Latin America since this part of the world is apparently one of the chief centers of amaryllid dispersal. Of the 51 genera of bulbous amaryllids recognized by Baker in 1888, including *Ixiolirion*, 18 genera, or 35 per cent, are indigenous to South America, Central America, Mexico and the West Indies; 4 genera *(crinum, Zephyranthes, Cooperia* and *Hymenocallis)*, or 8 per cent, are shared with North America above Mexico, or the rest of the world. This is a conservative estimate since Baker had suppressed some genera that have been recently revived, namely, *Ismene, Pyrolirion, Argyropsis* and *Habranthus*—all except the last named found only in South America.

The American Amaryllis Society has carried on a worthy pioneer work in singling out this great and beautiful group of plants for particular attention. Due to this sponsorship, with the cooperation of all the Americas, and the amaryllid enthusiasts in other lands, the steady advancement of the amaryllids is assured. Toward this end botanists and horticulturists in Latin America are urged to take advantage of the opportunity of publishing articles on amaryllids in HERBERTIA and thus aid in accomplishing the objectives of the Society.

It is of interest to note that some notable contributions from Latin Americans have appeared in past issues of HERBERTIA, and that in the present Latin American issue there is a fine biography of the great botanist, Dr. Rudolph Amandus Philippi, whose name is forever linked with the discovery of many amaryllids. Sr. Castellanos contributes a biographical sketch of Dr. Holmberg, the late great savant, who made a special study of amaryllids. It is fitting that the original description of *Amaryllis aglaiae* Castellanos, native to South America, be published in this issue.

In conclusion, and on behalf of the countries members of the Pan American Union, I wish to extend congratulations to the American Amaryllis Society for a labor of love so ably carried on by this organization.

—L. S. Rowe,
Director General,
Pan American Union

October 2, 1940.

PREFACE

As pointed out in the Introduction, it is highly fitting that this Edition of Herbertia is dedicated to Latin America where such a wealth of amaryllids is found. Ever since the first plants were sent to Europe from the Americas, there has come a never ending parade of amaryllids from this source. One of the Latin Americans most intimately connected with the discovery of this vast floral wealth was the late Dr. Rodulfo Amando Philippi, 1808-1904, and we are grateful to his grandson, Dr. R. A. Philippi II of Santiago, Chile, for the portrait and biography of this great botanist. We are fortunate also to have the excellent portrait and biography of the late Dr. Eduardo Ladislas Holmberg, the late great scientist, contributed by Sr. Alberto Castellanos of Buenos Aires, Argentine. Sr. Castellanos also describes a new South American species of *Amaryllis* in this edition.

Dr. F. C. Hoehne, Director-Superintendent of the Department of Botany, Secretariat of Agriculture, Industry and Commerce, State of Sao Paulo, Brazil, writes under date of Nov. 4, 1940, that due to illness he regrets to report that he has not been able to prepare the contemplated article on the amaryllids of Brazil for the Latin American Edition, but he hopes to prepare such a paper for a future issue of Herbertia. Dr. Hoehne's many friends in all the Americas will be glad to hear that he has recovered and is back at his important botanical work.

Appropriately, Dr. Goodspeed of the University of California begins his very important series on the amaryllids collected on plant exploration trips to South America. Another important event is fully described in the text—The Brazilian "Blue Amaryllis", *Amaryllis procera*, bloomed in Florida. The bulbs were imported by Mr. E. J. Anderson of Palm Beach, Florida. Mrs. Wilhelmina F. Greene, the artist of Winter Park, Florida, saw the plant in bloom and has kindly furnished an appropriate cover design featuring the "Blue Amaryllis".

We owe a debt of gratitude to the modest, indefatiguable worker, W. M. James, of Santa Barbara, California, who is doing very valuable work in the culture of amaryllids. He has also begun breeding experiments, including the study of chromosome numbers in amaryllids, and reports his first successes with *Nerine filifolia* hybrids. His contributions in this field are among the most important being made at the present time. As the movement for the advancement of the amaryllids gains ground other important specialists in this field will surely appear. Many have already started and only time is needed to bring their work to fruition.

The interest in the daylily is still mounting, and this is reflected in the amount of space devoted to this subject in this issue. Dr. Stout and Miss Kojan contribute very valuable articles from the New York Botanical Garden, and Prof. Watkins reports on important experiments from the University of Florida. We regret to announce the death of Mr. Kelso who pioneered in the evaluation of daylilies. His courageous beginning in this field will immortalize his memory to all amaryllid enthusiasts, present and future. Mr. Steichen resigned as Chairman of

the Daylily Committee on account of ill health, and he was succeeded by Mr. Elmer A. Claar, who reports on the 1940 activities. Mr. J. Marion Shull has given the members a concise data card for *Hemerocallis* that has been officially adopted. This is a real step in advance.

Another group that is deservedly gaining in popularity is the alstroemerids. Mr. Hannibal reports on *Alstroemeria* activity on the West Coast, Mr. James adds a note on Bomarea acutifolia, Dr. Uphof presents two interesting articles, and Dr. Goodspeed writes of the alstroemerids of South America.

In this brief preface it is not possible to touch on the many other important contributions appearing in this issue, and we take this opportunity of thanking the contributors, one and all, for their helpful cooperation in making this edition complete in all departments. In spite of World War II, our courageous English friends are keeping in touch with us. Major Albert Pam takes us for an intimate walk in his garden that we will all treasure. We are glad to welcome Mr. H. W. Pugsley, who received the 1940 Herbert Medal for his important researches on the classification of the amaryllids.

Finally, let us take a glance at what future issues of Herbertia have in store for you. The 1941 issue will feature the daylily, and will be dedicated to the pioneers in daylily breeding—George Yeld, Willy Mueller, Amos Perry, C. S. Betscher, and A. B. Stout. It will be in the nature of a tribute to them from those who have entered this field more recently. There will be biographies and portraits of the pioneers, a detailed inventory of past achievements and plans for the future.

The 1942 issue will feature the Alstroemerids—*Alstroemeria, Bomarea,* Leontochir and Schickendanzia. Detailed plans are being developed by the alstroemerid enthusiasts at the present time and will be announced in the next issue.

The 10th. Anniversary issue will appear in 1943, and will be dedicated to those who helped to advance the amaryllids during the past decade. There will be a detailed inventory of past accomplishments and plans for the future.

In following years, it is planned to feature some one particular group of amaryllids each year. However, there will always be a well balanced amaryllid menu, as in the past, so that the advancement of the whole family in popular esteem will go steadily on.

U. S. Horticultural Station,
Beltsville, Maryland,
October 7, 1940

—*Hamilton P. Traub*

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS—PLATES

FIGURES

ERRATA

HERBERTIA, VOL. 6, 1939

Page 31, 1st. line from top, for "was" read "were".
Page 72, change "23" to "24" preceding "*Tuckii*".
Page 103, Index of Species, after "*helictus*" change "38" to "39".
Page 105, 19th. line from bottom, for "1653" read "1753".
Page 166, 6th. line from top, for "be" read "by".
Page 169, Plate 157, for "*Hermerocillas*" read "*Hermerocallis*".
Page 198, 5th. line from bottom, for "Sargant" read "Sargent".

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.

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.

This volume of Herbertia
is dedicated to Latin America,
particularly to those, who,
in the past and present, have been,
or are devoted to the amaryllids
of South and Central America,
the West Indies and Mexico.

Dr. Rodulfo Amando Philippi, 1808-1904

Plate 168

BIOGRAFIA DEL DR. RODULFO AMANDO PHILIPPI, 1808-1904

Dr. R. A. Philippi,

Museo Nacional, Santiago, Chile

Don Rodulfo A. Philippi nació en Charlottenburg, Berlin el 14 de Septiembre de 1808. Hizo sus primeros estudios en el famoso Instituto de Pestalozzi, en Iverdon, Suiza.

En 1822 terminó los estudios en el Gimnasio llamado Convento Gris de Berlin. Allí inició su afición por la Botánica descubriendo en 1826 cuatro plantas nuevas en la Marca de Brandenburgo. Por consejo de sus padres estudió Medicinia en la Universidad de Berlin, recibiendo su título de Doctor en esta ciencia a fines de 1830. Su memoria de grado se tituló "Los Ortópteros de Berlin". Nunca sintió agrado por la Medicina y desde que recibió su título se dedicó exclusivamente a las Ciencias Naturales y en especial a la Botánica.

En 1837 emprendió un largo viaje al Sur de Italia donde hizo una magnífica colección de Moluscos aun hoy día existente en el Museo de Santiago. Publicó dos tomos sobre Moluscos de Sicilia que fueron premiados por el Rey de Prusia.

A su regreso fué profesor del Politécnico de Cassel, en el Ducado de Hessen-Nassau. Allí permaneció hasta 1848, epoca en que sobreviene la famosa revolución de dicho año. El Dr. Philippi, por sus ideas democráticas tuvo que dejar el cargo y pensar en buscar su vida en otra parte. Estas razones lo impulsaron a emigrar a Chile donde llegó en 1851.

Hizo de Chile su segunda patria y en 1853 fué nombrado Director del Museo Nacional. Permaneció en ese puesto hasta el año 1900, año en que fué sucedido por su hijo Don Federico Philippi.

La obra del Dr. R. A. Philippi en Chile fué immensa. El Museo que era una sola pieza se transformó en el mejor de su época en Sud-América. Exploró gran parte del pais, su viaje principal fué el Viaje al Disierto de Atacama en 1854 que dió lugar a numerosos descubrimientos científicos.

Como era propio de la época, él se dedicó a todas las ramas de la Historia Natural, preferiendo, sin embargo, la Botánica.

Durante su larga vida hizo 450 publicaciones científicas. Las Colecciones del Museo de Santiago poseen un enorme número de Tipos del Dr. Philippi.

Fué también Profesor en la Universidad, por lo que dejó numerosos alumnos.

La labor de Philippi fué enorme, y hoy día cualquier estudio que se haga sobre las Ciencias Naturales de Chile tiene que consultar los Trabajos o los Tipos de especies del ilustre sabio alemán.

Falleció en Santiago en 1904 a los 95. Años de edad. Se le hicieron funerales nacionales.

BIOGRAPHY OF DR. RODULFO AMANDO PHILIPPI, 1808-1904 *

Dr. R. A. Philippi,

National Museum of Natural Sciences,
Santiago, Chile

Don Rodulfo A. Philippi was born in Charlottenburg, Berlin, Germany, the 14th of September, 1808. He received his elementary education at the famous Pestalozzi Institute at Iverdon, Switzerland.

In 1822 he concluded his studies in the "Gymnasium" known as the Gray Convent of Berlin. There he first demonstrated his aptness for botany, discovering in 1826 four new plants in the Mark of Brandenburg. On the advice of his parents he studied medicine in the University of Berlin, receiving the degree of Doctor in this science at the end of 1830. His graduating thesis was entitled *The Orthoptera of Berlin.* He was never seriously inclined toward Medicine, and from the time of receiving his degree he devoted himself exclusively to the natural sciences, and especially to Botany.

In 1837 he undertook a long journey to Southern Italy, where he made a magnificent collection of mollusks, which may be found to this day in the Museum of Santiago, Chile. He published two volumes on the *Mollusks of Sicily,* which were the subject of special honors awarded to him by the King of Prussia.

After his return he was Professor of Polytechnics at Cassel, in the Duchy of Hessen-Nassau. There he remained until 1848, the year of the famous revolution. Dr. Philippi, because of his democratic ideas, was obliged to give up his position and to think of seeking a new field for his life's work. These reasons impelled him to emigrate to Chile, where he arrived in 1851. He made Chile his second fatherland, and in 1853 he was named Director of the National Museum. He remained in this post until 1900, when he was succeeded by his son, Don Federico Philippi.

The work of Dr. Rodulfo Amando Philippi in Chile was immense. The Museum, which was in a single room, was transformed into the best of its time in South America. He explored a great part of the country, his principal journey being the *Trip to the Desert of Atacama* in 1854, which resulted in numerous scientific discoveries. As was the custom of the period, he dedicated himself to all branches of Natural History, preferring, however, Botany.

During his long life, he published 450 scientific papers. The collections of the Museum of Santiago possess an enormous number of type specimens from Dr. Philippi's collecting trips. He was also a professor in the University of Chile and was survived by many students who had

* Translators Note—Dr. R. A. Philippi II, the author of this biographical sketch, is the grandson of the late great Chilean botanist. He is a noted ornithologist in his own right and is associated with the National Museum, Santiago, Chile. The American Amaryllis Society is greatly indebted to Dr. Philippi II for his interesting biography that will be treasured by all students of South American botany. The Society also owes a debt of gratitude to Dr. Alberto Castellanos of Buenos Aires who introduced us to Dr. R. A. Philippi II.—W. Hayward.

received their training under him. The labor of Dr. Philippi was no less than enormous, and today, no matter what study is undertaken in the natural sciences of Chile, one is obliged to consult the works or the type specimens of the illustrious German-Chilean savant.

He died in Santiago in 1904 at the age of 95, and national honors were rendered to him at the funeral services.

EDUARDO LADISLAS HOLMBERG, A BIOGRAPHICAL SKETCH

ALBERTO CASTELLANOS,

Museum of Natural Sciences, Buenos Aires, Argentine

The late Eduardo Ladislas Holmberg greatly influenced the development of science in his native country, especially in the natural sciences. His work parallels, though on a lesser scale, that of Erasmus Darwin and Wolfgang Goethe in their respective countries. His grandfather was an Austrian artilleryman who arrived in Argentina during the era of its emancipation, who was one of those who helped to achieve independence, and who remained in the country that he helped to liberate. His father took part in the civil wars, and served his country in a political capacity.

Eduardo Ladislas Holmberg was born in the City of Buenos Aires, June 27, 1852, and received his early education in an English school in that City. He later studied medicine, completing this work in 1880. The degree of Doctor of Medicine and Surgery was conferred upon him, his thesis being, "El Fosfenso". He never practiced his profession, however, and immediately dedicated himself to the study of nature, especially zoology, and botany.

He was the first director of the municipal Zoological Garden of Buenos Aires, and he founded the publication (Review) of this institution. He was professor of Natural Sciences in the Normal School of Professors, inspector of Secondary Education, Member of the National Academy of Sciences in Cordoba, (contributing many scientific papers to its Bulletin and Acts), professor of Botany in the School of Natural Sciences of the Faculty of Exact, Physical and Natural Sciences of the University of Buenos Aires, being the first Argentine to occupy the last named chair. When he retired on pension, he was honored with the presidency of the Academy of Exact, Physical and Natural Sciences.

He was an enthusiastic and pioneer propagandist for Darwinism in Argentina, and on the death of Darwin, he gave one of his most original and stimulating lectures at his conference on May 19, 1882, in the Círculo Médico Argentino entitled "Charles Robert Darwin".

He explored a great part of Argentina,—Mendoza, Chaco, Misiones, etc. His "Journey to Misiones", published in 1887-1889, is a book that contains immortal chapters of great literary value, such as the description of the subtropical rain-forest. On the anniversary of Argentinian independence, May 10, 1910, he published a poem dedicated to the Araucanian Race, entitled "Lin-Calel". In collaboration with some of

his pupils and colleagues he founded the scientific reviews, "El Naturalista Argentino" and "Apuntes de Historia Natural". These are at present very scarce. Only two volumes of the latter appeared, Vol. 1 (1909), and Vol. 2 (1910). In the first appeared several collaborations in insects and molluscs.

Fig. 45. Dr. Eduardo Ladislas Holmberg, 1852-1937.

His great accomplishments in languages, literature, and the arts gained for him the reputation of an important writer, and in his venerable old age he was indeed the dean of Argentinian culture. Besides his scientific publications, already referred to, he produced others of scientific and literary interest, including the short story, the novel and verse, and it was natural that when the Guatemalan poet, Rubén Darío, resided in Buenos Aires, Holmberg was one of his friends.

His pupil, the botanist Hicken, dedicated to him the Genus *Holmbergia,* of the Chenopodiaceae, and the entomologist, L. F. Deletang, dedicated to him the Genus *Edholmbergia,* of the Cicadidae. Although Zoology was the branch of science that attracted his attention most, he was genuinely interested in botany as the following list of citations shows:

Ojeada sobre la Flora de la provincia de Buenos Aires. Censo de la provincia de Buenos Aires de 1881. (1882) : 56-68.
Clave analítica de las familas de las plantas. Buenos Aires (1895) ; 2nd. ed. (1904) : 1-88.
Flora de la República Argentina. Censo de 1895; I (1898) : 385-474; with 1 map.
Sobre el representante de una familia nueva para la Flora Argentina. Anales Soc. Cient. Argentina. XLIX (1900) : 22.
Hippeastrum flamigerum Holm. nov. sp. Anales Museo Hist. Nat. Buenos Aires. 3a ser. I (1902) : 411.
Amaryllidaceae platenses nonnulae. Ibid. II (1903) : 77.
Zephyranthes jujuyensis Holm. nov. sp. Ibid. IV (1905) : 523.
Zephyranthes porphyrospila Holm. nov. sp. Ibid. p. 65.
Amarilidáceas argentinas indígenas, y exóticas cultivadas. Anales del Museo Nac. de Buenos Aires. XII: 75-192. (1905) ; with 1 map.
Botánica elemental. Buenos Aires. (1909) pp. 1-478; with 3 maps.

In Herbertia 1936, a tribute to Dr. Holmberg who was then in his 83rd. year, was contributed by Sr. José F. Molfino and Sr. Salvator Siciliano. In the following year, Dr. Holmberg died in his native city, Buenos Aires, November 4, 1937.

AMARYLLIDACEAE FROM THE UNIVERSITY OF CALIFORNIA BOTANICAL EXPEDITIONS TO THE ANDES

T. H. Goodspeed

Professor of Botany and Director of the Botanical Garden, University of California, Berkeley

During the last ten years the University of California Botanical Garden has sent out three plant hunting expeditions to secure new or little known species of scientific and ornamental importance. The first of these expeditions, under the direction of Dr. Joseph F. Rock, covered a large area in western China and Tibet and sent back to California a numerous and valuable collection of herbarium specimens and seed of many species and varieties of Rhododendrons and related genera, of lilies, roses and other plants of ornamental as well as of scientific interest.

The second and third expeditions, which were carried on during 1935-36 and 1938-39, under my direction, worked principally in Peru, Bolivia, Chile and Argentina. A total of ten North American botanists and assistants and three local botanists and collectors worked for almost one hundred man months along both flanks of the Andes, on the adjacent West Coast, in the Argentine pampa and in Patagonia to Magellan Strait.

The primary objective of these two South American plant hunting expeditions was the collection and study of native species of *Nicotiana* and the related genera *Petunia, Salpiglossis, Fabiana, Nierembergia* and

Bouchetia, and mapping the distribution of *Nicotiana* species, many of which are peculiar to temperate South America. In addition, general collections were made of the more important elements of the various floras which we encountered and a special effort was made to find in these floras new or little known plants of potential ornamental importance. A number of commissions from research institutions and from botanists interested in the vegetation of South America were undertaken. For the Division of Plant Exploration and Introduction, Bureau of Plant Industry, of which a number of members of the expeditions were appointed Collaborators, we collected native and cultivated races of tobacco, cotton, corn and potatoes. .

All three plant hunting expeditions sent out by the University of California were financed almost entirely from funds donated by scientific foundations in this country, in England and in South America, by private individuals, by horticultural organizations and particularly California Garden Clubs, Inc. in the case of the second South American expedition. Valuable assistance in propagating, establishing and studying in the University of California Botanical Garden the plant introductions from Asia and from South America is being received from the personnel of Work Projects Administration under O. P. 65-1-08-91 Unit B-3.

I am glad to have this opportunity to make special mention and grateful acknowledgment of the financial assistance provided by the American Amaryllis Society. Such material aid, but of equal importance the approval and encouragement which such aid connotes, is extremely heartening to those who adventure far afield in the hope of securing new or otherwise valuable plant material. It helps to sustain them when after long contact with unfamiliar, often dangerous and inevitably trying environmental conditions they begin to wonder whether all the discomforts and privations of mind and body which they must endure are really justified. In plant hunting in difficult and isolated areas the psychological hazard is often almost as great as the physical one. Under such circumstances to keep in mind the interest which such a representative organization as the American Amaryllis Society will take in the success of your work is very definitely helpful.

The two South American expeditions were eminently successful in the amount and variety of the scientific information obtained. Over one hundred thousand herbarium specimens were collected along with seed of those many species which investigators in this country and abroad were anxious to secure. Of ornamentals, thousands of bulbs, roots, cuttings and seeds were sent back for trial in the University of California Botanical Garden. Such an unexpectedly large amount of valuable material of proved or potential ornamental importance was secured from what has proved to be the most extensive plant exploration ever undertaken in temperate South America, that not sufficient funds are available to permit the propagation of more than a part of it and the necessary testing for worth and the essential selection for quality which we alone can successfully carry on.

T. H. Goodspeed, Berkeley, Calif. See pages 21, 24

Upper, Placea sp., in its native habitat; lower, Crocopsis fulgens.

Plate 169

Amaryllids often had a prominent share in making attractive the landscape of those considerable portions of Peru and Chile which members of the South American expedition traversed. In the following list of the species which have bloomed or are about to bloom in the Botanical Garden in Berkeley it will be noted that a number were originally collected in the Andes of southeastern Peru in the Deptos. Cuzco, Apurimac and Puno. Scenically this is a magnificent area. In terms of vegetation it is one of the most diversified and important regions of temperate South America. Various members of our expeditions spent a total of five man months in this portion of the Andes and made significant discoveries of new or little known species in a wide range of plant families.

Cuzco, the ancient capital of the Inca Empire, is a most colorful city which is one-fourth modern, one-half Spanish-Colonial, and one-fourth Inca in architecture and still represents as it did of old, the "Hub of the Universe" for the rather primitive descendants of the Incas. With their loaded llamas they constantly throng Cuzco's narrow streets and make them gay with brilliant native costumes. Lying at an altitude of almost 12,000 feet and in sight of the snowy Cordillera, its climate would be rigorous were it not that the equator is only some 13 degrees away. Tender species grow there successfully, even the graceful "banana palm" only requires protection from the strong, cool winds which blow down into Cuzco gardens from the nearby highlands. The rainy season begins in November and lasts for three months or more but showers may be expected at other seasons in the nearby river valleys at lower altitudes.

Cuzco is the most convenient headquarters for the botanist in southeastern Peru. Radiating from it passable automobile roads lead in a number of directions and put the collector within striking distance of almost completely unbotanized areas. At the end of the road the automobile is replaced by horses, burros and llamas but ultimately a lot of hard climbing on foot is involved.

Less than a day's journey from Cuzco is the "Grand Canyon" of the Rie Urubamba whose nearby source is less than one hundred and fifty miles from the shores of the Pacific but whose waters after mingling with other confluents to create the mighty Amazon, flow eastward ultimately to become a part of the Atlantic. In the bottom of the gorge at altitudes of six to seven thousand feet, the banks of the swift flowing river are clothed with a tropical rainforest, which is also characteristic of most equally low altitudes in Peru in areas which lie east of the maritime Cordillera. Through the rare openings in the dense, dark riverside vegetation there are glimpses of almost vertical canyon walls which extend upward to altitudes of ten to fourteen thousand feet and above the high ridges the glittering white peaks and great snow fields of the eighteen to twenty thousand foot crest of the Cordillera stand out vividly against the hard, burnished blue of the Andean sky.

On the steep canyon walls the vegetation, which constantly changes as it ranges upward, shows a remarkably clean cut altitudinal zonation. Thus, a series of species of such a solanaceous genus as *Nicotiana* are found in broad horizontal strips, each one separated from its neighbor

by an altitudunal difference of from five hundred to one thousand feet. In the shady tropical forest at the bottom there are epiphytic orchids while a thousand feet above there are terrestial ones growing vigorously on rocky outcroppings in full sun or perhaps, in the partial shade of a giant *Calceolaria* whose great golden "pocketbooks" hang five to ten feet above your head from the branches of a massive, pyramidal inflorescence. Still higher, from ten thousand to twelve thousand feet, we found such Amaryllids as *Eustephia coccinea, Crocopsis fulgens,* (Plate 169) *Urceolina peruviana,* and others still undetermined. They grew always in well drained situations and mostly either partially shaded or where grasses or low shrubs protected the soil from the intense isolation of the high altitudes.

South and east of the Cuzco region begins the high plateau region, or *puna,* scantily clothed with coarse grasses and dotted with such "vegetable sheep" as *Azorella,* or mound-like aggregations of white cacti. In the midst of the *puna* lies Lake Titicaca, which, with its shore line at an altitude of twelve thousand feet, is said to be the highest large body of water on the earth's surface as it certainly is one of the most beautiful with its blue waters reflecting the snowy crests of the Bolivian Andes. To certain of its islands is assigned the legendary place of origin of the Inca race, the ruins of whose marvellous agricultural terraces rise tier on tier up the island's hillsides. High above the lake's surface, among these evidences of an ancient civilization on Isla Estebes, we found a splendid *Stenomesson,* possible a variety of *S. incarnatum.* On the *puna* almost hidden by the spring luxuriance of *ichu* and other grasses, *Zephyranthes parvula* made the most of the short growing season at thirteen thousand feet. North of Lake Titicaca where the elevated plateaus dip down along river gorges into the Amazonian forest grows a striking *Amaryllis (syn. Hippeastrum)* that we have not as yet identified.

On the western foothills of the first or maritime Cordillera in central Peru we found other amaryllids. In October a green leaf or two appeared here and there on the rocky hillsides and constituted, apart from the ubiquitous cacti, the only evidence that plant life existed in such arid terrain. But when the light Andean foothill rains began to fall in April, then suddenly the surfaces of the rough, barren slopes were alive with splashes of color from red, orange and yellow flowers borne on flowering shoots which came from bulbs deep seated under the rocks and boulders. The labor of digging out these bulbs was severe but a fair representation of species was secured. Since they were taken at the dormant season and have not yet flowered in Berkeley they cannot be reported by name or commented upon as to ornamental value at this time.

In terms of ornamentals Chile means to me primarily *Alstroemeria,* although we found there other genera of attractive amaryllids and a host of fine species of trees, shrubs and herbs of many other families. Of *Alstroemeria* we made many collections over a distance of six hundred miles along the coast of middle Chile and also at a number of points in

the *Cordillera de la Costa* behind it and in the Chilean Andes. One was an annual, a little, not too vigorous plant which grew on dry, gravelly slopes of coastal hills while another pushed up six feet high with massive umbels topping thick, almost woody flowering stems. The flower color range was amazing and in the soft clear atmosphere of the Prov. Valparaiso, truly a "Vale of Paradise", pastel shades seemed to predominate. The prize among the Alstroemerias was *A. violocea* (Plate 170), of which for a time we despaired of getting seed.

One of the problems of the plant hunter is to time his visit to an important collection region sufficiently accurately so that he will find most of the vegetation just going out of flower. Then he can make selection of what appears to be new or otherwise interesting, scientifically or from the ornamental view point, on the basis of floral and vegetative characters and at the same time be able also to collect seed or other propagative material of his selections.

Working south along the Chilean coast with the advancing spring season we came upon *Alstroemeria violacea* in all the glory of its first flowering. Regretting the absence of seed the collecting party had to push on southward to keep pace with the spring vegetation. Later on, when we judged that seed should be ripe in the area where we had found *A. violacea* and other important plants, we retraced our steps by aeroplane. Although we had judged the season correctly in the case of other plants the capsules on *A. violacea* were still greener than we liked. There was, however, nothing to do but make the best of it by collecting the immature seed in quantity and fortunately a little seed of this most charming *Alstroemeria* ripened in the immature capsules during their trip to California.

In the mistaken impression that we could dig *Alstroemeria* without too serious injury to the tubers and their important buds we spent many back-breaking hours in the Chilean hillsides with pick and shovel. Of more than a thousand plants sent back to California only a dozen or two survived. It is almost impossible to extract from rather heavy soil the large ramifying tuber mass, that is produced by a mature plant of *Alstroemeria*, without considerable breakage of the tissues. These wounded tissues mould very rapidly and after five or six weeks in transit we had almost nothing to show for all our labor. In Berkeley most of the species of which we were able to collect seed begin to bloom in about eighteen months after sowing. Grown in a very light soil in wooden or paper pots they can be transferred to permanent garden locations without injury or retardation of growth.

The Alstroemerias of high altitudes in the Chilean Andes are very attractive but will doubtless be difficult to grow except where artificial scree kept at proper moisture content can be supplied. Along the Transandine Railway at altitudes of approximately twelve thousand feet a dark maroon flowered species, whose fleshy spatulate leaves formed a rosette on the surfaces of precipitous rock slides, was never in fruit during my three periods of collecting in that region. Repeated efforts to induce the proprietor of the somewhat primitive hotel at Portillos, the

T. H. Goodspeed, Berkeley, Calif.

See pages 22, 25, 30

Alstroemeria violacea

Plate 170

station just before the entrance to the tunnel which pierces the Andean crest and through which the train passes under the Argentine border, to collect seed later in the season were unsuccessful.

A few thousand feet below the zone in which this high-altitude *Alstroemeria* is found, a species of *Placea* began to appear in some quantity. On sandy plots between the massive boulders covering all but the steepest slopes which lead upward to what perhaps for many centuries has been the most important transandine pass, red-brown flowering shoots in groups of two to five were topped with large light to dark pink, wide-open-mouthed trumpets. Deceived by the sandy soil surface through which they grew I attempted to dig some of these Placeas but found their bulbs wedged in between rocks which were too large and heavy for my collecting pick to loosen. Fortunately at still lower altitudes where the season was more advanced *Placea* was in fruit and I was able to collect ripe seed. On the coastal Cordillera we collected either the same or a related species of *Placea* which is shown in Plate 169.

It is said that the rock scenery along the Transandine Railway is the finest in the world. Certainly the immensity of the Andes is most impressive in this central portion of the Chilean Cordillera. You can stand at eight thousand feet in little valleys beside mountain torrents and let your eyes slowly follow up the sharp edges of bold, rocky ridges and on over tremendous rock slides to the beginnings of the snowfields and still on across them to the peaks which culminate in Mt. Aconcagua fourteen thousand feet above you. From December to February the alpine vegetation of "The Pass" is at its best with a succession of species coming into bloom and rapidly going to seed during the brief alpine growing season.

The aridity of the Peruvian coast is continued down to about 30° S. latitude in Chile and further south rainfall increases rapidly until in Prov. Valdivia it may reach two hundred inches annually. Wherever rain falls in middle Chile there is a definite alternation of wet and dry seasons, the former occurring, of course, in the southern winter. The great range of variation in moisture and altitude in the relatively narrow coastal plain backed by a high mountain range which is Chile, produces a correspondingly varied series of floras in which amaryllids are represented in all regions where climatic conditions are not extreme.

Just as in the case of seeds so in the case of bulbs and tubers it was difficult to find their flowers in fresh condition and at the same time obtain their underground organs sufficiently well matured to be dug and shipped with hope of success in growing them in California. In some instances, as already stated, bulbs were dug of what appeared to be amaryllids but concerning which we knew nothing as to species. In a large number of cases unfortunately, herbarium specimens of amaryllids in flower were secured without seed or bulbs being available. These specimens are of great value as evidence of speciation and distribution but too often they show fine ornamental types of which we brought back nothing more than the dried material. In many cases we were, however, able to secure not only herbarium specimens but also seeds or bulbs.

As yet we have authoritative determinations for only a few of our numerous collections of dried specimens of amaryllids, and in the case of specimens obtained only as seed or bulbs there are many which have not bloomed. Therefore it appears best at the present time to list only those species which have flowered in the University of California Botanical Garden for which we have a determination, either final or approximate, or which appear to possess some special interest. If desired, further reports can be supplied in the future after all our large collection of amaryllids from South America has come into flower and has been adequately studied taxonomically.

In most instances, the species listed below were flowered without the protection of glass or shade in a well drained loam. This lack of protection is no necessary indication of hardiness because during the last two winters we have had only a degree or two of frost in Berkeley and then only for a total of a week or so. Thus we are unable to predict the extent to which the species listed will successfully withstand lower temperatures or more prolonged periods of light frost. However, in some cases the high altitude of their native habitats would suggest a considerable degree of tolerance and hardiness. Among the most important factors in successful cultivation are, of course, adequate drainage and provision for a definite resting period during which water is withheld and the underground reproductive organs are allowed thoroughly to ripen.

SPECIES OF AMARYLLIDACEAE FROM SOUTH AMERICA WHICH HAVE FLOWERED IN THE UNIVERSITY OF CALIFORNIA BOTANICAL GARDEN *:

Crocopsis fulgens Pax (36.2047). Bulb elongated, about 1 in. diam. Leaves narrow, linear, 9-10 in. long, ¼-in. wide. Flowers almost sessile, narrowly funnel-form; tube scarlet, 3 in. long and flared to 1 in. at mouth. Collector's notes: "Collected in Peru, Depto. Cuzco, at Tetecacca, 3 km. east of Cuzco in small open valley among rocks, also in shelter of bushes. Alt. 3550 m. Common name: 'Pulla-pulla.'" In its native habitat this species flowers in October but in Berkeley it has flowered in April and June. Sometimes the stemless flowers appear previous to or just with the foliage. Requires sharp drainage. (See Plate 168).

Eustephia coccinea Cav. (36.2048). Bulbs ovoid, about 1 in. diam. Leaves bright green, narrowly linear, 8-10 in. long, about ⅓-in. wide. Flowers produced on a 2-edge scape 9-12 in. high, 4-5 flowers to a scape; flowers pendant, tubular, about 1¼ in. long, and ½-in. wide at mouth of tube; tube dull crimson and slightly recurved, segments tipped greenish yellow. Collector's notes: "Collected in Peru, Depto. Cuzco, Prov. Calca, near Pisacc; habitat various, but usually in rocky ground. Alt. 3000-3500 m. Hardy." This species is apparently quite common

* Numbers in parentheses refer to accession numbers in the University of California Botanical Garden.

in this locality and flowers in September. In Berkeley the flowers appear in April and May.

Eustephia? (36.1006). Bulb ovoid, 1 in. diam. Leaves narrowly linear, 8-10 in. long, ⅓-in. wide, recurved at tips. Scape 12-15 in. high, 4-5 flowers to a scape. Flowers tubular and pendant, 1¼ in. long and ⅓-in. wide, deep crimson with green-tipped segments. Very similar in appearance to No. 36.2048, but differs primarily in that the tips of the segments do not flare outward. Bulbs only collected.

Amaryllis (syn. Hippeastrum) advenum Herb. (36.1174). Bulb ovoid, 1-1½ in. diam. Foliage narrowly linear, 8 in. long, ¼-in. wide. Scape 12 in. high; flowers 4-5, enclosed in persistent papery bracts which are 1½-2 in. long. Flowers funnel-shaped, apricot yellow, 1½-2 in. long and ½-¾-in. wide at mouth. Collector's notes: "Collected in Chile, Prov. Valparaiso, between Puchuncavi and Matitencillo, on road Viña del Mar to Zapallar; fields and pastures near coast. Alt. 25 m." Blooms usually around December in Chile; specimens in Berkeley have bloomed in May, and in September.

Amaryllis (syn. Hippeastrum) sp. (39.1038). Bulb globose, 2-3 in. diam. Leaves linear, 12-24 in. long, ¾-1 in. wide, appearing with flowers. Inflorescence a scape 18-20 in. high. Two flowers to the scape, which open at right angles to stem on 2-in. pedicels. Flowers enclosed by two leafy green bracts 2½ in. long by 1 in. wide. Perianth segments 4½ in. long and 1½ in. wide at broadest part. Interior of segments checkered blood red, exterior of segments with broad green stripe. Interior base of segments light green with clusters of fleshy glandular hairs at base of stamens. Stamens as long as petals, anthers yellow, stigma slightly trifid, ¼-in. longer than stamens. Collector's notes: "Collected in Peru, Depto. Puno, Prov. Sandia. Hillsides of Huancarani, 5 km. from Limbani; near water in rocky, sandy soil. Alt. 3000 m."

Amaryllis (syn. *Hippeastrum) (bicolor?)* (38.1082). Bulbs globose, black-coated, 2 in. diam. Foliage linear, 12 in. long, ½-in. wide. Scape to 18 in. high with 4-5 flowers to the umbel. Flowers ascending, narrowly funnel-shaped, tube 2 in. long, segments red, tips yellowish green, ¼ in. wide at the mouth. Collected as bulbs, Chile, Prov. Coquimbo, near Vicuña. Bloomed in Berkeley in July, 1939.

Amaryllis (syn. *Hippeastrum) sp.* (36.1219). Bulb pyriform, about 2 in. diam., with blackish brown membranous coat. Foliage glaucous, linear, 1 ft. long. Scape 15 in. high, 6 blooms to inflorescence, pedicels 1½ in. long. Flowers coral-pink to rose-pink, funnel-shaped, 2 in. long, 2-2½ in. wide at mouth. Collector's notes: "Collected in Chile, Prov. Cautin, near Las Paraguas Sawmill, west foot of Volcan Llaima, 20 km. east of Cherquenco, among hard grasses, in moor-like formation, slaty soil. Alt. 2000 m." Flowers in Chile during December, but in Berkeley during May and June.

Urceolina peruviana (Presl) Macbride (36.1041). Bulb globose, 1 in. diam. Leaves 1-2, shortly petiolate, linear, lanceolate, about 9-12 in. long, 1-2½ in. wide, light green below with prominent midrib, glossy green above. Scape to 12 in. high. Flowers pendant on 1-2 in.

T. H. Goodspeed, Berkeley, Calif.

See page 30

Alstroemeria Hookeriana in its native habitat.

Plate 171

pedicels; perianth tube 1¼ in. long, deep orange, dilated in the upper third; constricted above the segment tubes which are slightly flared, giving the flower an urn-shaped appearance. Collector's notes: "Collected in Peru, Depto. Apurimac, 6 km. south of Chincheros on trail to Andahuaylas; trailside banks under shrubs. Alt. 3300 m." Bulbs were in bloom in November in their native habitat and have bloomed in Berkeley during the months of September, October and November and, in some instances, in April and May. This species does better in partial shade at Berkeley.

Stenomesson (incarnatum?) (39.1042). Bulb globose, 2-3 in. diam. Leaves erect, linear, 12-18 in. long, ½-¾ in. wide, light green, contemporary with flowers. *Scape* solid, slightly flattened, two edged, 91 cm. long, .8 cm. wide; *spathes* 4, two 5.3 cm. long, 1.9 cm. wide, two 4.9 cm. long, 1.3 cm. wide; *bracts* 4; *flowers* 6; *pedicels* 1.2 cm. long; *ovary* 1.4 cm. long, 6 mm. wide; perigone (perianth) curved, pendulous, resembling a typical *Cyrtanthus,* 9.5 cm. long; *tube* 7 cm. long, 4 mm. wide at base, 1.5 cm. wide at throat; *segments* 2.5 cm. long, 1.3 cm. wide; *color* effect in mass Azalea Pink (RHS 618), tube and outside of segments Azalea Pink, prominent green markings on segments, .4 mm. to .5 mm. wide and tapering to a point at apex, inside of segments light Azalea Pink, whitish band .3 mm. to .4 mm. wide, in center light green stripe on each side; *stamens* 8 mm. long. inserted at edge of throat, united into a very short staminal cup, with bifid teeth between the stamens; *style* white, *stigma* capitate tinged with light Azalea Pink, style excerted 1 cm. or more beyond segments. Collector's notes: "Collected in Peru, Depto. Puno, Isla Estebes, Lake Titicaca; on calcareous rocky slope. Alt. 3840 m. Common name in Cuzco: 'Mayhua.'" Flowers in Cuzco until January. Has bloomed at Berkeley in April and May also in November. A very attractive species, requiring partial shade in Berkeley.

Stenomesson (Piercei?) (38.1071). Bulbs ovoid, 2 in. diam. Leaves lanceolate, 10-18 in. long, 1-1½ in. wide, glaucous below with prominent midrib. Scape 18-24 in. high, flowers pendant, 6 or more to umbel on 3-in. pedicels. Tube funnel-shaped, 1½ in. long, pale greenish yellow with ends of segments tipped green, ½-1 in. wide at the mouth. Collected as bulbs in Peru, at Sacsahuaman, Depto. and Prov. Cuzco. Not a very ornamental species.

Ismene (amancaes?) (39.1027). Bulb globose, 1½ in. diam. Leaves 4-5, superposed, suberect, 12 in. long, 1½ in. broad. Peduncle ancipitous, 15 in. high. Flowers 2-5, pale yellow, fragrant. Collector's notes: "Collected in Peru, Depto. Apurimac, Prov. Abancay, Hacienda Trancapata, Curahuasi; on cultivated lands. Alt. 2800 m. Common name: 'Amanckai.'"

Bomarea Bridgesiana Beauverd? (36.1295). Large, thickened, fibrous roots. Stem to 8 ft., stout (½-in. diam.), sub-erect. Leaves lanceolate, light green, 4 in. long, ½-in. wide. Inflorescence an umbel of 10-15 flowers enclosed by numerous broad, leafy bracts. Perianth tube 2 in. long, ¾-in. wide, light green. A very strong growing species

and, while not too attractive, may prove to be an admirable parent for hybridization, possibly with *Bomarea Caldasiana*. Collector's notes: "Collected in Peru, Depto. Cuzco, Ruins of Quencco at Cuzco; among rocks. Hardy, non-climbing. Alt. 3600 m." In Berkeley, flowers in June, July and August.

Bomarea sp. (36.1376). Root system, thickened fibers. Stems slender and twining to 4 ft. high. Leaves alternate petiolate, lanceolate, 2-2½ in. long, ¼-½ in. wide, glabrous and green above, glaucous below. Inflorescence a compound umbel, rays ⅓ in. long, each ray about 3 flowers. Perianth segments equal in length, 1 in. long; flowers tubular, purplish red, segments tipped green. Collector's notes: "Collected Chile, Prov. Valparaiso, southwest slope of Campana de Quillota; semi-arid brushland, climbing among shrubs. Alt. 1000 m."

Zephyranthes parvula Killip (36.1155). Bulb globose, ½-in. diam. Leaves narrowly linear, 2-3 in. long and ⅛-in. wide. Flowers, which appear before the leaves, are barely 1 in. long. Perianth tube ½-in. long segments spreading from 1 to 1½ in. across, white in the interior, exterior of the segments purplish. Collector's notes: "Collected in Peru, Prov. Melgar, Depto. Puno, at Granja Modelo de Chuquibambilla; among grasses on pampa. Alt. 3914 m." Bloomed in Berkeley in July. Requires full sun and should be at home in the rock garden.

Zephyranthes sp. (39.2492). Bulb globose, 1-1½ in. diam. Leaves narrowly linear, 9 in. long, ¼-in. wide. Peduncle to 10 in. high. Flowers large, funnel-shaped, bright yellow, 3 in. long, 2 in. wide at mouth. An excellent and showy species. Bloomed at Berkeley in September and October. Collector's notes: "Collected in Peru in cotton fields near Molina Experiment Station near Lima; open fields in rich soil, fair amount of moisture. Alt. ca. 80 m."

Alstroemeria recumbens Herbert (36.1188). A low growing species with very short vegetative stems. Flowering stems attain a height of from 9-12 in. The inflorescence is an open compound umbel, 4-7 rayed. The interior of perianth segments are light lavender pink, flushed maroon, with deep maroon tips. Upper lobes striped maroon, tips marked with yellow—a very odd combination of color. This species apparently requires a little shade and certainly resents too much water. Flowered from April until August in the Botanical Garden at Berkeley. Collector's notes: "Collected in Chile, Prov. Valparaiso, near Monte Mar, on road from Viña del Mar to Concon; flat tops of headlands near beach, in sand. Alt. 5 m. Associated with *Carpobrotus chilensis.*"

Alstroemeria violacea Phil. (39.1615). This is probably the first introduction into cultivation of this fine species. Mature plants attain a height of 5 ft. and are found growing on the edge of the Atacama desert in Chile at altitudes of 500-1500 ft. The leaves on the sterile stems are ovate-oblong, 2 in. long, 1 in. wide, and shine as though lacquered. The flowering stems eventually reach a height of 5 ft. and produce a compound umbel, 6- to 8-rayed with as many as 16 blossoms to the inflorescence. The flowers are a pleasing shade of Mauve (R.H.S. Color Chart 633/2), 2¼-in. wide at the mouth, each segment being

1½-in. long. The lower half of the upper segments white with scattered carmine spots. This species has responded to the same cultural treatment as other Alstroemerias. The blossoms first appeared in June, approximately five months after germination, and continued to appear until late August. (See Plate 170.)

Alstroemeria sp. (36.1215). Closely resembles *A. ligtu* in growth, habit, and floral characters. The umbel is compound, 6-rayed, with 6 flowers to each ray. The individual blossoms are slightly smaller than the largest of the "Ligtu-Angustifolia" hybrids of Constable, and are a striking shade of salmon red. The lower segments are slightly longer than the upper, and tipped yellow with maroon stripes. A peculiar situation exists in the stamens, the anthers of which dehisce or abort about the time when the flower is opening although in some instances, one stamen elongates to produce a large normal anther close to the exserted stigma. This species appears to have sixteen pairs of chromosomes as compared with eight pairs in other species of *Alstroemeria* which have been examined. Its flowering period is later than other species, commencing in June and continuing through August.

Alstroemeria sp. (36.1343). Dwarf species with vegetative shoots barely 2 in. high. Requires some shade and careful watering. Inflorescence attains a height of 12 in., bearing a compound 7- to 9-rayed umbel which is quite large for the size of the plant. The individual flowers are crimson (R.H.S. Color Chart 22/2). Upper lobes with long and darker stripes. An excellent color shade and should be good color parent. In cultivation has maintained its dwarf habit for three years. Collector's notes: "Collected in Chile, Tumbes Peninsula, Concepcion Bay, 10 km. north of Talcahuano; coastal bluffs, west shore of bay. Alt. 15-50 m." In Berkeley this species usually blooms from May until the beginning of August.

Phaedranassa sp. From a correspondent in Costa Rica we have obtained bulbs that were sent in as *Chaemaloe costaricensis* (37.407). Bulbs globose, 2 in. diam. Leaves 1-2, erect, oblong, lanceolate, 18 in. long, 2½ in. wide at center, glaucous green below with prominent midrib. Peduncle 2 ft. high, flowers 6-8 in the umbel. Perianth tube pendant, 2 in. long, bright red, tipped green. In Berkeley it blooms during October and November.

* * * * * * *

Of *Alstroemeria* between twelve and fifteen seed collections from the wild have not yet bloomed. I am especially interested in seeing *A. Hookeriana* (Plate 171), collected in the Cordillera de la Costa in middle Chile. On the basis of evidence from herbarium specimens we should soon see the flowers of a number of other new or little known species of *Alstroemeria.* In addition we have grown a few special selections which originally came as seed from cultivation in Europe and South America. Of these, three are worthy of mention. First a race which represents a variant of *A. aurantiaca* (36.1814) with an original color range from light yellow to deep orange from which we have secured

better colors than those ordinarily in the trade. Second, a strong growing variant of *A. ligtu* (38.2095). The flowering shoots are 2½ to 3 feet high bearing an open compound 6- to 10-rayed umbel. The flowers, on 3-inch pedicels, are light to dark orange-red, the tips of the upper segments yellow with maroon stripes. It is a sturdy variety which blooms with us from May until August. Third (38.2096), a race similar in habit to the preceding but with a more compact 9- to 12-rayed umbel, the flowers borne on larger pedicels. The flower color is Geranium Lake flushed with orange and the tips of the segments are dark maroon.

We have seedlings of ten or more *Amaryllis* (syn. *Hippeastrum*) which include *A. graciliflorum* and *A. Bagnoldii*, among species already determined. Concerning others the herbarium specimens and collectors' notes indicate that a number will have special interest. The species of *Placea* shown in Plate 169 has not yet bloomed for us.

Of *Bomarea* and related genera we have approximately fifteen collections which will flower in 1941, among them *B. ovata*, *B. nematocaulon* and *B. Fiebrigiana*. Bulbs of *Stenomesson Flavum* (?) were received some time ago and should bloom next Spring. In addition we are growing a number of other species of *Stenomesson*.

Of collections from South America which were tentatively labeled by the collectors as Amaryllidaceae we are growing twenty or more and additional collections of similarly undetermined seeds, tubers and bulbs are constantly being received from correspondents in Peru and Chile.

CARL PURDY, PIONEER CALIFORNIA HORTICULTURIST AND LANDSCAPE ARTIST

Mr. Carl Purdy received the Herbert Medal in 1939, and a portrait with short autobiography appeared in 1939 Herbertia. This was a mere sketch, and was not as complete as desired. Through the good offices of Mr. Frank Leach, Piedmont, California, who handled the necessary correspondence, this short statement is here supplemented by the testimony of four distinguished Californians.

The officers and members of the Society are of the opinion that amaryllids, roses, orchids, and other choice floral tributes should be distributed while the recipients are still with us to enjoy the friendship and appreciation that they represent. In accordance with this policy, we are honored to present the symposium on Carl Purdy by these distinguished Californians.—*Hamilton P. Traub; Wyndham Hayward.*

CARL PURDY: LOVER OF THE NATIVE PLANT LIFE

Willis Linn Jepson,

Department of Botany, University of California, Berkeley

If the full story of Carl Purdy's quests in the mountains and valleys of California in search of native plants and the cultural history of his work with them could be told, it would make a saga of surpassing

interest. Nature, in the full exuberance of indigenous plant life in pioneer days, provided in his native County of Mendocino a fitting environment for his beginnings. He grew up in the small town of Ukiah with little formal education beyond the grammar school. Doubtless his interest in the flowering plants dated from an early age when he began to collect and cultivate them. His interest in this work developed to such a degree that finally as a young man he gave up a livable job in the town in order to devote himself wholly to his real love, the lilies. Concurrently he felt certain defects of education and began to study botanical science and the Latin language. In this manner he found the way, not merely to organize and make effective the knowledge which he already possessed, but thereby to expand continually the horizon of his interests and to offer the results of his work to the public in printed form.

Some of his articles are serious scientific contributions, such as his "Revision of the Genus Calochortus" published in volume three, third series of the Proceedings of the California Academy of Sciences in 1901, his "Notes on Liliaceae" published in the journal Zoe, volume one, in 1890, and his "Lilies of the Western United States and British Columbia" which appeared in the Journal of the Royal Horticultural Society, London, volume twenty-six, in 1904. In addition, he has written numerous articles of a more popular nature for horticultural or garden journals. His papers on various phases of the California vegetation, which appeared in Garden and Forest forty-five years ago, contain much valuable ecological matter and are still meaty reading.

During the course of the years he has often talked informally but most effectively before conventions or clubs interested in horticulture. One afternoon long ago he was invited to a large drawing room in San Francisco. The introduction of the chairman of the meeting was couched in such effusive terms of extravagant praise that nearly every one in the gathering felt embarassed. Mr. Purdy was undisturbed. He stood quietly until the orator had finished, inclined his head slightly towards him and uttered one word, "Ditto". The gathering laughed, every one once more felt at ease, and Mr. Purdy plunged at once into that which he had to say about plant culture. His talks were always well-prepared, orderly and interesting.

The natural powers of his mind are very great and have been continually strengthened and deepened by continuous thought and study. His knowledge of the life-history of the native Liliaceae and many other groups is unsurpassed. Serene of mind, resourceful of intellect, gifted with exceptional fortitude and unusual powers of perseverance, his achievements in his chosen field are notable. Moreover, he has passed on to others in full volume his great enjoyment of life and nature in the out-of-doors in California.

CARL PURDY: THE GARDEN DESIGNER

KATHERINE D. JONES,

Agricultural Hall, University of California, Berkeley

My earliest contact with Mr. Purdy was when I was teaching Agricultural Education under Professor Ernest Babcock and sending out seeds to the High Schools of our state, California. This was from 1910 to 1913, but my contact with Mr. Purdy did not cease when I was transferred to the new Landscape Design Department, which was established in 1913. We had school gardens during the term time and courses for teachers during summer vacations when again they had school gardens.

Mr. Purdy at that time was doing some interesting work on some of the estates about the San Francisco Bay region, sent us catalogues for our classes which were highly artistic and gave us cultural directions which he had prepared with special thought for our group as well as for his increasing number of clients. He was experimenting in naturalizing bulbs on barren hillsides, in studying succession of bloom in hardy border and in planting "little corners" in favored spots or on prominent portions of grounds that were much in the public eye. He gave us evening lectures to illustrate some of these plans which he had already planted out and we afterwards visited such gardens with our students to study the finished product.

As examples, Blue Dick, *Brodiaea capitata,* had been planted 6 to 12 inches apart in the grass. Camass Plant, *Camassia Leichtlinii,* planted 3 to 4 inches deep in the fall both in sun and shade. Dog-tooth Violets, Erythroniums, in shade on a north slope a foot apart. Checker Lily, *Fritillaria lanceolata,* in the shade of oak trees on a north slope, a foot apart.

All this was most stimulating and created great interest in the several experiments. People flocked to his lectures and went home to make plans and to plant.

CARL PURDY

ALICE EASTWOOD,

California Academy of Sciences, San Francisco

Carl Purdy is known wherever California plants belonging to the Lily Family can be grown. For many years he has distributed the bulbs of these lovely plants to all parts of the world where an interest in flower and gardens exists. Probably no other person knows these lily plants so intimately as he. He has seen them growing where they are native and in his own garden. All their variations are familiar to him.

His chief botanical paper was a revision of *Calochortus* which was published in the Proceedings of the California Academy of Sciences in

1901, Vol. III, series 2. In this he named the following species: *Calochortus amabilis, C. Lobbii, C. shastensis, C. concolor, C. Dunnii, C. Vesta* and the following varieties of *Calochortus venustus*, namely: *eldorado, roseus, suphrureus.*

Calochortus obispoensis was published by him in Bot. Gaz. *XI*: 180 (1886). Two lilies were named by him: *Lilium occidentale* in Erythea *V*: 103 (1897); and *Lilium Kelloggii* in one of his early catalogues. These two lilies have recently been beautifully illustrated in Supplement of Elwes Monograph of the Genus *Lilium*. The plates are folio and colored. He published *Erythronium Californicum* in Flora & Silva *11*: 253 (1904). *Iris Watsonia* was published in Erythea V: 128 (1897).

It has been a privilege and a pleasure to have named the following in his honor: *Calochortus Purdyi*,[1] *Fritillaria Purdyi*,[2] *Iris Purdyi*[3] and *Allium Purdyi*.[4] *Sedum Purdyi* was named by Dr. Jepson in Flora of California *11*: 110 (1936).

His knowledge of the natural environment of many other kinds of California plants has been required in helping to restore the native vegetation, both by seeds and trans-planted plants, in places where it had been destroyed. The talks that he gives to Garden Clubs are informal and delightful, no "hifalutin" style but just homely talks that everyone can understand. He is a man of a simple, honest nature such as is not rare among plant and garden lovers.

CARL PURDY: PIONEERED CALIFORNIA NATIVES FOR THE HOME GARDEN

George B. Furniss,

Charter Member, California Botanical Society

Mr. Purdy was the first to send California native bulbs and wild flower seed to Europe in quantity and became the source for supply for many famed dealers abroad. His sheer love for plant life and nature, led him into remote and unknown parts of virgin country. Venturesome and observing, he gained intimate knowledge of California's vast flora. He commercialized his zeal that he might carry on and share with others the joy of his quests. Prices became modest carrying charges and again he ventured first where few followed: "*Post paid to your door*".

His catalogues are intriguing and unique, combining botany and horticulture. His language is remarkable for both clarity and brevity; informative as to description, habit and culture and carries a subtle urge and challenge. His recognition is attested by the frequency he is quoted; generally verbatim. He has been consultant and referee for western botanists.

The year 1915 was a detour. Bertram Farr displayed at the San Francisco Panama-Pacific Exposition, the first of the newer German

[1] Proc. Calif. Acad. 111. **1:** 137 pl. 11, (1898)
[2] Bull. Tor. Club XXIX, **79,** Pl. 6, (1902)
[3] Proc. Calif. Acad. **11.** 1: 78, pl 7 (1897)
[4] Leafl. West Bot. **11.** 110, (1938)

iris. Mr. Purdy bought the collection and became the means of starting many of the specialists of today but soon left the hybrid field to others.

He was early to advocate pot culture of certain native bulbs. Such permitted resting the dormant bulb in dryness to correspond with California's rainless summer. This helped popularize bulbs in Europe because Europeans make more use of pot plants in the garden, along walks and steps, than we do and which we might emulate for better effectiveness.

As business grew, it became necessary to train assistants to do collecting with Mr. Purdy's insistence that they also carry on in the conservation of flora by leaving lily scales, offsets, roots or seeds for nature to replenish. He lives within a half hour automobile ride of all that is modern yet his home, in a mountainous section, is still isolated within the charm of the primeval. His writings partake of that verdure and ruggedness of outlook. The great number of plants of merit which he found and named and those named to his credit are also his contribution to botany and horticulture.

HERBERT WILLIAM PUGSLEY

A Biographical Sketch

Herbert William Pugsley was born at Bristol, England, on January 24, 1868. His early education was received at Bristol Grammar School, and later he attended the University of London where he was singled out as University Prizeman, and received the B. A. degree in 1889. In 1896, Mr. Pugsley entered the Admiralty and remained on the staff there until his retirement on pension in 1928. Subsequently he worked voluntarily in the Botanical Department of the Natural History Museum at South Kensington.

Mr. Pugsley has been a lifelong student of systematic botany, particularly Eurasian phanerogams, in available leisure, and has traveled extensively during leave and since retirement over central and western Europe as well as the British Isles.

Mr. Pugsley has carried on consistent and important research on the description and classification of Narcissi, and his work is the most important on this group since the appearance of Baker's Handbook of the Amaryllideae in 1888. More than forty years ago he began to cultivate Narcissi in his garden, and the first report of his studies was an account of the Poeticus group entitled "*Narcissus Poeticus* and its Allies", published as a supplement to the Journal of Botany in 1915. This work covers both the wild and cultivated forms, the latter sometimes of obscure origin. He accomplished what few botanists have even attempted for he has studied the forms that most workers dismiss as synonyms, following the policy inaugurated by Bentham. Even if one does not agree that these forms are all entitled to specific rank, one must agree that the work is very valuable and illuminating for it properly defines the whole group treated. Much more work of this nature should be carried on by systematic botanists if we are to secure some

idea of the evolutionary tendencies in the group. That after all is one of the most important objectives in systematic botany.

In 1933 Mr. Pugsley's "A Monograph of *Narcissus*, Subgenus Ajax" appeared in the Journal of the Royal Horticultural Society. This valuable work measures up to the high standard set by his earlier report. It is based on the study of a wealth of living material, both wild and cultivated, in his garden, and also on the field study of plants in their native habitat. As evidence of his continued interest in the Narcissi, he published "Notes on Poet's Narcissi" in the Journal of Botany in 1937, and "Notes on Narcissi", in 1939, in the same periodical.

Mr. Pugsley is specially interested, not only in Narcissi, but also in Fumariaceae, of which the genera Fumaria and Rupicapnos were monographed in 1919, Euphrasia (Monograph of British species in 1930), Dactylorchis (revised in 1935), Saxifraga, sect. Robertsonia (revised in 1936) and Hieracium, of which a monograph of British forms is in the course of preparation. He has also described many new species and varieties of plants, and he is a constant contributor to the British "Journal of Botany" since 1900. He has taken an active interest in the Wild Plant Conservation Board, a branch of the Society for the Protection of Rural England.

Apart from botany, Mr. Pugsley is interested in art, and is a collector of English water-colour drawings.

In recognition of Mr. Pugsley's important contributions to the systematic botany of the Narcissi, and in recognition of his sterling character, the Society is honored to bestow upon him (Plate 172) the William Herbert Medal for 1940. It is handed to him with the congratulations of all the members.

U. S. Horticultural Station,
Beltsville, Maryland

—*Hamilton P. Traub*

IN MEMORIAM—GEORGE DE WITT KELSO

WYNDHAM HAYWARD, *Florida*

George DeWitt Kelso was born April 9, 1867 at Newburgh, New York. He lived on a farm and attended local schools until he reached the age of about 15 years. Later he was a student at Mt. Hermon School, Mt. Hermon, Massachusetts, and from there he entered Rutgers College at New Brunswick, New Jersey, graduating with the Class of 1892. Following graduation, he was in the insurance business for some years. He moved to Rhode Island in 1902, and about 1910 he entered hospital work, and for many years owned and managed the Surgical Clinic in Providence, Rhode Island.

Since 1909 Mr. Kelso had lived in the country traveling to and from the city daily. On his country estate he indulged his love for flowers and his other hobby—photography. Hemerocallis claimed his attention several years ago, and it gave him real delight to visit his

Herbert William Pugsley

Plate 172

garden each morning and evening to note the new blooms, and when failing health prevented him from even that mild exercise, the blooms were brought in for his inspection. The friendly letters received from those similarly interested were a source of genuine pleasure to him. He spent much of his time on the daylily evaluation work, a field in which he was the only pioneer, and completed that for the season 1939 only

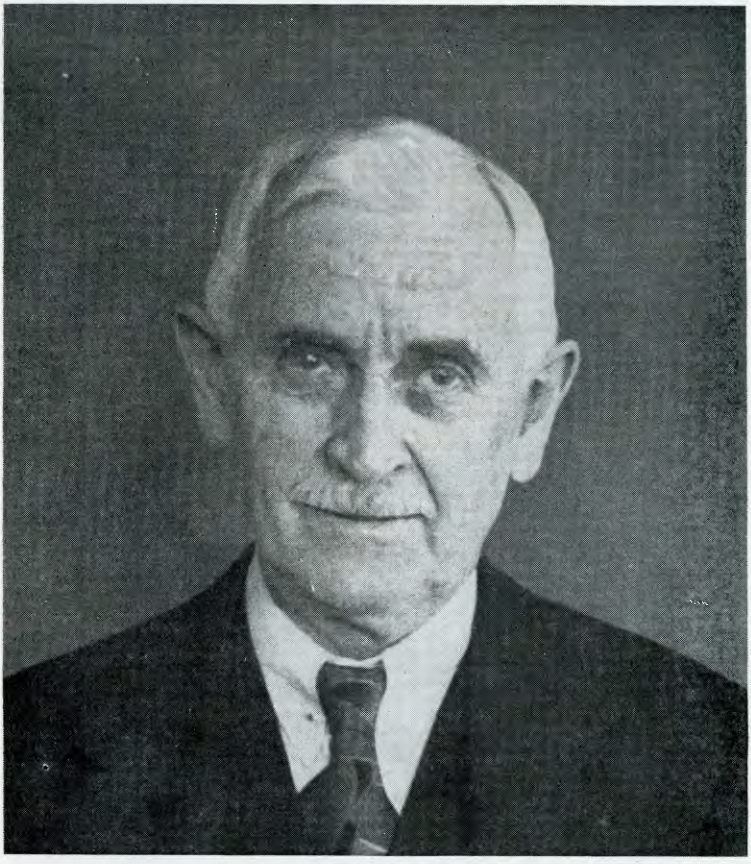

Fig. 46. George DeWitt Kelso, 1867-1940

a few days before his death on February 8, 1940. His final report on daylily evaluation appears in this issue of Herbertia.

Mr. Kelso was in charge of the daylily experimental display garden at Roger Williams Park, Providence, Rhode Island, where he tried out many daylily clones and species received by donation, exchange and purchase from all parts of this country and Europe. In his daylily evaluation work he cooperated with Professors George D. Graves and H. S. Tiffany of the Massachusetts State Agricultural Experiment

Station, and officers and members of the American Amaryllis Society who encouraged him, and published his daylily evaluation reports in Herbertia.

EXCERPTS FROM LETTER FROM MRS. GEORGE DE WITT KELSO

OCTOBER 20, 1940

"I am sending an excellent photo of Mr. Kelso (Fig. 46). * * * * The idea of a display garden of Hemerocallis at Roger Williams Park originated with Mr. Kelso. He was granted a planting space and in 1934 secured about fifty clones. In this he was encouraged and assisted by Dr. A. B. Stout of the New York Botanical Garden. Various nurseries, seedsmen and individuals donated plants, many coming from distant points, even from England. The collection increased to eighty clones, and then due to new greenhouse construction the plants were moved to a new and more favorable location overlooking one of the numerous lakes of the Park. New plants were added until there were about one hundred and twenty-five.

"Mr. Kelso superintended the planting and arrangement of the daylily beds, and made frequent trips to the garden until stricken ill in November 1937. The next summer, 1938, his visits were less numerous, due to illness, although the garden was thriving and the amount of bloom was increasing. However, others interested in daylilies were free to visit the collection and many availed themselves of this opportunity.

"After the month of May, 1939, Mr. Kelso was wholly unable to visit the Park. At home he continued to work on the evaluation records, a work that was of great interest to him until the very end.

"While he was President of the Rhode Island Horticultural Society, Mr. Kelso suggested a display garden of narcissi for Roger Williams Park. The idea was well received, and a very fine display was arranged. Mr. Kelso was also interested in various other flowers. At one time he had a fine collection of dahlias, and a little later peonies claimed his attention, and he continued to enjoy their beauty until his death.

"I wish to thank Prof. H. S. Tiffany of the Massachusetts Agricultural Experiment Station at Waltham, for his kindness in sending out the 1939 symposium results. I am glad to know that the work begun by Mr. Kelso is being ably continued by the Daylily Committee".

NOTES ON AMARYLLIDS, 1939-1940

ALBERT PAM, *England*

I have been asked by the Editor to contribute an article to Herbertia, and I shall do my best to comply with his request. But it will be realized by all members of the A. A. S. that it is a difficult task for us in England at the present critical time to bring ourselves to take interest in, let alone to write about, our plants or our gardens.

The following is a short account of some observations on amaryllids in my gardens during the past year.

Phaedranassa Carmioli. Thanks to the kindness of Mr. Austin Smith, of Zarcero, Costa Rica, I received some bulbs of this species in 1939. When the first of these flowered I found that it corresponded exactly with the description in Baker's Handbook, but when I referred to the plate published in the Botanical Magazine, Tab. 8356 in 1911, it was evident that this did not match my plant at all. I therefore sent a flower to the Royal Botanic Gardens, Kew, and the Director informed me that he quite agreed that the plant figured in Tab. 8356 was not *P. Carmioli.* Sir Arthur Hill wrote me,—"Your plant is certainly different from the one figured in the Botanical Magazine, t. 8356, but it exactly matches the original drawing of this species of Saunders, Ref. Bot. t. 46. The species was first described there, so your plant is correctly named. We are rather puzzled about what Bot. Mag. t. 8356 really represents. It is supposed to have come from Costa Rica, but *P. Carmioli* is the only species known from there. We have actual specimen here, and it agrees well with the plate but looks more like a form of *P. chloracea.*" A new figure has now been prepared based on the material supplied by me and will in due course be published in Bot. Mag.

Zephyranthes Lindleyana Herb. Among the plants collected by Mr. Edward K. Balls in Mexico, his No. B. 4146 flowered here early this year; it agreed with the field specimen sent by Balls under this number, which had been identified by the Herbarium at Kew as this species, but only a flower was sent by Balls and no leaves were included. When, however, the leaves developed on my plants, they were 10 mm. wide, although they are described as "linear" by Herbert and by Baker, and are so shown in plate 35 of Herbert's Amaryllidaceae. I am particularly interested in this species, as both it and *Z. grandiflora* were originally grown in these gardens by my predecessor, Sir Abraham Hume, in 1825 or earlier. Owing to a mistake of the gardener here at that time, Botanical Register tab. 902 shows the flower of *Z. grandiflora* but the leaves of *Z. Lindleyana;* see Herbert (loc.cit) page 174 under *Z. Lindleyana* and page 173 under *Z. carinata.* I fear that we shall now have to wait till this plant flowers again before the puzzle can be cleared up, but in the meantime it would appear that the plant sent by Balls is not *Z. Lindleyana.* B. 4146 seems to be a species very like it in flower but with broad leaves which will, in due course be submitted to Dr. Hume for identification, as Kew has nothing like it in its Herbarium.

Zephyranthes lutrae. Some years ago I was given some bulbs under this name by the New York Botanic Gardens, bearing No. 74986. One of these has flowered this year, but Kew are unable to trace this name, and I should be glad to receive information about this plant. Kew reported that it has some resemblance to the plant known as *Cooperia pedunculata,* but differs in being almost sessile.

Stenomesson flavum. I was glad to flower this species for the first time, as it is a pretty plant. It was sent by Balls under his number

B. 5859, and was probably collected in Peru, although I do not seem to have received the field notes.

Zephyranthes verecunda. This species was collected by Balls in Mexico in a number of localities. It appears to be a very variable species both as to colour of the flower and width of leaf. I have now flowered it under four separate numbers, and each is slightly different.

* * * * *

The past winter has been very cold indeed for this country, and record frosts have been recorded in many parts. In my gardens the lowest temperature was 2 degrees below zero Fahrenheit in the open, and it hovered around zero for several weeks. Yet the amaryllids grown in the open did not suffer, and I have had but few losses. It seems as if established plants can stand very much more cold than we had expected, and I think that it may be worth while for some lovers of this family who live in the more northern States of the U. S. A. to try to grow in their gardens some species which were reputed to be tender. Among the plants which not only survived here but have flowered this year as freely as ever are,—*Amaryllis (Hippeastrum) pratensis, Sprekelia formosissima; Amaryllis (Hippeastrum) Ackermanni; Crinum Powellii, C. Moorei* & *C. longifolium; Alstroemeria Ligtu, A. aurantiaca, A. chilensis; Pancratium illyricum,* in addition of course to all the species generally considered as hardy. The following are untouched by frost and will certainly flower freely in their proper season: *Collicore rosea (Amaryllis belladonna), Nerine Bowdeni major, Hymenocallis festalis* (Mr. Worsley's hybrid), *Lycoris spp.,* and several other alstroemerias such as *A. braziliensis.* My large plants of *Beschorneria yuccoides* were killed, but young ones are coming away freely from the base; even this is surprising, as this *Beschorneria* has not been considered as hardy in these parts even in a mild winter. I should add that most of the plants I have mentioned above are being grown in narrow beds facing South, with a low brick wall behind them; but this winter the cold was so intense and so persistent that frost penetrated the soil to a great depth everywhere, and the wall was of little protection. I do not believe that several degrees of frost in excess of what we experienced would have made any difference, as my plants received no additional protection such as a mulching of leaves or straw because such frosts were quite unexpected. With a little attention of this kind I feel sure that they could even have withstood the more severe cold of many States on the Eastern sea-board of the U. S. A. provided that they were planted in light and well drained soil. A curious effect of the unusual cold has been that it seems to have increased the floriferousness of some plants. I grow a number of *Zephyranthes grandiflora (carinata)* in pots in a greenhouse which used to be heated in winter but this year was practically a cold house. These bulbs flowered magnificently, ten or more flowers being out at the same time in each 4 inch pot, although the soil had been frozen almost solid in January. This species is not

very easy to flower in pots over here, but with the experience gained I shall now try other *Zephyranthes* species and other genera in much lower temperatures while they are at rest. It may be that this will increase their floriferousness, and it is an experiment worth trying; I should be glad if it could be tried elsewhere too and the results published.

* * * * *

Amaryllis (Hippeastrum) calyptrata X. A. auluca. As I had plants of these two species in flower at the same time, I crossed them. I was successful in obtaining a good pod of large winged seed, which has proved fertile and has germinated *freely.* The result of this cross should be interesting, and I am glad that I was able to send some of the seed to Mr. Wyndham Hayward to raise for the A. A. S.

AMARYLLID MUSINGS

W. M. JAMES, *California*

Considerable data is available regarding bud formation and flowering of Narcissus. Briefly these bulbs should not be dug until the foliage is thoroughly ripened; flower bud formation does not start until after foliage is thoroughly ripened; and time of flowering can be advanced or retarded by control of temperature during storage and early growth periods (Herbertia Vol. V-1938, pages 177-196; Scientific Horticulture Vol. VI, 1938, pages 160-170; Bulletin No. 56, Laboratory for Flowerbulb Research, Lisse, Netherlands).

But what about some of the other amaryllids? The fall and winter of 1939-40 was abnormally warm in Southern California. This may or may not have affected bulbous plants. A few bulbs of *Haemanthus carneus* have bloomed the latter part of August for several years. This year they were in better bloom than ever before in the latter part of June while still on trays in the storage room. They were planted in early July and are developing foliage now.

This season I fully intended to cut bulbs of *Lycoris squamigera* at regular intervals in order to learn something about bud formation. Soon after the foliage had matured and had been removed in early June, several bulbs were examined. The only thing noticeable was apparently a "branch" or start of bulb division. Other work interfered with this project until July first when I was surprised to find 6-12-inch flower stems from a large percentage of the bulbs. They had never bloomed before until the latter part of August at Las Positas Nursery.

What influence does digging and disturbing roots have on the flowering of some of the Amaryllids? All of the "old timers" insist and written instructions emphasize that *Nerine* roots should not be disturbed if flowers are expected. And yet we have dug a collection of several different kinds each year as soon as they were dormant and kept them bare in storage at room temperature until growth began again without any apparent check on flowering. Several color forms of *Call-*

icore rosea (syn. Amaryllis belladonna, Herb., non Linn.) and several seedling selections of *Brunsvigia-Callicore* hybrids have been handled the same way. Incidentally, these hybrids are going to make a splendid item. Besides having fine flowers, the bulbs are nice to handle. The picture (Fig. 47.) shows bulbs of one kind several years after importation from Australia.

Fig. 47. Bulbs of Brunsvigia-Callicore Hybrid.

Apparently the flowering of *Amaryllis (syn. Hippeastrum* Herb.) *candida* is affected by digging. A collector in Brazil writes that they do not bloom in his garden for two years after being moved. Neither do they bloom for two years when the natives in Argentina move them into gardens from their native habitat. And yet one bulb of several recently imported from Argentina bloomed this spring before the foliage developed and another is blooming now, just as the foliage is apparently fully developed.

It seems that more observation and study than one individual can make is required to settle such questions.

There are times when I am puzzled as to just what a species is. Presumably it is what the geneticists would call homozygotes, or those plants having similar or like chromosomes. I have the following in my notes, although, unfortunately, the name of the writer has been lost. "Some are critical of what, in different hands, a species may be made to include or allowed to exclude; or its demarkation being loose and its name often indeterminate. A species is of course, only a unit of con-

venience and a specific name a means by which one man may let another know what he, the first, is talking about. No man-made conception can be final so long as human knowledge is capable of extension; neither can a description of any unit be more than approximately accurate, accuracy being incompatible with the human instrument. Moreover, no two individuals can be precisely similar whether the species to which they belong is of the animal or vegetable kingdom. One further point; A plant is not, and never will be, grouped and named primarily for the convenience of gardeners or foresters or herbalists or others whose concern is with its material value. Although the work of naturalists can be applied to the ordinary things of everyday existence, their true function is the study of life, its shapes and the relationships between these shapes. For such, a language is necessary; specific names represent the alphabet of that language."

Perhaps cytology (including chromosome counting) will eventually help to clarify and limit some of the more uncertain species. A paper recently published on *Calochortus* shows how the chromosome numbers indicated a natural and logical reclassification of certain species that were very puzzling from a taxonomic viewpoint (Cytological Studies in Relation to the Classification of the Genus *Calochortus*. J. M. Beal, Botanical Gazette, Vol. 100, No. 3, March 1939.).

A report in the Carnegie Institute Year Book (No. 38, 1938-39 Section on Experimental Taxonomy by Clausen and others) is very surprising. "Certain perennial plants with a wide distribution in a variety of conditions have the same chromosome number. Other plants had a wide variation in the species chromosome count. *Potentilla gracilis* Dougl., varying from 56 to 109 (octoploid to almost 18-ploid) in the somatic count. This extreme amount of cytological variation occurs within the Central Sierra Nevada Mountains (California) in what is recognized as a single taxonomic subspecies, although it is divided into several altitudinal ecotypes." These two almost contradictory reports are slightly confusing. Apparently, we still have a little to learn about plants.

Some of the amaryllid species seem more like hybrids than species to me. These would include *Alstroemeria chilensis*, and *A. ligtu*, and *Callicore rosea* with their color variations. *Amaryllis (*syn. *Hippeastrum* Herb.*) reginae* seems to be somewhat variable. None of the leading western botanists agree as to the taxonomic classification of several of the Genera found on the Pacific Coast. Robert F. Hoover (Midland Nat. 22:551-574. 1939) has recently done a good job in his revision of *Brodiaea* and this shows what can be accomplished.

Most of the Brodiaeas can still be found growing under natural conditions. These plants, as well as many others, change somewhat under cultivation and make it much more difficult to classify them properly under culture. Therefore it seems advisable to straighten out the classification as has been done with *Brodiaea* before they become too "civilized".

1. REGIONAL ACTIVITIES AND EXHIBITIONS

AUTUMN AMARYLLIS SHOWS, POMONA, CALIF., 1939 AND 1940

CECIL HOUDYSHEL, *California*

The Autumn Amaryllis Show in connection with the Los Angeles County Fair is an important means of publicity for amaryllids. This fair is the World's largest county fair. It was attended this year by nearly 750,000 people and nearly all view the floral exhibits because of their outstanding merit.

Prizes as high as $500 are given for single exhibits, the amount won by Armocost and Royston for their orchid display both in 1939 and 1940. For amaryllids, the prize awards amounted to $75 and this will be increased when warranted. This is an opportunity for all American growers who appreciate publicity. The numbers who view our exhibits may be compared with attendance at any flower shows, anywhere.

The 1939 Show was held on November 21 and 22. Nine exhibitors took part. A table over 50 feet long was well filled. The Sweepstakes Prize of $25 is offered for the largest number of winning entries. The First went to the writer, Cecil Houdyshel, with 13 blue ribbons and two Third prizes.

Second in Sweepstakes, with an award of $20 went to Mrs. Leonard Swets of Riverside.

Placing third, with an award of $15. was W. E. Rice of Downey.

The Fourth with an award of $10 was won by E. P. Zimmerman of Carlsbad.

Fifth place with an award of $5.00 was won by an enthusiastic amateur, Mrs. W. E. Robbins of Artesia.

Other exhibitors who won ribbons were Richard Diener Nursery, of Oxnard; Mrs. Norma Cooper, Ontario; Mrs. Nana Giridlian, Arcadia; Mrs. G. E. Rawlins, Orland.

The flowers exhibited included, *Callicore rosea (Amaryllis belladonna), Cooperia, Crinum, Habranthus, Haemanthus, Amaryllis (Hippeastrum), Hemerocallis, Lycoris, Nerine, Polianthes, Sternbergia, Vallota* and *Zephyranthes.*

Altho more flowers were shown in the 1940 Show, more rare and outstanding exhibits and more space occupied, fewer exhibitors took part. This is probably the fault of the writer. In 1939 we wrote over 50 personal letters urging participation in the event. That is quite a chore in our very busy fall season and we could not do it this year. Let it be understood this Fall Amaryllis Show is an annual event. It may be participated in by anyone anywhere. The date of the show is announced in our Spring Catalogs and that date will not be changed as was the date we announced for the Spring Show at Montebello.

In staging the fall shows, exhibitors are invited to use any bulbous flowers or plants that will add to the interest of their display. Thus the writer usually uses a number of large out door grown Fancy Leaf Caladiums as a back ground. Several rare amaryllids having decorative foliage are usually used in the displays. None of these however are

subject to entry and are not considered by the judges in making awards. They are designed only to add interest and educational value to the displays. They help in attracting and holding attention.

This year, as in former years, the Amaryllids exhibits were always a center of attention. Many visitors with note book and pencil did just what we planned to have them do, and future reference to these notes will show in many gardens. Many visitors spoke of the Amaryllis Show as the most interesting of the floral exhibits, and complimented its educational value.

In our opinion the most outstanding display this year was that of the Las Positas Nursery of Santa Barbara. Only six entries were made by this wholesale nursery but each was awarded a blue ribbon and even that was scarcely enough recognition of its high merit. One entry, three huge umbels of *Haemanthus Katherinae,* was the finest thing in the show and was given a blue ribbon and a special award.

Nerines displayed by Las Positas were large vases of *N. Bowdenii, N. filifolia* hybrids (by James) and James' Hybrids. The latter are designed for propagation and final introduction. They are novelties of the highest merit. They are not repetitions of European introductions (as many American introductions evidently are) but carry destinction especially in colors shown. One of these has been named *Chameleon.* Mr. James' description appears elsewhere in this volume. Since flower colors often are classified differently by another observer, and may possibly even affect the nerve mechanism of sight differently we shall add our description.

The name, *Chameleon,* for this clone is well chosen. As we write seven stems are before us. At least three or four descriptions might be possible if exact color tones were represented for all. We choose the two with outer flowers recently opened. In these the petals are near to Tyrian Rose, (Ridgway). But this term is inadequate to express the full impression of its color. The natural sheen of a nerine flower is here present in an unusual degree and when a flower is turned in the light it glistens and glows from those surfaces in the correct angle between light, flower and eye as if covered by a million microscopic golden facets. As petals age they seem to pass through Amaranth Purple to Pansy Purple, and to fade into deep Plumbago Blue. The last color reminds me of the "blue" rose.

This cross *(N. filifolia* x *N. corusca major)* is a particularly well considered one and evidently designed to combine the rapid vegetative reproduction of *N. filifolia* with the larger and more attractively colored flowers of the pollen parent. In my opinion Mr. James has eminently succeeded and in this new race I shall expect to see nerines become more adapted to outside culture here in the hands of amateurs and hope some time to see them abundant enough to become a standard florist's flower.

We can foresee for Mr. James a name in amaryllid history. Many breeders begin with the best hybrids already available, and their introductions show less distinction than the introductions of those who use species as well.

John V. Watkins, Gainesville, Fla. See page 51

Southeastern Amaryllis Show, 1940. Upper, Ralph W. Wheeler exhibit; lower, Mrs. R. E. Kline exhibit.

Plate 173

The Las Positas Nursery also showed *Calostemma aurea* and *Bessera elegans* winning six blue ribbons, and placed third in Sweepstakes. This nursery does no retail business. But we believe they are supplying to the trade a greater number of new bulbs than any other American grower.

Second in Sweepstakes was won again this year by Mrs. Leonard Swets of Riverside, with five Firsts and three Seconds. She showed fine specimens of *Vallota purpurea, Hemerocallis fulva, Amaryllis aulicum, Lycoris radiata, Amaryllis advena* and others. Mrs. Swets is an enthusiastic grower of amaryllids, specializing in *Amaryllis (Hippeastrum)* seeds of very high quality, which she sells both wholesale and retail.

Fourth place in Sweepstakes was won by W. E. Rice of Downey. Mr. Rice showed *Lycoris aurea, Sternbergia lutea* and a large display of high quality *Amaryllis (Hippeastrum).* He won four blue ribbons and one second.

As a grower of fine amaryllids, Mr. Rice is coming up front. He has recently acquired large stocks of nerines in both species and hybrids. One new hybrid nerine, the complete stock, was recently received from the Guernsey Isle. It will be one of the best acquisitions in our floriculture. Another rare bulb recently received was *Lycoris radiata alba.*

As we have said before the Rice *Amaryllis (Hippeastrum)* are outstanding in quality and the fact that he could show so many perfect specimens on a fall date makes them appear to be among our best out of season or fall bloomers. Mr. Rice is a wholesale grower and does no retail business.

Fifth place in Sweepstakes was awarded to Mrs. Leonard Slosson of Los Angeles. Mrs. Slosson showed *Sternbergia lutea* and *S. macrantha, crinums* and *Callicore rosea (Amaryllis belladonna).* She is a most enthusiastic amateur grower and is constantly enlarging her collection of amaryllids.

The writer, Cecil Houdyshel, was awarded the First Prize in Sweepstakes. He placed over forty entries; all distinct species or varieties. The Judge, Mr. Fred Howard, awarded to these 17 Blue Ribbons, 12 Seconds, and 3 Thirds. About 10 entries were wholly disqualified, altho there was no competition. Possibly our best exhibit was a vase of hybrids,—Brunsdonnas *(Brunsvigia* x *Callicore rosea).*

It is planned to revise somewhat the method of awarding the Sweepstakes. More credit should be given to the relative merit of the entries and less to total number of winning entries.

NATIONAL AMARYLLIS SHOW, 1940, MONTEBELLO, CALIF.

CECIL HOUDYSHEL, *California*

The show at Montebello was held in the large offices and display room of Howard and Smith on April 12, 13 and 14, 1940. Several nurseries who feature *Amaryllis (Hippeastrum)* and other amaryllids and a few amateurs cooperated fully and brought outstanding exhibits.

As a show it was a good one. However, on account of the "very unusual" hot weather which arrived on the opening day, the attendance was below average. It was not only hot but very hot the first and second days of the show. The last day, Sunday, was comparatively pleasant, not cool, and on this day only the attendance was good.

Perhaps a contributing restriction on the attendance might have been the admission charge. But this could hardly be true for the 25c fee should not affect this region noted for its appreciation of flowers.

All who know the reputation and the merit of their stock would expect from Howard and Smith the outstanding exhibit and they did not disappoint. For "*Amaryllis (Hippeastrum)* species" shown, they won First, Second and Third. Also First on best "Collection of Species." In *Amaryllis (Hippeastrum),* Grandiflora Group, First Prizes for "Best Collection of Ten or More"; Best "Display of Hybrid Amaryllis"; "White, with Light Marking", "White, with Stripes, Keels, Tips, etc," (as well as Second and Third); "Pure Orange Scarlet, no Markings"; "Orange Scarlet, with Markings"; "Pure Light Red, no Markings"; "Light Red with Markings"; "Pure Deep Red, no Markings," (also Second and Third).

Four Specials were given to Howard and Smith hybrid *Amaryllis (Hippeastrum).*

In all this firm won eleven First, six Seconds and five Thirds, a total of 22 Ribbons. With a more complete schedule they could have won several more as several varieties of merit were shown that could not qualify in the color classes offered. Among these were fine flowers of rose and pink.*

W. E. Rice, of Downey, is an outstanding grower of Hybrid Amaryllis *(Hippeastrum).* At present his fields of many acres, solidly planted, accomodate several hundred thousand bulbs. He has no greenhouses. All are absolutely field grown. Before the show it was conceded that field grown Hybrid Amaryllis *(Hippeastrum)* should not be shown in competition with those greenhouse grown. Rather empirically it was decided to classify the field grown in the Decorative Group and the greenhouse grown flowers in the Grandiflora Group, although such grouping may not accord with either theory or practice. In addition to highest decorative merit Mr. Rice's Hybrid Amaryllis possess a rugged constitution and strong vegetative functions.

Mr. Rice won Firsts in the Decorative Group for "Pure White", "Orange Scarlet with Markings"; "Light Red with Markings", (also Second and Third); "Pure Deep Red, no Markings", also Second and Third) and "Deep Red with Markings". He also edged in on the Grandiflora Group and in competition with greenhouse grown flowers won First on "Deep Red, with Markings". Mr. Rice also could have won more ribbons on a more extended schedule. His display worthily occupied a prominent position in the Show. He won a total of eight Firsts, three Seconds and three Thirds, a total of 14 Ribbons.

* Such exhibits should be placed under "any other color,"—Ed.

Placing third for the best display of Amaryllis in the Show, The Hunt Nursery showed that they were up and coming in this field. They showed many beautiful specimens, field grown and classed in the Decorative Group. This Nursery won three Seconds and three Thirds, an excellent showing considering the stiff competition.

Mrs. Leonard Swets of Riverside who is a commercial grower of Amaryllis seeds entered only a small exhibit but made up for it in quality. Her huge white Amaryllis was really one of the outstanding entries. Visiting reporters hopped on to it, made photographs and featured it in writing up the show. It won the Blue as best white in the Grandiflora group. The flower was pure white and must have been near to 11 inches across. Mrs. Swets also won First for White with markings; *Hemerocallis* and Crinums, a total of four Firsts. There was a blue ribbon on nearly every entry for Mrs. Swets.

The Blue Ribbon for the best *Clivia miniata* hybrids went to the well known clivia grower and breeder, E. P. Zimmerman of Carlsbad. Although the date was very late for clivias here he succeeded in showing flowers of the highest standard. He won two blue ribbons.

The Oregon Bulb Farms sent down a large collection of the newer hybrid daffodils. These were in perfect condition when judged on the first day but naturally could not last thru the show in such hot weather. Many very rare and exquisite varieties were shown. A Blue Ribbon was placed on this entry which was classed as a collection.

The change in the date of the show at a late period to one week earlier than that decided on by a committee of three threw out the writer, Cecil Houdyshel from competition in *Amaryllis (Hippeastrum)*. Our flowers, so far inland, are a little later than those near the coast. Our soil too is heavy, not sandy, and that means later flowers. We do not grow the large quantity but have some fine ones.

We won first for Double Amaryllis, *Clivia* Species, *Clivia nobilis* hybrids, *Pancratium illyricum, Phaedranassa carmioli, Sprekelia formosissima, Leucojum aestivum* and *Hymenocallis* species. We won nine Firsts and three Seconds, although several of our entries which won were credited to other exhibitors in the trade paper reports of the show.

The judges of the Show were Ernest Braunton, the well known horticultural writer, of South Pasadena; and William Hertrich, Director of Huntington Library and Huntington Gardens, Pasadena.

SOUTHEASTERN AMARYLLIS SHOW, ORLANDO, FLA., 1940

WYNDHAM HAYWARD, *Florida*

The 1940 Southeastern Regional Amaryllis Show was held at the Theodore L. Mead Botanical Garden between Winter Park and Orlando, Florida, April 13 and 14, with notable displays of the giant flowers by numerous amateur and professional growers.

The scene of the exhibition was the orchid house of the botanical garden, which was opened recently as a memorial to the late Mr. Mead, one of the pioneer horticulturists of Florida and a leading hybridizer

of Amaryllis in his day, being the originator of the "Mead Strain".

More than a thousand choice blooms of hybrid Amaryllis, Amaryllis species, Zephyranthes, Cooperias, Crinums and related plants were on the benches, and a large attendance of flower lovers from all parts of the state and the Southeast was recorded for the two-day event.

Outstanding displays of the show were set up by R. W. Wheeler, Winter Park, and Mrs. R. E. Kline, Windermere (Plate 173). There were also worth-while showings offered by Peterson and Riedel, Orlando; Frank Vasku, Winter Park; Wyndham Hayward, Winter Park; Dr. Hamilton P. Traub, Orlando, and others.

The judges were Prof. E. L. Lord, Orlando, Mrs. Fred Yerkes, Jacksonville, and Russell S. Wolfe, Orangeburg, S. C. R. W. Wheeler, Winter Park, was show manager, and the event was held in the Mead Botanical Garden with the cooperation of the garden authorities, headed by Prof. E. O. Grover, of Rollins College, president of the garden organization, and Jack Connery, director.

R. W. Wheeler won the "best Bloom" award in the show with a huge strawberry-lavender red flower of Leopoldii type, brilliant and full-petaled. The variety was given the name "Beacon". Awards of Merit were made to Mr. Wheeler and Mrs. Kline for their exhibits. Mrs. Kline's display was of mainly "rainbow and tricolored" types.

Two other awards of merit were voted by the judges, one to Dr. Traub for his entry of *Amaryllis* species, and the other to the flower of a single specimen of *Cooperanthes,* the rare bi-generic hybrid between *Cooperia* and *Zephyranthes* originated by Mr. S. P. Lancaster in India. It was grown and exhibited by Wyndham Hayward, who also displayed a vase of the new hybrid Crinum, *Wormley Bury,* grown in Florida from seed hybridized in England by Major Albert Pam, noted British amaryllid specialist, and named by Major Pam after his country estate. It was the first time the *Cooperanthes* and the hybrid Crinum had been shown at any flower show in America.

An attractive display of hybrid and species Crinums was arranged by Mr. Hayward, along with seedling and named varieties of early-blooming *Hemerocallis.* J. J. McCann, of Punta Gorda, exhibited some interesting double types of hybrid Amaryllis.

Other exhibitors included Mrs. A. R. Bogue and L. S. Thornton, Orlando; Mrs. W. G. Tilghman, Palatka; Dr. Traub and Mr. Thornton received one first class certificate each for hybrid Amaryllis blooms; Mr. Wheeler received three first class certificates, and the Crinum, *Wormley Bury,* received a first class certificate.

Mr. Wheeler won 19 blue ribbons for his entries of hybrid Amaryllis; Mrs. R. E. Kline won 13 blue ribbons for hybrid Amaryllis; Wyndham Hayward won 15 blue ribbons for various hybrid Amaryllis, Crinums and Daylilies; Frank Vasku won eight blue ribbons for Amaryllis and related bulbs, including *Cooperia* and *Zephyranthes*; Dr. H. P. Traub, six blue ribbons; L. S. Thornton, one blue ribbon; Mrs. W. G. Tilghman, two blue ribbons; J. J. McCann one blue ribbon.

FIRST NATIONAL DAYLILY SHOW, ORLANDO, FLA., APRIL 18 AND 19, 1940

WYNDHAM HAYWARD, *Florida*

The first competitive all-daylily show in the history of the world was conducted by the American Amaryllis Society April 18-19, 1940 at the Mead Botanical Garden in Orlando-Winter Park, Florida. The event was planned as the first of a series of similar annual major exhibitions, and was held with the cooperation of the Mead Garden authorities, and various Florida daylily enthusiasts, including the State Agricultural Experiment Station workers.

The show brought out a large display of standard and new types of species and horticultural varieties, representing most of the leading hybridizers in America and England.

The show was scheduled at the height of the daylily blooming season in Florida, which is two to three months ahead of the similar period in more northerly climates. The show was well attended.

Of special interest was the display brought from the Florida State Agricultural Experiment Station at Gainesville, Fla., by Prof. John V. Watkins, of the Department of Horticulture at the University of Florida. This included several flowers of the new red variety, *Mrs. John J. Tigert*, which will be released shortly by the State authorities for a limited distribution. The State has maintained an important project for the growing and breeding of hybrid *Hemerocallis* and Species for several years, originally under the direction of Dean H. Harold Hume.

The Orlando display featured vases of the common lemon and tawny daylilies *(H. fulva* and *H. flava)* and many of the hybrid clones of international note originated by the late George Yeld, Dr. A. B. Stout, Amos Perry, Carl Betscher, H. P. Sass, etc., in addition to the entries of originations of Florida hybridizers, including Dr. H. P. Traub, Orlando; Prof. E. L. Lord, Orlando; R. W. Wheeler, Winter Park; Wyndham Hayward, Winter Park; and Mrs. G. B. Knight, Orlando.

An unusual dark purplish-red type of flower was exhibited for Dr. Leon H. Leonian, specialist in red Hemerocallis, Morgantown, W. Va., which was grown by W. Hayward.

Outstanding blooms in the show besides *Mrs. John J. Tigert,* were *La Tulipe,* a magnificent cottage tulip-shaped bloom from Dr. Traub, with most unusual dark cardinal and orange coloring; also *Hector,* an interesting pastel shaded bloom from Prof. E. L. Lord, and *Ruby Supreme,* a completely new dark ruby red bloom from R. W. Wheeler, of large size and wide open flower character, which seems destined to make daylily history.

Many interesting seedlings in red, copper, bronze, chocolate, ruby, pinkish tones, etc. were on exhibition, showing the trend away from the usual oranges and yellows that is showing itself in the daylily breeding field.

Mr. R. W. Wheeler was show manager, and cooperation was extended personally by Dr. E. O. Grover, President of the Mead Garden,

and Jack Connery, Director. Prof. Watkins was head judge of the competitive classes, the University collection being entered for display purposes only.

Awards made were as follows in the competitive classes: *Blue ribbons*—(1st. place) H. P. Traub, 5 (for the clones *La Tulipe, Fred Howard, Mayor Starzynski, Indian Chief* and *Carnival)*; Wyndham Hayward, 40; E. L., and R. P. Lord, 18; R. W. Wheeler, 53; Mrs. G. B. Knight, 4; Frank Vasku, 4; Mead Botanical Garden, 1. *Red ribbons*—(2nd. place) H. P. Traub, 3; Wyndham Hayward, 3; E. L. and R. P. Lord, 3; R. W. Wheeler, 1; Mrs. G. B. Knight, 1; Frank Vasku, 5; Dr. Leon H. Leonian, 1. *White ribbons*—(3rd. place) H. P. Traub, 1; W. Hayward, 1; R. W. Wheeler, 1; Frank Vasku, 1.

Awards of Merit were made to the following displays: The University of Florida Exhibit; Dr. Hamilton P. Traub display of 35 unnamed seedlings of rainbow shades; Wyndham Hayward display of many excellent named clones; and R. W. Wheeler display of 50 unnamed dwarf seedlings in bright colors.

First Class Certificates were awarded by the Society to the following clones: *Patricia* (Stout) exhibited by Hayward; *Dauntless* (Stout) exhibited by Hayward; *La Tulipe* (Traub) exhibited by Traub; *Ruby Supreme* (Wheeler) exhibited by Wheeler; *Emperor Jones* (Hayward) exhibited by Hayward, and *Hector* (Lord & Lord) exhibited by the Lords; and *Mrs. John J. Tigert* (Univ. Fla.) exhibited by the University of Florida.

THE CALIFORNIA DAFFODIL CONFERENCE, 1940

Frank A. Leach, *California*

Under authority of the Council of the California Horticultural Society, an all day conference on daffodil growing, breeding and distribution was held at the University of California, Berkeley, March 16, 1940. President Sydney B. Mitchell presided over the first daffodil conference.

Mr. and Mrs. Kenyon Reynolds of Pasadena staged a fine collection of named varieties and seedlings. Visits were made Saturday and Sunday to President Mitchell's garden to see his fine new seedlings. A few flowers were also contributed by Drew Sherwood, Oswego, Oregon. Dr. S. S. Berry, Redlands, Calif.; Joseph Urmston, San Marino; Sydney B. Mitchell, Berkeley; Peter Valinga, San Mateo; and Frank Leach, Diablo, Calif.

The following papers were presented at the morning session:

"Daffodils for the Average Gardener in California" by J. A. McDonald, Niles, Calif.

"Daffodils for the Advanced Amateur in California" by Kenyon Reynolds, Pasadena, Calif.

"Daffodils in the Pacific Northwest" by Grant E. Mitsch, Lebanon, Oregon.

"Notes on Rock Garden Daffodils" by Drew Sherrard, Oswego, Oregon.

"The Use of Daffodils as Garden Decoration", by Lockwood and Elizabeth de Forest, Santa Barbara, Calif.

"The Woodside Project in Popularizing Daffodils" by Mae Vrooman Forbes, Redwood, Calif.

"Daffodil Diseases", a letter from Frank P. McWhorter, Corvallis, Oregon.

"Breeding Daffodils in Oregon" by E. N. Hornbeck, Sandy, Oregon.

"A Few Random Daffodil Notes from Southern California," by Dr. S. Stillman Berry, Redlands, Calif.

The afternoon session was devoted to a very full and profitable discussion of the papers presented. The July issue of the Journal of the California Horticultural Society contains the papers and the discussions in full.

CALIFORNIA SPRING GARDEN SHOWS, 1940

L. S. Hannibal, *California*

The 1940 Annual California Spring Garden Show was held May 1 to 5 at the Oakland Civic Auditorium. This show is sponsored each year by the Oakland Business Men's Garden Club with the assistance of various garden clubs in the San Francisco Bay Area. As usual the design was executed by Howard Gilkey, noted California landscape architect.

Although the American Amaryllis Society has taken no active part in the exhibitions, several local sponsors entered a number of Hybrid Amaryllis. Peter Valinga of Burlingame exhibited a large number of Holland imported white Amaryllis of the Leopoldii type making a striking indoor display. Herman Brown of Gilroy also had a number of his red-white hybrids on display. The San Francisco Garden Club contributed a number of mixed Reginae type hybrid amaryllis in a large outdoor display which created considerable interest in the possibilities of use of these flowers for outdoor gardens in the bay district.

The C. F. Michaels estate of Menlo Park received a second class award for an hybrid amaryllis display. This was the only award issued to any amaryllis display.

The University of California furnished a display of a number of amaryllids and alstroemerids obtained from their Andes Expedition collection. These included *Bomarea,* and *Alstroemeria* of several types with marked color ranges, *Hymenocallis multiflora* and an unidentified *Amaryllis (Hippeastrum)* species. The latter should be of particular interest to the members of the American Amaryllis Society due to the unusual red and green checkered effect exhibited on the inside of the lower petals.

VISITS TO THE GARDENS OF DAYLILY ENTHUSIASTS

ELMER A. CLAAR, *Illinois*

My notes and observations are probably highly presumptuous, therefore, I wish to issue a few personal words of warning directed to anyone who reads anything that I write about flowers. I have some very definite prejudices about bloom and color of flowers and it will very likely be reflected in my notes.

My observations about the new daylilies must be taken as from one who has seen only a few of them. One person can hardly see all of the good new daylilies under present conditions. I missed many fine new things and I have seen other fine things at a disadvantage. I had to hurry from garden to garden which isn't conducive to thorough study. I missed the very fine gardens of the Sass Brothers, Carl Betcher, Paul Cook and many others whom I might enumerate. I very decidedly want the daylily enthusiasts who read my notes to state wherein they disagree with me.

During the latter part of April and May I took a trip to Florida and during the month of August I went to New York and New England to see the gardens of daylily specialists. I was much impressed by the high quality and large percentage of very lovely seedlings. You will undoubtedly be offered in the near future pink, rose, raspberry, red, maroon, bi-color and vari-colored daylilies of various sizes, shapes and blooming seasons.

Dr. A. B. Stout says he has critically examined over 100,000 seedlings; Dr. Hamilton P. Traub says he is growing over 30,000; Mr. J. B. Norton, Hyattsville, Maryland, says he has discarded over 20,000; Mr. Milton A. Rubel says, "I am planting around 30,000 hand crossed seeds a year and in several seasons I expect to have quite a nice showing of Daylilies." I didn't ask Mrs. Thomas Nesmith as to how many seedlings she has but from the size of her seedling beds she must have from forty to fifty thousand. I do not know how many she has discarded. Mr. Ralph Wheeler has between five and ten thousand seedlings, and Mr. Hayward has several thousand. Mr. David Hall has critically examined over one thousand seedlings. I have over 1000 seedlings.

My trip to Florida was unfortunate as to time inasmuch as the peak of the bloom of the daylily had not as yet arrived but I saw many lovely and interesting gardens and met a host of hospitable daylily enthusiasts.

I first went to the Fairchild Tropical Gardens located just south of Miami. They were not much interested in any Herbaceous perennials although I was informed they had some daylily plants sent them by Mr. Lord. I did not see them in bloom.

I then went to the very interesting Plant Introduction Garden of the United States Government just south of Cocoanut Grove at Chapman Field. The Superintendent, Mr. McClelland, said he was not particularly interested in daylilies and that the station had only a few ordinary clones but he told me that Mrs. Clifford Cole of Cocoanut Grove was an enthusiast and that perhaps the Palmetum of Col. Robert M. Mont-

gomery might have some daylilies. Mr. Montgomery was not in but his Superintendent, Mr. Jordahn, very cordially showed us around this marvelous garden. There were palms of every variety but we saw only a few daylilies. They were not in bloom and were not labeled.

Our next call was at Mrs. Clifford C. Cole's lovely garden at Cocoanut Grove. She is very enthusiastic about daylilies and has quite a nice collection. Mrs. Cole was most gracious and showed us her amaryllis and daylilies. Most of her daylilies were not in bloom at this time. She is doing some hybridizing and has quite a number of seedlings but has not introduced anything as yet.

We drove to Royal Palm State Park, twelve miles southwest of Homestead which is a remarkably natural "Hammock" preserved by the club women of Florida. Geographically it lies several hundred miles south of Cairo, Egypt and therefore it is tropical. There were remarkable specimens of the royal palm *(Roystonea regia),* and beautiful arboreal snails, but no daylilies.

We drove to Key West but found no evidence of daylilies there, nor on Sanibel Island, and Fort Meyers on the West Coast. We drove up to the Florida Everglades Experiment Station at Belleglade at the south end of Lake Okeechobee. At the homes of the employees there are lovely beds of daylilies. I called at the Superintendent's home but he was out. His wife informed me that her husband's predecessor had been a daylily enthusiast but that they had no particular interest in the plants. Here I recognized *Mikado* and saw many good yellow and orange clones growing beautifully. I was told that they bloom profusely several times a year.

I had been in communication with the group of daylily enthusiasts around Orlando and Winter Park so we drove up there and we certainly did strike gold. This region has a number of very enthusiastic daylily fans. Most of them are hybridizing on an extensive scale. They have a high standard, a lofty idealism and keen intelligence. Here the American Amaryllis Society was formed and here are most of its officers. You can get some lovely daylily hybrids from this section of Florida now and many more will be offered to the public in the near future.

We first visited the Lakemont Gardens of Wyndham Hayward of Winter Park, Florida. Lakemont Gardens is a commercial nursery with one of the finest commercial collections of daylilies that I know of in America. Mr. Hayward is our genial and efficient Secretary and he was most cordial. I understand that Mr. Hayward was originally in the newspaper business—I did a bit of reporting once myself so here was a common bond. Dr. Traub later told me his own interest in daylilies arose from seeing Mr. Hayward's lovely plants. We were somewhat early to see Mr. Hayward's seedlings at their peak but I was so enthusiastic about them that I am now growing in my own garden most of his introductions. His *Emperor Jones* is one of the finest reds that I have seen this year. *Araby* is a "must have" in my estimation. I also like *Antares* which is a good red but not of the calibre of *Emperor Jones.* I am also growing his *E. W. Yandre, Lenore, Ramona, Minnie, Sally,*

Ralph Wheeler, De-Lovely, William Pelham and *Florida.* Some of these plants I have not seen in bloom but I have seen enough to know that I want all of his introductions. I had a very pleasant visit with Mr. Hayward and took some colored still pictures of his seedlings and colored movies of him hybridizing daylilies in his garden. I plan to see his garden again at the peak of daylily bloom and I look forward to this experience with a distinct thrill.

From here I went to the home of Mr. Ralph W. Wheeler, of Winter Park, who is Treasurer of the American Amaryllis Society and another enthusiastic amaryllis and daylily hybridizer. My experience with amaryllis is very limited but here I saw the loveliest pink clone that I have ever seen. I have a lovely colored picture of it. We visited his daylily seedling beds of several thousand plants and selected and tagged a number that were very beautiful. None of his seedlings had been named at that time. I hope to be growing some of them very soon.

Our next visit was to Dr. Hamilton P. Traub, our efficient Editor. Mr. Gore had told me about Dr. Traub and I was glad to meet him. He has a beautiful estate called Mira Flores just outside of Orlando. Dr. Traub told me that he was at present growing over thirty thousand daylily seedlings. Most of these were young seedlings and again I was rather early for the bloom but we saw some delightful things and I am growing his *Granada,* (this bloomed for me twice this year after I planted it in May. The color was very good), *Duchess of Windsor, Victory Taierchwang, Dr. Stout, Estelle Friend, Wekiwa* and *Happiness.*

Wyndham Hayward says that the flower of *Indian Chief,* a Dr. Traub introduction, is nine inches in diameter in his garden. I also heard that Dr. Traub's *Dr. Stout* is a very brilliant "Sunburst". The Doctor has thirty-eight named seedlings up to this time. Although I have seen few of them in bloom up to the present, I feel that we will shortly see many very lovely ones from this garden. I only wish I might have been there at the peak of the bloom. The Doctor had been growing the species *(Hemerocallis exaltata)* for several years but it was not happy and had not grown properly in the sub-tropic climate of Orlando so he asked me to grow it in Illinois where he hoped it might prosper. I took the plant and am now growing it in my garden. It appears to be happy for it gained more in Illinois in four months than it had in Florida in several years. I have never seen it bloom but understand that it may be valuable for hybridizing. Early this summer Dr. Hamilton P. Traub transferred from Orlando to Beltsville, Maryland and moved his thirty thousand seedlings with him.

While in the Orlando section I missed the gardens of R. P. Lord and E. L. Lord, two daylily enthusiasts who are also engaged in hybridizing daylilies.

We next stopped at the Mead Botanical Garden in Orlando—Winter Park. I have been told that it is planned to sponsor a daylily trial garden at this institution. This spring the first National Daylily Show was held in Orlando, and from all reports it was a splendid success.

My next stop was at the McKee Jungle Gardens at Vero Beach, Florida. It was especially interesting to me inasmuch as one of its owners, Mr. Sexton, was a business associate of my father's years ago. McKee's Jungle Gardens are one of the horticultural wonders of America. However, they were specializing in tropical and semi-tropical plants and only have a few daylilies at present.

I did not see any daylilies on my visit to Bok Tower and Gardens at Lake Wales. At Fort Lauderdale are two horticultural enthusiasts, Mr. Gore who at one time was Executive Secretary of the Amaryllis Society. Mr. Gore is now centering his interest in orchids and he has a very fine collection. His daylilies are at his place near Chicago. Dr. Wilhelm, another horticultural enthusiast at Fort Lauderdale was growing about thirty different daylily clones at his place in Fort Lauderdale. I sent them to him. He has many more at his farm near Chicago.

I did not visit the University of Florida gardens at Gainesville where one can see a fine trial garden and meet two daylily enthusiasts, Prof. Watkins and Dr. Hume. Nor did we get to the Oriental Gardens near Jacksonville; to Mr. Shoemaker's Jacksonville Landscape Company of Jacksonville, Florida; or the plantings of Mrs. H. E. Carter at Tallahassee. I hope to see all of these in another year.

During the latter part of August, I took a trip to New York and New England. I first went to the New York Botanical Garden and was royally entertained by Dr. A. B. Stout. He had lovely *Linda* in typical bloom, (my wife says this looks like an orchid), and also *Rajah*. Here I saw for the first time *Charmaine*. It is described by Dr. Stout in his book on Daylilies, as a clear rosy pink of a shade that closely approaches pink. I would describe it as a pink with silver-white edges and a white line down the center of the petals. Three segments are slightly recurving and the others are fairly straight. It is tops. I saw the pinched and twisted *Taruga*. Daylily enthusiasts owe Dr. Stout a debt of gratitude for he is one of the pioneers in this field and has introduced more first class seedlings, according to the votes of the Amaryllis Society poll, than any other hybridizer. The Doctor showed me *Majestic* which he said was one-third the size of a typical bloom because it was at the end of its blooming period. It has good form and a clear color. I did not see his new seedling beds but I did see his selected seedlings. The Doctor is in the process of preparing a portfolio on *Hemerocallis* which will be the finest thing of its kind. The project has met with difficulties due to the expensive and numerous color prints. We spent considerable time discussing his proposed book. I think a laudable object of this Society and of any Society interested in beautiful flowers would be to help work out a plan to acquaint daylily enthusiasts with this book, and get enough enthusiasts to subscribe toward publishing it.

I saw some lovely seedlings in bloom at this time but Dr. Stout told me that he had already spent a considerable time thinning out his seedling beds. I did not succeed in getting any pictures of his seedlings so I am not in a position to give much of a report on what we may expect in the next few years from Dr. Stout. All of Dr. Stout's introductions are sold by the Farr Nursery Company at Weiser Park, Pennsylvania,

and many of his introductions have been so sought after that they are listed in other nursery catalogues at two and three times what they were offered for by the Farr Company at the time of introduction. This is indeed a high tribute to Dr. A. B. Stout and the Farr Nursery Company.

After my visit with Dr. Stout I took a train to Lowell, Mass. to Fairmount Gardens, the delightful home and gardens of Mr. and Mrs. Thomas Nesmith. These gardens, in the hills of New England, had lovely trees in the background—I saw them against an azure blue sky with cumulus and cirrus clouds languidly floating by. In the foreground were hundreds of lovely vividly colorful daylilies—pink, raspberry, rose, red, maroon and peach colors. In fairness to the other hybridizers I must say that there was more peak bloom at the time that I called here than there was at any other garden either in Florida or the East. I was especially impressed with her seedlings.

The Nesmiths were most cordial and I certainly spent an exciting and lovely day. Mrs. Nesmith said she had just sent six hundred scapes of her daylilies to the New York World's Fair Gardens where she received a gold medal of which she was rightfully proud. I did not see a number of her very fine things but I saw so many rare and vividly colored clones that my enthusiasm mounted tremendously. I took two hundred feet of colored movies in her garden and they turned out to be some of the best colored pictures that I have ever taken.

I was already growing the following daylilies introduced by Mrs. Nesmith—*Burgundy, Burmah, Gay Day, Autumn Haze, Golden Dawn* and *Oriole,* none of which had bloomed as yet in my garden. I was also growing *Crown of Gold, Heather Rose* and *Starlight,* each of which bloomed in my garden. I did not get my *Crown of Gold* from Mrs. Nesmith and I did not see it bloom in her garden. I wonder if I really have it as my plant looks like a twin of *Dover. Heather Rose* was distinct and lovely in my shady garden but I was disappointed in *Starlight.* While it is the lightest yellow I grow, it is not close to white and I should like to see it bloom on an older plant to see if this will improve its form.

Among her 1939 introductions I liked *Dawn Play, Bold Courtier* and *Petra* best but I did not see *Pink Lustre, Sweetbriar, Persia, Princess* or *Dolly Varden* in bloom. Of the 1940 introductions I liked *Pink Charm* best. It impressed me as a dusty pink of a coral shade and I do not like it as well in my colored pictures as I do *Charmaine.* This might be the fault of the pictures but I don't think so. It is an entirely different shade from that of *Charmaine.* However no one is able to buy *Charmaine* so I bought *Pink Charm.* I am now growing *Amulet, Dragon* and *Highland Chieftain* among the pastel colors. *Moonray* is a small *Mikado,* a dainty little yellow with a spot on its throat. At the time that I saw it in her garden I liked it very much but after seeing my movies I should like to see it again to examine it for form before buying it.

You should see *Golden West* as Mrs. Nesmith grows it. It is one of the very best yellows that I have seen. It made me wonder if I had the same plant. Mrs. Nesmith introduced this clone. She said the stock had been mixed by the hybridizer. I bought another plant from her and shall grow it beside my "*Golden West*" and compare them.

China Sea reminded me of *Araby* with its lovely halo. I have no more room in my yard for midsummer yellow or orange or apricot daylilies unless they are so lovely and distinctive when I see them as to literally force themselves upon me. However, I thought well enough of *China Sea, Satsuma* and *Summer Gold* to take their pictures in color even if I do not buy them. All of these flowers have a halo and each is very pretty. Among the reds I like *Morocco Red* and the deeper *Matador. Royalty* is a maroon purple. *Purple and Gold* is a deep purple-toned red. I am intensely enthusiastic about Mrs. Nesmith's seedling beds. She will have more beautiful things for us later.

H-39-116 is the most vivid, vibrant deep cherry red of any daylily that I have seen. Its color is most distinctive. It glistens and radiates warmth. As soon as this seedling is available I shall be growing it.

H-40-222 is utterly stunning. I called it *"Honey Red Head"* and Mrs. Nesmith appeared to like the name. Well, it is away far in advance of anything that I have ever seen in its color class. It has a deeper tone than H-39-116 and at the edge of the segments the color changes to a much lighter color—a sort of silver edge. There is a light stripe of yellow down the center of the segments that broadens out into a golden throat. I will have this clone also as soon as I can.

H-38-345 is an especially lovely deep maroon with large white lines in the middle of each segment. It is interesting and utterly lovely. I should like to compare this with Mr. Hayward's *Emperor Jones* in my garden.

I am especially fond of bi-colors. I was much impressed by H-39-48. Its form shows its *Byng of Vimy* parentage. It is very large and presents the most vivid contrast of any bi-color that I have seen. Three segments are cherry red with a brown cast and with a yellow strip down the center, and three are pale yellow with a slight suggestion of red brushed just at the edge of these segments.

H-39-61 is a pastel peach which is very luminous and I like it very much. H-39-129 is a very good mahogany.

Mrs. Nesmith introduced twelve daylilies in 1939 and thirty-six in 1940 at prices ranging from $3.00 to $20.00. Before visiting her garden I thought this was too many introductions and a number of other garden enthusiasts whom I know also felt the same way, but frankly, after seeing her garden I do not see how she can be so conservative. I believe there are between five and six hundred named daylilies at the present time. There are ninteen thousand iris. There are very few people in the United States who have ever seen a pink, raspberry, maroon or rose daylily and it seems a shame to me that hundreds of these plants which would add so much gracious beauty to some of our finest gardens should be destroyed just because one other plant is slightly superior after a microscopic examination. These rare color harmonies should be released in groups and sold to daylily enthusiasts.

In general there are three methods of introducing daylilies. The New York Botanical Society has a policy by which Dr. Stout makes crosses, and then selects his superior seedlings. After he has grown a superior plant so that he can divide it he sends a plant to Farr &

Company and he keeps a plant. If the plant under observation is worth keeping, Dr. Stout describes the plant in a horticultural year book like Herbertia. Farr & Company grows the plant and propagates it until they have enough plants to fill all of their orders at $3.00 per plant before it is actually introduced. Sometimes after growing as many as five hundred plants of a given variety they will throw out all of them as not worth introducing.

This method of introducing is the conservative method. I shall always purchase anything that Dr. Stout introduces. A purchaser of a plant is more certain to get value for his investment but one disadvantage to the flower lover is that he must wait a long, long time before he can have a clone which is described. To illustrate: *Majestic* was described in Dr. Stout's book on Daylilies published in 1934. A few plants were issued by error prior to 1940. In the fall of 1940 orders on file were filled by Farr & Company at $3.00 per one-eyed plant but the plant was still not listed for sale in their general catalogue.

The second method of introduction is used by Mrs. Nesmith. She also has thousands of beautiful seedlings. She selects her superior plants and propagates them. She introduces a plant by name when she thinks she has enough to fill all orders and this will be when she still has only a relatively few plants. Her introduction price will be from $3.00 to $25.00. This method will on the law of averages be more likely to offer plants which will be inferior after several years and the purchaser takes a greater risk, but on the other hand he has the joy of prompt possession of a bloom which is rare and unusual. A third method of introduction is used by confirmed amateurs who send their treasures as gifts to their friends.

I can see no reason to argue that any plan is superior or inferior to any other. It depends entirely on what the purchaser wants and can pay for. If Mrs. Nesmith can market her Daylilies for fifty dollars a plant this is a matter entirely between Mrs. Nesmith and the purchaser.

In the afternoon I went to Craemore, the garden of L. Ernest Plouf of Lawrence, Mass. Mr. Plouf is an enthusiastic collector of daylilies. He grows an unusually large number of named clones. He is also interested in hybridizing and has named five or six plants and introduced one. He had just moved his plants so that they were not typical. I did not see any field of seedlings such as I saw at the other hybridizers and most of his plants were not blooming.

I then returned to Mrs. Nesmith's home and wandered about in her garden taking notes and I stayed at the Nesmith's until late that evening when I had to take the train back to New York.

I spent the next day with Col. Edward Steichen in New York. He was formerly Chairman of the Daylily Committee and President of the American Delphinium Society but was compelled to resign both positions because of ill health. Mr. Steichen has however lost none of his interest or enthusiasm for daylilies. We spent a most pleasant and for me a profitable day discussing daylilies in general, daylily enthusiasts and objectives of the Society relative to daylilies.

I want to thank the daylily enthusiasts for a wonderful time.

2. COLOR DESCRIPTION

PRESERVING HERBARIUM SPECIMENS IN NATURAL COLORS

HAMILTON P. TRAUB, *Maryland*

The method here described undoubtedly was discovered years ago. The writer was told about it by several gardeners who had in turn received their information from others. It would be greatly appreciated if those who can cite definite literature references will report them in Herbertia.

During the spring of 1940 flowers of *Amaryllis belladonna* Linn. (non Herb.) were collected at Mira Flores, Orlando, Florida, in order to try out the method of preserving flowers in their natural colors that had been communicated to the writer as already indicated. The flowers were cut after the morning dew had dried for this is an important detail. The containers were new clay pots that are more porous than used ones. The flowers, placed in these, were surrounded with dry, fine sand. The flower was held in place with one hand and the sand poured in the pot with the other. The pots were stored in a dry place in the garage.

When the sand was removed early in July, the flowers were in an excellent state of preservation as far as their shape and natural colors were concerned. As the writer looks at the specimens many months later (December) the color is so well preserved that any conclusion about this point could not be very far wrong. In comparison with the pitiful state of the specimens, with reference to color, in the herbaria of Europe and America, these specimens are near perfection.

The method is easy. Sand, porous containers and a dry storage place should be available anywhere except possibly in the humid tropics. It appears that it would be worth while for curators of herbaria to consider the matter from the standpoint of providing standard equipment for the preservation of specimens, particularly the flowers, in approximately natural colors by means of this easy method.

Another important point to bear in mind with amaryllids is to include also dissected flowers so that the necessary details as to length and structure of tube, corona, insertion of stamens, etc., can be ascertained accurately by the worker in systematics. The writer cut flowers in two parts vertically on through the ovary disclosing all the important structures needed for classification and preserved them by the present method. In these the structures are in much better condition than in the case of squashed remains secured by the plant press method. For the want of a better name the writer has used the phrase, "the dry sand method", in referring to the method described above.

3. DESCRIPTION, CLASSIFICATION AND PHYLOGENY

AMARYLLIS AGLAIAE CASTELLANOS SP. NOV.

In response to the request for a contribution to 1940 Herbertia, dedicated to Latin America, I am pleased to comply by giving the description of a new species of *Amaryllis* that grows abundantly in and is characteristic of, the flora of the northwestern part of the Argentine (Fig. 49). In spite of this fact, its scientific name, if it has one already, is not known to me. It might be included in a description so lacking in clearness that it is not possible to place it, but that is unlikely, and I therefore propose it as a new species of *Amaryllis*. The species is an

Fig. 48. Amaryllis Aglaiae, Castellanos sp. nov., half natural size.

important feature in the flora of the Tucuman-Bolivian botanical province, and is known locally as "The Great Amancay".

Amaryllis Aglaiae Castellanos *sp. nov.* Fig. 48.*

Bulb globose, 5 cm. long, 4.5 cm. diameter, the neck 7 cm. long, both blackish in color; leaves green, 20-35 cm. long, lightly channeled, fasciculate, narrowed at base, 1-2.3 cm. wide at the middle, the apex obtuse; scape glaucous, 50-52 cm. long; subcylindric, decreasing in diameter from base to apex, the greatest diameter 12 mm.; spathe bibracteate, papyraceous and dry at anthesis, the bracts triangular, 1 cm. broad at base, 4-4.5 cm. long; inflorescence 2- or 3-flowered; flowers

* Sr. Castellanos sent a fine colored drawing and also a black and white drawing with his description in addition to the photograph reproduced as Fig. 48 in this issue. The two drawings have been deposited in the U. S. National Museum and there they will be permanently available to the student of the Genus *Amaryllis*.—Ed.

pedunculate, horizontal or oblique, the peduncle glaucous, subcylindric, 25-45 mm. long, up to 3 mm. thick; ovary dull green, subprismatic, 6-9 mm. long, 5 mm. broad; perianth outside greenish-yellow in the lower part, the upper part butter-yellow, paler on the margins; the tube short, 5 mm. long; corona reduced to small scales bearing on the lower part the staminal filaments; sepals spatulate, acute, 7-7.2 cm. long, 2.4-2.5 cm. wide; petals similar but narrower, 2-2.2 cm. wide, the lowest, in which the filaments rest, still narrower, 14 mm. wide; genitalia shorter than the perianth, upwardly curved at the apex; stamens large, 18 mm. long, the filaments white; style longer than the filaments and equaling the

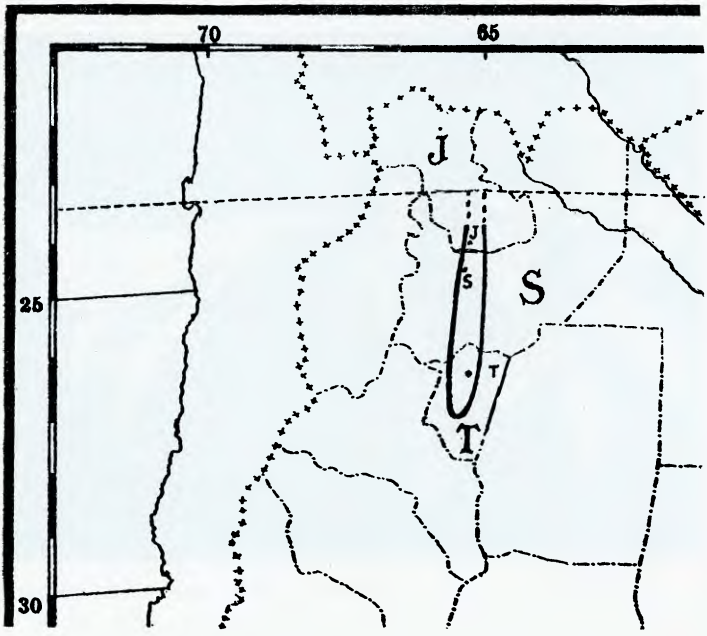

Fig. 49. Map showing geographical range of Amaryllis Aglaiae Castellanos sp. nov., in northwestern Argentina.

perianth segments; stigma trifid; capsule trigonous, 12 mm. high and 30 mm. broad, many-seeded, the seeds black with irregular plates; fruiting peduncle 4 cm. long and 3 mm. thick.

Amaryllis Aglaiae Castellanos *sp. nov.* tab. 48.

Lais, bulbi globosi, 5 cm. longi, 4.5 cm. diam., collo 7 cm. longo, uterque colore fuliginoso. Folia viridia 20-35 cm. longo, leviter canaliculata, fasciculata, angustiora in basi, 1-2.3 cm. lata in medio, cuspide obtusa. Scapus glaucus 50-52 cm. altus, subcylindricus, decrescens a basi (diametrus maximus 12 mm.) ad verticem versus medium diametrum. Spatha 2-foliaris, papyracea et sicca per anthesim, triangularis, metiens

1 cm. in basi et quaeque pars 4-4.5 cm. longa. Inflorescentia 2-3-flora. Flores pedunculati horizontales aut obliqui, pedunculo glauco, subcylindrico 25-45 mm. longo et diametro maximo 3mm. Ovarium obscure viride, subprismaticum, 6-9 mm. longum, 5 mm. latum. Perianthium cum tubo brevi, 5 mm. longum, extus in parte inferiore luteo-subviride, in parte superiore colore luteo butyri, marginibus tantum pallidioribus; corona reducta ad squamulas minusculas, in cuius parte inferiore nascuntur filiamenta staminalia. Tepala spathulato-acuta, 7-7.2 cm. longa, 2.4-2.5 cm lata. Petala similia sed angustiore 2-2.2 cm. lata, inferius, in quo nituntur stamina, etiam angustius, tantum fasciculatum, 14 mm. latum. Genitalia breviora perianthio, apicibus sursum versus curvis; stamina filamentis albis, anteris pallidis, magna, 18 mm. longa; stylus longior filamentis et aequalis perianthio, stigmate 3-fido. Capsula trigona 30 mm. lata et 12 mm, alta,—seminata, seminibus atris laminaribus irregulariter formatis. Pedunculus fructus, si dehiscet, 4 cm. longus et 3 mm. diam.

Specimina examinata.—Argentina: Tucuman, Caspinchango, inter Rodeo Aspero et Rodeo Grande, leg. Castellanos 22 VII 1929. BA (Museum of Natural Sciences, Buenos Aires, Argentina)[1] no. 7237.

Notes.—When I collected this evergreen species for the first time, I thought that it might be rare in occurence because in winter when not in flower it was not easily visible. However, during a journey that I made in the summer of 1935 into the northwestern Argentine, the contrary appeared to be true. In fact, I was impressed to note that it was never wanting in the fields of the Argentine provinces of Tucuman, Salta and Jujuy, where it is called "The Great Amancay" to distinguish it from other species of Liliiflorae that are also called "Amancay". The bulbs that I collected at an earlier date were cultivated in the garden of the Museum of Natural Sciences, Buenos Aires, and these flowered for the first time there in November 1931. The fruits ripened well, and I obtained plants from seeds. Since that date they have flowered every year in the Museum garden.

Museum of Natural Sciences, *Alberto Castellanos*
Buenos Aires, Argentina.

ZEPHYRANTHES FOSTERI SP. NOV.

Mr. Mulford B. Foster has made a number of plant collecting trips to Latin America and he has brought back numerous amaryllids. However, none of these have been described until now. The new species described below is of outstanding beauty and can be easily grown.

Type material.—The type specimen (Traub No. 118) has been deposited in the U. S. National Herbarium. It was taken May 1, 1940 from bulbs collected in the type locality by Mulford B. Foster, and grown at Orlando, Florida.

Description.—Bulb globose, 2.5 cm. in diam., 2.5 cm. high, exclusive of the neck which is 3 cm. long, and 8 mm. in diam.; tunics dark brown; *leaves* up to 5 in number, held stiffly upright, very slightly glaucous,

1 "BA" is the abbreviation for the Museum; see Chronica Botanica. V (1939), 144.

concave toward center, and up to 22 cm. long, 4 mm. wide at base, 5 mm. at middle and 2.5 mm. near the acute apex; *peduncle* hollow, ribbed, tinged reddish, and up to 7 cm. high, somewhat flattened and slightly two-edged; spathe 3 cm. long, ribbed, united for 1.5 cm., apex bifid to 6 mm.; *flowers* in May and June, sessile, *color* near Rose Bengal (RHS 25/1), held stiffly upright, open in daytime and closed at night, odor not particularly pleasant; *perianth* 5 cm. long, tube 2 cm. long; *corona* of short transparent scales between the *spatulate segments* which are about 4 cm. long more or less ribbed on outer side; sepaline segments 1.5 cm. wide, petaline, 1.3 cm. wide, margins slightly incurving; ovary 6 mm. long, 4 mm. wide; *stamens* 3.2 cm. long; style 3 cm. long, *stigma* trifid; *seeds* numerous, compressed, winged.

Zephyranthes Fosteri Traub, *sp. nov.*

Bulbus globosus, 2.5 cm. diam., 2.5 cm. altus, collo 3 cm. longo et 0.8 cm. diam. excluso; tunicae fuscae; folia usque ad 5, erecta, subglauca, concava, usque ad 22 cm. longa, basi 0.4 cm. lata, medio 0.5 cm. lata, apicem acutum versus 2.5 mm. lata; pedunculus fistulosus, rubrotinctus, usque ad 7 cm. longus, paullo complanatus, paullo anceps; spatha 3 cm. longa, costata, marginibus 1.5 cm. connatis, apice bifida (0.6 cm.); flores sessiles; perianthium 5 cm. longum, tubo 2 cm. longo, segmentis spathulatis, 4 cm. longis, plus minusve externe costatis, segmentis exterioribus 1.5 cm. latis, interioribus 1.3 cm. latis, marginibus paullo incurvis; coronae squamae hyalinae, segmentis alternantes; ovarium 6 mm. longum, 4 mm. latum; stamina 3.2 cm. longa; stylus 3 cm. longus; stigma trifidum; semina numerosa, compressa, alata.

Habitat.—Type locality, near the city of Morelos, State of Morelos, Mexico; elevation about 4000 ft.; found growing near sprekelias in loamy soil, rich in humus, among rocks.

Notes.—Collected by Mulford B. Foster of Orlando, Florida, in Mexico in 1938. The species is named in his honor since we owe many new plant treasures to him. This is a very distinct species with its stiffly upright leaves and outstanding Rose Bengal colored flowers. The foliage is apparently evergreen.

—*Hamilton P. Traub*

Mira Flores,
Orlando, Florida,
May 1, 1940

ZEPHYRANTHES LINDLEYANA HERB.

J. C. Th. Uphof, *Florida*

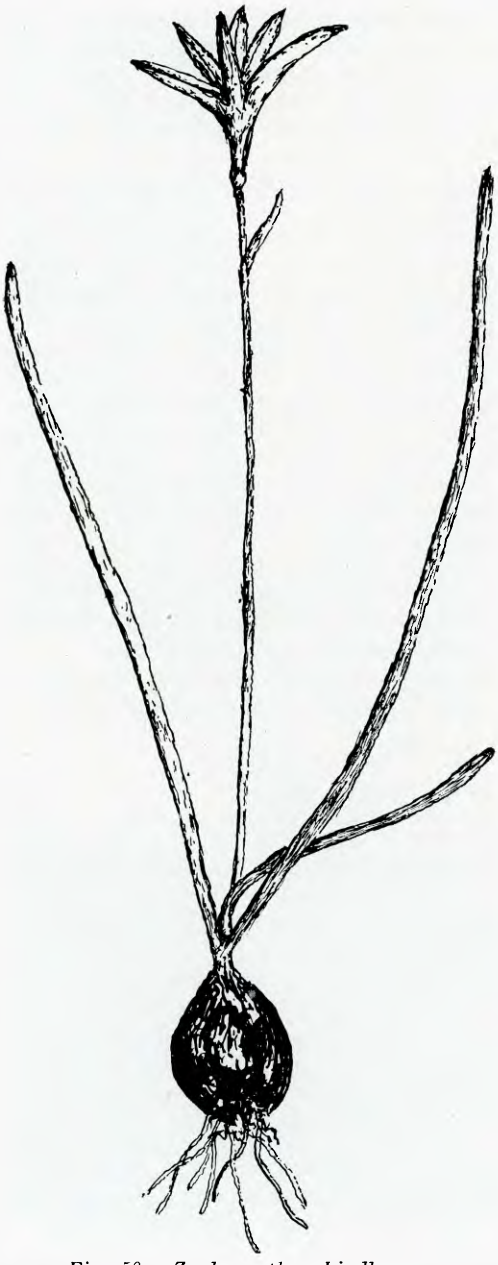

Fig. 50. Zephyranthes Lindleyana.

When visiting various parts of El Salvador, Central America, I noticed in different towns and villages of this interesting and densely populated Republic, a small though very attractive species belonging to the Amaryllidaceae. Herbert[1] in his well known work, called it *Zephyranthes Lindleyana* in honor to Dr. J. Lindley. This bulbous plant is in that country often grown in gardens, especially along borders of herbaceous plants and shrubberies, sometimes it is found in groups in separate beds, or it is mixed with other plants, here and there in patches (See Fig. 50.).

When flowering the plant reaches a height of 12 to 20 cm. depending very much upon the elevation where it is grown. Around San Salvador, the Capital of El Salvador, in Santa Tecla and Santa Ana, regions that are situated in tropical to subtropical zones, the plants are highest. On the other hand in higher elevations, like Ahuachapan where the temperature is cool, even during the summer months, the plants are very much shorter.

The bulbs of *Zephyranthes Lindleyana* are globose, sometimes somewhat elongated and reach when fully grown a diameter of 1.5 to 2 cm. The scales surrounding the bulb are dark brown to almost black. On the

[1] William Herbert, Amaryllidaceae; 174 Plate 35, fig. 5. London 1837.

average the plant produces 2 to 5 leaves; very heavy ones produce as many as 6 to 8. They are linear and narrow, reaching almost the same length as the flower scape. The color of the perianth varies from pink to a beautiful bright red. The individual flowers are about 1.5 to 2.5 cm. in length. The stamens are nearly half as long as the limb. The stigma is three-lobed. The plants flower in the warmer sections of the country from July until August and in the higher parts of the mountainous sections I have seen them starting to flower the second half of August.

It has been reported that *Zephyranthes Lindleyana* is indigenous in certain mountainous parts of Mexico, however, I found this species also growing wild in the mountain valleys near Lake Atitlan in Guatemala, far removed from any Indian villages. I also observed the species against the higher sections of the volcano San Salvador in El Salvador. In the latter case it may be that these plants could have escaped from cultivation, because this species occurs in many gardens at the nearest homes. I also found in open spaces near the jungles farther removed from any civilization of the same mountain range, *Z. grandiflora,* which is supposed to grow there wild, and of which I know that it is not in cultivation. Its geographical distribution is much more extensive than that of *Z. Lindleyana,* for it has also been reported from other Central American Republics, Mexico and the Antilles. Both species are known in El Salvador under the name of "Jacinto."

Smith[2] reports the occurence of *Z. Lindleyana* in three localities of Guatemala, namely from Naranjo in the Department Rosa at 3500 feet alt., from Cerro Redondo, Department of Santa Rosa at 4500 feet and from Patzun in the Department of Chimaltenango at 6000 feet.

From a standpoint of nomenclature there are problems that have to be solved as is apparent in the works of Hemsley,[3] Lindley and others.

San Salvador, Republica de El Salvador,
September 1938.

[2] John Donnel Smith. Enumeratio Plantarum Guatemalensum neconon Salvadorensium Hondurensium Nicaraguensium Costaricensium. Oquawkee 4:151-152, 1895.

[3] W. Botting Hemsley. Biologia Centrali-Americana. 3:333, London 1882-1886.

A CHECKLIST OF AMARYLLIDACEAE, TRIBE ALLIEAE, IN THE UNITED STATES[1]

C. V. MORTON, *U. S. National Museum*

The following list includes all of the species of the tribe Allieae described from the United States.[2] It is intended also to list all synonyms, both generic and specific, which have been based on United States plants. This checklist does not, however, attempt a critical view of the group. Although such a revision is highly desirable, it would require extensive and detailed studies impossible to the author at the present time. A conservative treatment of the genus *Allium* would un-

[1] Published by permission of the Secretary of the Smithsonian Institution.

[2] Received for publication, March 26, 1937.

doubtedly reduce the number of species recognized from the western United States.

In the preparation of this list the author has been much aided by the "Flora of California" by Prof. W. L. Jepson and the "Illustrated Flora of the Pacific States" by Prof. LeRoy Abrams. There is great diversity of opinion concerning proper generic limits within the tribe. *Allium* itself, which for so large a genus is remarkably uniform morphologically, has been subdivided into no fewer than forty-three "genera." With good reason these have generally been ignored. On the other hand, the numerous genera segregated from *Brodiaea* have been based on more trustworthy morphological and habital characters. Their recognition was advocated by Dr. E. L. Greene, who has been followed by Abrams. The present list follows the more conservative system outlined by Sereno Watson, which Jepson has followed in general.

Now that the American Amaryllis Society has decided to follow Dr. J. Hutchinson in uniting the tribe Allieae with the Amaryllidaceae, it is to be hoped that the various species will obtain a wider horticultural popularity. Although they can not compete with the true Amaryllidaceae in beauty, the species of *Brodiaea* are graceful and charming and are probably susceptible of horticultural improvement.

I. ALLIUM L. Sp. Pl. 294. 1753.

Schoenoprasum H. B. K. Nov. Gen. & Sp. 1: 277. 1815.
Ophioscordon Wall. Sched. Crit. 129. 1822.
Gynodon Raf. Fl. Tell. 21; 18. 1837.
Kalabotis Raf. op. cit. 19.
Stelmesus Raf. loc. cit.
Hexonychia Salisb. Gen. 88. 1866.
Calliprena Salisb. op. cit. 89.
Validallium Small, Fl. Southeast. U. S. 264, 1328. 1903.

1. ALLIUM ACUMINATUM Hook. Fl. Bor. Amer. 2: 184. 1840.
Allium Murrayanum Regel, Gartenfl. 22:260. pl. 770, fig. 1. 1873.
?Allium Elwesii Regel, Acta Hort. Petrop. 5:266. 1877.
Allium acuminatum var. *cuspidatum* Fernald, Zoe 4:380. 1894.
Allium cuspidatum. Rydb. Fl. Rocky Mts. 160, 1061. 1917.
RANGE: British Columbia to northern California, east to Colorado and Montana, south to Arizona.

2. ALLIUM AMPLECTENS Torr. Pacif. R. Rep. 4:148. 1856.
Allium attenuifolium Kell. Proc. Calif. Acad. 2: 110. pl. 33. 1863.
Allium occidentale A. Gray, Proc. Amer. Acad. 7: 390. 1867.
Allium acuminatum var. *gracile* Wood, Proc. Acad. Phila. 1868:171. 1868.
Allium monospermum Jeps. ex Greene, Man. Bay Region Bot. 321. 1894.
Allium attenuifolium var. *monospermum* Jeps. Fl. W. Mid. Calif. 120. 1901.
RANGE: Washington, Oregon, and California.

3. ALLIUM ANCEPS Kell. Proc. Calif. Acad. 2: 109. pl. 32. 1863.
RANGE: Nevada, Oregon and eastern California.
4. ALLIUM ANSERINUM Jeps. Fl. Calif. 1: 274. 1921.
RANGE: Described from Goose Lake, California.
5. ALLIUM ARIDUM Rydb. Fl. Rocky Mts. 159, 1061. 1917.
?Allium reticulatum var. *ecristatum* M. E. Jones, Contr. West. Bot. 18: 21. 1935.
RANGE: Colorado. A doubtfully valid species.
6. ALLIUM ATRORUBENS Wats. Bot. King's Exp. 352. 1871.
?Allium decipiens M. E. Jones, Contr. West. Bot. 10: 16. 1902. Not Fisch. (1812).
?Allium inyonis M. E. Jones, op. cit. 10: 86. 1902.
RANGE: Nevada and eastern California.
7. ALLIUM AUSTINAE M. E. Jones, Contr. West. Bot. 10: 85. 1902.
RANGE: Sierra Nevada of California.
8. ALLIUM BIGELOVII Wats. Bot. King's Exp. 487. pl. 38, fig. 8, 9. 1871.
RANGE: Arizona and New Mexico.
9. ALLIUM BISCEPTRUM Wats. Bot. King's Exp. 351. 1871.
?Allium bisceptrum var. *utahense* M. E. Jones, Contr. West. Bot. 10:33. 1902.
Allium tenellum Davidson, Bull. So. Calif. Acad. 21:39. 1922.
Allium Bullardi Davidson, op. cit. 22:72. pl. 20. 1923.
RANGE: California, Nevada, Utah and Idaho.
10. ALLIUM BOLANDERI Wats. Proc. Amer. Acad. 14:229. 1879.
Allium stenanthum Drew, Bull. Torr. Club 16:152. 1889.
Allium Bolanderi var. *stenanthum* Jeps. Fl. Calif. 1:278. 1921.
RANGE: Oregon and northern California.
11. ALLIUM BRANDEGEI Wats. Proc. Amer. Acad. 17:380. 1882.
Allium miser Piper ex M. E. Jones, Contr. West. Bot. 10:13. 1902. (nomen).
RANGE: Oregon, Idaho, Utah, and Colorado.
12. ALLIUM BREVISTYLUM Wats. Bot. King's Exp. 350. 1871.
RANGE: Montana, Wyoming, Colorado, and Utah.
13. ALLIUM BREWERI Wats. Proc. Amer. Acad. 14:233. 1879.
Allium falcifolium var. *Breweri* M. E. Jones, Contr. West. Bot. 10:83. 1902.
RANGE: Central California.
14. ALLIUM BURLEWII Davidson, Bull. So. Calif. Acad. 15:17. 1916.
RANGE: Southern California.
15. ALLIUM CAMPANULATUM Wats. Proc. Amer. Acad. 14:231. 1879.
Allium Bidwelliae Wats. loc. cit.
Allium campanulatum var. *Bidwelliae* Jeps. Fl. Calif. 1:274. 1921.
RANGE: California.
16. ALLIUM CANADENSE L. Sp. Pl. 1195. 1753.
Allium mutabile Michx. Fl. Bor. Amer. 1:195. 1803.
Allium longicaule Hornem. Hort. Hafn. Suppl. 130. 1819.
Allium continuum Small, Flora Southeast. U. S. 263, 1328. 1903.
Allium canadense var. *ovoideum* Farwell, Bull. Torr. Club 42:351. 1915.

Allium canadense var. *robustum* Farwell, op. cit. 352.

RANGE: Southern Canada and throughout eastern United States.

NOTE: Michaux misinterpreted the Linnaean *Allium canadense* and identified it with the plant now known as *Nothoscordum bivalve*. He accordingly redescribed the true *A. canadense* as *A. mutabile*, a name which has commonly been misapplied to the mid-western species here known as *A. Drummondii*.

17. ALLIUM CERNUUM Roth in Roem. Arch. 1, pt. 3:40. 1798.
Allium tricorne Poir. in Lam. Enc. Suppl. 1:270. 1810.
?Maligia laxa Raf. Fl. Tell. 2:19. 1837.
Gynodon cernuum Raf. op. cit. 18.
Gynodon Ellioti Raf. loc. cit.
Gynodon rupestre Raf. loc. cit.
Calliprena cernua Salisb. Gen. 89. 1866.
Allium cernuum var. *obtusum* Cockerell, Bull. Torr. Club 18:173. 1891.
Allium allegheniense Small, Bull. N. Y. Bot. Gard. 1:279. 1899.
Allium neomexicanum Rydb. Bull. Torr. Club 26:541. 1899.
Allium recurvatum Rydb. Mem. N. Y. Bot. Gard. 1:94. 1900.
Allium nutans Rydb. op. cit. 95. Not L. (1753).
Allium cernuum f. *album* Henry, Ottawa Nat. 31:56. 1917.
Allium cernuum var. *neomexicanum* Macbr. Contr. Gray Herb. n. ser. 56:5. 1918.

RANGE: Almost throughout the United States, with several well-marked variants.

18. ALLIUM Coryi M. E. Jones, Contr. West. Bot. 17:21. 1930.

RANGE: Described from Alpine, Texas.

19. ALLIUM CRATERICOLA Eastw. Leafl. West. Bot. 1:132. 1934.

RANGE: Described from Mt. St. Helena, California.

20. ALLIUM CRENULATUM Wiegand, Bull. Torr. Club 26:135. pl. 355. 1899.

RANGE: British Columbia, Washington and Oregon.

21. ALLIUM CRISPUM Greene, Pittonia 1:166. 1888.
Allium peninsulare var. *crispum* Jeps. Fl. Calif. 1:278. 1921.

RANGE: Central and southern California.

22. ALLIUM CRISTATUM Wats. Proc. Amer. Acad. 14:232. 1879.

RANGE: Utah, Arizona and southern California.

23. ALLIUM CUSICKII Wats. Proc. Amer. Acad. 14:228. 1879.
?Allium anceps var. *aberrans* M. E. Jones, Contr. West. Bot. 10:10. 1902.

RANGE: Oregon and Idaho.

24. ALLIUM CUTHBERTII Small, Flora Southeast. U. S. 264, 1328. 1903.

RANGE: North Carolina to Florida and Alabama.

25. ALLIUM DESERTICOLA (M. E. Jones) Woot. & Standl. Contr. U. S. Nat. Herb. 16:114. 1913.
Allium reticulatum var. *deserticola* M. E. Jones, Contr. West. Bot. 10:30. fig. 60. 1902.

RANGE: Western Texas to Arizona and Utah. Reduced to the synonymy of *A. textile* by Rydberg but evidently distinct. It

is closer to *A. Geyeri,* but differs in its larger flowers, more conspicuous ovary crests, and usually shorter, coarser scapes.

26. ALLIUM DICHLAMYDEUM Greene, Pittonia 1:166. 1888.
Allium serratum var. *dichlamydeum* M. E. Jones, Contr. West. Bot. 10:84. 1902.
RANGE: Coast Ranges of California.
NOTE: According to an unpublished notation by J. B. Norton, this is typical *A. serratum.*

27. ALLIUM DICTUON St. John, Proc. Biol. Soc. Wash. 50:3. 1937.
RANGE: Described from Washington.

28. ALLIUM DICTYOTUM Greene, Pl. Baker. 1:52. 1901.
Allium pikeanum Rydb. Bull. Torr. Club 31:402. 1904.
RANGE: Colorado.
NOTE: Rydberg reduces *A. dictyotum* to the synonymy of *A. textile,* but examination of the type shows it to be the same as his species *A. pikeanum.* The relationship is with *A. Geyeri* rather than *A. textile.*

29. ALLIUM DIEHLII M. E. Jones, Contr. West. Bot. 10:86. 1902.
Allium tribracteatum var. *Diehlii* M. E. Jones, op. cit. 18.
RANGE: Utah.

30. ALLIUM DOUGLASII Hook. Fl. Bor. Amer. 2:184. pl. 197. 1838.
Allium Hendersonii Rob. & Seat. Bot. Gaz. 18:237. 1893
RANGE: Washington, Oregon, and Idaho.

31. ALLIUM DRUMMONDII Regel, Act. Hort. Petrop. 3, pt. 2:112. 1875.
Allium mutabile auct. Not Michx. (1803).
Allium hyacinthoides Bush, Rep. Mo. Bot. Gard. 17:119. 1906.
Allium lavandulare Bates, Amer. Bot. 22:58. 1916.
RANGE: Florida to Texas and New Mexico, north to Nebraska; also South Carolina, but very likely introduced.

32. ALLIUM EQUICAELESTE St. John, Proc. Biol. Soc. Wash. 44:31. 1931.
RANGE: Washington.

33. ALLIUM FALCIFOLIUM H. & A. Bot. Beech. Voy. 400. 1841.
Allium falcifolium var. *demissum* Jeps. Fl. Calif. 1:280. 1921.
RANGE: Southern Oregon and northern California.

34. ALLIUM FIBRILLUM M. E. Jones, Contr. West. Bot. 10:24. 1902.
Allium collinum Dougl. ex Wats. Proc. Amer. Acad. 14:228. 1879. Not Guss. (1842).
RANGE: Washington and Oregon, east to Montana.

35. ALLIUM FIMBRIATUM Wats. Proc. Amer. Acad. 14:232. 1879.
Allium fimbriatum var. *aboriginum* Jeps. Fl. Calif. 1:273. 1922.
Allium fimbriatum var. *mohavense* Jeps. loc. cit.
Allium mohavense Tidestr. Proc. Biol. Soc. Wash. 48:39. 1935.
RANGE: California.

36. ALLIUM FRAGILE Nels. Univ. Wyom. Publ. Bot. 1:123. fig. 7. 1926.
RANGE: Washington.

37. ALLIUM GEYERI Wats. Proc. Amer. Acad. 14:227. 1879.
Allium Geyeri var. *tenerum* M. E. Jones, Contr. West. Bot. 10:28. 1902.

Allium Geyeri var. *graniferum* Hend. Rhodora 32:22. 1930.
Allium funiculosum A. Nels. Amer. Journ. Bot. 21:577. 1934.
RANGE: Washington and Oregon, east to Wyoming and south to Arizona, New Mexico, and Texas.
NOTE: A variable species, in the northern part of its range running into *A. textile.* It has been reported from farther east, but the specimens are perhaps better referred to *A. textile.* The Arizona form is *A. funiculosum,* which may be distinct. The Colorado form here listed as *A. dictyotum* is perhaps only varietally different.

38. ALLIUM GRANDISCEPTRUM Davidson, Bull. So. Calif. Acad. 23:126. 1924.
RANGE: California.

39. ALLIUM HAEMATOCHITON Wats. Proc. Amer. Acad. 14:227. 1879.
Allium Marvinii Davidson, Bull. So. Calif. Acad. 20:49. 1921.
RANGE: Coastal southern California and northern Lower California.

40. ALLIUM HICKMANI Eastw. Bull. Torr. Club 30:483. 1903.
Allium hyalinum var. *Hickmani* Jeps. Fl. Calif. 1:276. 1921.
RANGE: Coast Ranges of California.

41. ALLIUM HYALINUM Curran, Bull. Calif. Acad. 1:155. 1885.
RANGE: Sierra Nevada of California.

42. ALLIUM INTACTUM Jeps. Fl. Calif. 1:273. 1921.
RANGE: Described from Placer Co., California.
NOTE: Considered by Prof. Abrams as synonymous with *A. Sanbornii.*

43. ALLIUM KUNTHII Don, Mem. Wern. Soc. 6:82. 1827.
Schoenoprasum lineare H.B.K. Nov. Gen. & Sp. 1:277. 1815. Not *Allium lineare* L. (1753).
Allium scaposum Benth. Pl. Hartw. 26. 1840.
Allium Elmendorfii M. E. Jones, Contr. West. Bot. 18:20. 1935.
RANGE: Texas, Arizona, and Mexico.

44. ALLIUM LACUNOSUM Wats. Proc. Amer. Acad. 14:231. 1879.
Allium Davisiae M. E. Jones, Contr. West. Bot. 12:78. 1908.
Allium pseudobulbiferum Davidson, Bull. So. Calif. Acad. 20:49. 1921.
RANGE: Central and southern California.

45. ALLIUM LEMMONI Wats. Proc. Amer. Acad. 14:234. 1879.
Allium anceps var. *Lemmoni* Jeps. Fl. Calif. 1:279. 1921.
RANGE: Northern California.

46. ALLIUM MACNABIANUM Regel, Gartenflora 22:261. pl. 770, fig. 2-3. 1873.
RANGE: Described from cultivated material of uncertain origin. A doubtful species.

47. ALLIUM MACROPETALUM Rydb. Bull. Torr. Club 31:401. 1904.
RANGE: Colorado and New Mexico.

48. ALLIUM MACRUM Wats. Proc. Amer. Acad. 14:233. 1879.
RANGE: Eastern Washington and Oregon.

49. ALLIUM MADIDUM Wats. Proc. Amer. Acad. 14:228. 1879.
RANGE: Oregon.

50. Allium minimum M. E. Jones, Contr. West. Bot. 10:19. fig. 36. 1902.
Range: Idaho.
51. Allium mirabile Hend. Rhodora 32:22. 1930.
Range: Oregon.
52. Allium mobilense Regel, Acta Hort. Petrop. 3, pt. 2:121. 1875.
Allium arenicola Small, Bull. Torr. Club 27:276. 1900.
Allium microscordion Small, Flora Southeast. U. S. 263, 1328. 1903.
Range: Florida to Texas, Arkansas, and Oklahoma.
53. Allium modocense Jeps. Fl. Calif. 1:279. 1921.
Range: Northeastern California.
54. Allium nevadense Wats. Bot. King's Exp. 351. pl. 38. fig. 1-3. 1876.
Range: Utah, Nevada, Arizona, and eastern California. Recorded from Texas, perhaps erroneously.
55. Allium Nevii Wats. Proc. Amer. Acad. 14:231. 1879.
Range: Washington, Oregon and Idaho.
56. Allium Nuttallii Wats. Proc. Amer. Acad. 14:227. 1879.
Allium Helleri Small, Flora Southeast. U. S. 264, 1328. 1903.
Allium reticulatum var. *Nuttallii* M. E. Jones, Contr. West Bot. 12:80. 1908.
Range: Texas, Oklahoma, and New Mexico. Reported from Kansas, Nebraska, and South Dakota, perhaps correctly. However, this species has commonly been confused with *A. Drummondii, A. textile,* and even *A. stellatum.*
57. Allium obtusum Lemmon, Pittonia 2:69. 1890.
Allium parvum var. *Brucae* M. E. Jones, Contr. West. Bot. 10:12, f. 16. 1902.
Range: Sierra Nevada and southern California.
Note: According to Jepson this species is the same as *Allium parvum.*
58. Allium oxyphilum Wherry, Journ. Wash. Acad. Sci. 15:370. fig. 1-2. 1925.
Range: Virginia and West Virginia.
59. Allium Palmeri Wats. Bot. King's Exp. 487. pl. 27. fig. 10-11. 1871.
Range: Utah, Arizona and New Mexico.
60. Allium Parishii Wats. Proc. Amer. Acad. 17:380. 1882.
Allium Piersoni Jeps. Fl. Calif. 1:274. 1921.
Allium montigenum Davidson, Bull. So. Calif. Acad. 19:55. 1920.
Allium monticola Davidson, op. cit. 20:51. 1921.
Allium Parishii var. *Keckii* Munz, Man. So. Calif. Bot. 87. 1935.
Range: Southern California.
61. Allium Parryi Wats. Proc. Amer. Acad. 14:231. 1879.
Allium Kessleri Davidson, Bull. So. Calif. Acad. 20:49. 1921.
Range: Central and southern California.
62. Allium parvum Kell. Proc. Calif. Acad. 3:54. pl. 13. 1863.
Allium tribracteatum var. *Andersoni* Wats. Bot. King's Exp. 353. 1871.
Allium tribracteatum var. *parvum* Jeps. Fl. Calif. 1:276. 1921.
Allium parvum var. *jacintense* Munz, Man. So. Calif. Bot. 86. 1935.
Range: California and western Nevada.

63. ALLIUM PENINSULARE Lemmon, Pittonia 1:165. 1888.
RANGE: California and Lower California.
64. ALLIUM PLATYCAULE Wats. Proc. Amer. Acad. 14:234. 1879.
RANGE: Oregon and northern California.
65. ALLIUM PLATYPHYLLUM Tidestr. Torreya 16:242. 1916.
RANGE: Oregon.
NOTE: Reduced to *A. Tolmiei* by Abrams, but an examination of the type shows it to be different.
66. ALLIUM PLEIANTHUM Wats. Proc. Amer. Acad. 14:233. 1879.
?Allium pleianthum var. *particolor* M. E. Jones, Contr. West. Bot. 10:31. fig. 61. 1902.
RANGE: Idaho, Nevada, and eastern Oregon.
67. ALLIUM PLUMMERAE Wats. Proc. Amer. Acad. 18:195. 1883.
RANGE: Arizona and northern Mexico.
68. ALLIUM PRAECOX Brandeg. Zoe 5:228. 1906.
Allium hyalinum var. *praecox* Jeps. Fl. Calif. 1:276. 1921.
RANGE: Southern California and northern Lower California.
69. ALLIUM PUNCTUM Hend. Rhodora 32:23. 1930.
RANGE: Oregon.
70. ALLIUM PURSHII Don, Mem. Wern. Soc. 6:10. 1827.
NOTE: Seemingly a synonym of *A. vineale* L., a species commonly naturalized in the United States.
71. ALLIUM RHIZOMATUM Woot. & Standl. Contr. U. S. Nat. Herb. 16: 114. 1913.
RANGE: New Mexico.
72. ALLIUM ROBINSONII HEND. Rhodora 32:22. 1930.
RANGE: Oregon.
73. ALLIUM RUBRUM Osterh. Bull. Torr. Club 27:506. 1900.
Allium fibrosum Rydb. Bull. Torr. Club 24:188. 1897. Not Regel (1887).
Allium Rydbergii Macbr. Contr. Gray Herb. n. ser. 56:7. 1918.
RANGE: British Columbia south to Oregon, east to Montana and Colorado.
74. ALLIUM SABULICOLA Osterh. Bull. Torr. Club 27:539. 1900.
Allium arenicola Osterh. op. cit. 506. Not Small (1900).
RANGE: New Mexico and Arizona.
75. ALLIUM SANBORNII Wood, Proc. Acad. Phila. 20:171. 1868.
Allium Sanbornii var. *Congdonii* Jeps. Fl. Calif. 1:275. 1921.
RANGE: Sierra Nevada of California.
76. ALLIUM SCHOENOPRASUM L. var. LAURENTIANUM Fernald, Rhodora 28:167. 1926.
RANGE: Oregon, Colorado and New York, northward to Newfoundland and Alaska.
NOTE: This has passed in most of the recent manuals as *Allium sibiricum* L. The distinctions given by Fernald do not seem to hold true in the copious material I have examined.
77. ALLIUM SCILLOIDES Dougl. ex Wats. Proc. Amer. Acad. 14:229. 1879.
NOTE: The identity of this species, described from "Priest's Rap-

ids,'' Columbia River, is still obscure. According to Rydberg it occurs from British Columbia south to Oregon and Idaho.

78. ALLIUM SCISSUM Nels. & Macbr. Bot. Gaz. 65:58. 1918.
Allium incisum Nels. & Macbr. Bot. Gaz. 56:470. 1913. Not Fomine (1909).
RANGE: Described from Idaho.

79. ALLIUM SERRATUM Wats. Bot. King's Exp. 487. pl. 37. fig. 4-5. 1871.
RANGE: Central California.

80. ALLIUM SIMILLIMUM Hend. Bull. Torr. Club 27:355. 1900.
RANGE: Idaho.

81. ALLIUM STELLATUM Nutt. in Fraser, Cat. No. 2. 1813 (nomen); Ker-Gawl. in Bot. Mag. 38: pl. 1576. 1814.
Stelmesus stellatus Raf. Fl. Tell. 2:19. 1837.
Hexonychia stellata Salisb. Gen. 89. 1866.
RANGE: Manitoba and Saskatchewan, south to Illinois and Texas.

82. ALLIUM TEXTILE Nels. & Macbr. Bot. Gaz. 56:470. 1913.
Allium reticulatum Nutt. in Fraser Cat. No. 1. 1813 (nomen); G. Don, Mem. Wern. Soc. 6:36. 1827. Not Presl (1819).
?*Allium reticulatum* var. *playanum* M. E. Jones, Contr. West. Bot. 12:79. 1908.
RANGE: Idaho and Colorado, north into Alberta and Manitoba, east to Minnesota.
NOTE: More southern forms previously identified as this species are incorrectly named, and are to be referred to *A. Geyeri, A. deserticola, A. Nuttallii,* and *A. Drummondii.*

83. ALLIUM *Tolmiei* Baker, Bot. Mag. 102: pl. 6227. 1876.
RANGE: Washington, Oregon, Idaho and Utah.

84. ALLIUM TRIBRACTEATUM Torr. Pacif. R. Rep. 4:148. 1856.
Allium ambiguum M. E. Jones, Contr. West. Bot. 10:18. 1902. Not Sibth. & Smith (1823).
RANGE: Oregon and California, east to Utah.

85. ALLIUM TRICOCCUM Ait. Hort. Kew. 1:428. 1789.
?*Allium triflorum* Raf. Med. Repos. N. Y. 5:362. 1808.
Ophioscordon tricoccum Wallr. Sched. Crit. 129. 1822.
Validallium tricoccum Small, Fl. Southeast. U. S. 264, 1328. 1903.
RANGE: Georgia, north to New Brunswick and Minnesota.
NOTE: Although differing rather widely from other American species *Allium tricoccum* has relatives in the Old World. There seems to be little reason for considering these plants generically distinct from *Allium;* but if so, the proper generic name is ***Ophioscordon*** Wallr., which antedates Small's *Validallium* by many years.

86. ALLIUM UNIFOLIUM Kell. Proc. Calif. Acad. 2:112. pl. 35. 1863.
Allium unifolium var. *lacteum* Greene, Pittonia 2:55. 1890.
RANGE: California and Lower California.

87. ALLIUM VALIDUM Wats. Bot. King's Exp. 350. 1871.
RANGE: Washington, Oregon, California, Nevada, and Idaho.

88. ALLIUM WATSONI Howell, Fl. N. W. Amer. 1:642. 1902.
RANGE: Oregon and northern California.

89. ALLIUM YOSEMITENSE Eastw. Leafl. West. Bot. 1:132. 1934.
RANGE: Yosemite Valley, California.

EXCLUDED SPECIES

90. ALLIUM ANGULOSUM L. Sp. Pl. 300. 1753.
NOTE: A European species erroneously recorded from the banks of the Missouri River by Pursh.[3] The plants are *A. textile* Nels. & Macbr.

91. ALLIUM CAROLINIANUM Delar. in Red. Lil. pl. 101. 1806.
RANGE: Said to have come from Carolina, but according to Regel it is *Allium blandum* Wall. of Asia.

ADDITIONAL RECENT SPECIES[4]

ALLIUM CASCADENSE M. E. Peck, Proc. Biol. Soc. Wash. 49:109. 1936.
RANGE: Oregon.

ALLIUM HOWELLII Eastw. Leafl. West. Bot. 2:109. 1938.
RANGE: Kern and San Luis Obispo Counties, California.

ALLIUM PERDULCE S. V. Fraser, Trans. Kans. Acad. Sci. 42:124. 1940.
RANGE: Nebraska to Texas.

ALLIUM PURDYI Eastw. Leafl. West. Bot. 2:110. 1938.
RANGE: Described from Clear Lake, California.

ALLIUM ROBUSTUM Eastw. Leafl. West. Bot. 2:110. 1938. Not Kar. & Kir. (1841).
RANGE: San Benito County, California.

ALLIUM ROGUENSE M. E. Peck, Proc. Biol. Soc. Wash. 49:109. 1936.
RANGE: Oregon.

ADDENDA

Under *Allium lacunosum* include *Allium lacunosum* var. *micranthum* Eastw. Leafl. West. Bot. 2:101. 1938 following *Allium pseudobulbiferum*.

Under *Allium Parishii* add the following note: Since the present list was written Ewan has shown that *Allium Parishii* and *A. monticola* are distinct species. See Bull. Torr. Club. 64: 509. 1937.

II. ANDROSTEPHIUM Torr. Bot. Mex. Bound. 218. 1859.

1. ANDROSTEPHIUM BREVIFLORUM Wats. Amer. Nat. 7:303. 1873.
Brodiaea Paysoni Nels. Bot. Gaz. 56:63. 1913.
Brodiaea breviflora Macbr. Contr. Gray Herb. n. ser. 56:9. 1918.
Bessera breviflora Jeps. Fl. Calif. 1:291. 1921.
RANGE: Colorado, Utah, Arizona, and southeastern California.

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[3] Fl. Amer. Sept. 1:223. 1814.

[4] The following species have been described since the above list was sent in for publication. Inasmuch as the manuscript has been set up in type, it does not seem worth while to insert them in their proper places above. C. V. M. Feb. 5, 1941.

2. ANDROSTEPHIUM COERULEUM (Scheele) Greene, Pittonia 2:57. 1890.
Milla coerulea Scheele, Linnaea 25:260. 1852.
Androstephium violaceum Torr. Bot. Mex. Bound. 219. 1859.
Brodiaea coerulea Macbr. Contr. Gray Herb n. ser. 56:9. 1918.
Androstephium coeruleum forma *leucanthum* Benke, Rhodora 34:10. 1932.
RANGE: Kansas and Oklahoma to Texas.

III. BLOOMERIA Kellogg, Hesperian 3:437. 1859.

1. BLOOMERIA CLEVELANDII Wats. Proc. Amer. Acad. 20:376. 1885.
2. BLOOMERIA CROCEA (Torr.) Coville, Contr. U. S. Nat. Herb. 4:203. 1893.
Allium croceum Torr. Bot. Mex. Bound. 218. 1859.
Bloomeria aurea Kell. Hesperian 3:437. 1859.
Nothoscordum aureum Hook. Bot. Mag. pl. 5896. 1871.
Bloomeria montana Greene, Bull. Calif. Acad. 1:281. 1885.
?Bloomeria gracilis Borzi, Bol. R. Ort. Bot. Palermo 1:19. 1897.
RANGE: Southern California and northern Lower California.

IV. BRODIAEA J. E. Sm. Trans. Linn. Soc. 10:2. 1811[5]
(nomen conservandum).

Hookera Salisb. Parad. Lond. pl. 90. 1808.
Hesperoscordum Lindl. Bot. Reg. 15: under pl. 1283. 1829.
Triteleia Dougl. ex. Lindl. loc. cit.
Calliprora Lindl. op. cit. 19: under pl. 1590. 1833.
Tulophos Raf. Fl. Tell. 3:71. 1837.
Scaduakintos Raf. op. cit. 4:23. 1838.
Dichelostemma Kunth, Enum. 4:469. 1843.
Seubertia Kunth, op. cit. 475.
Macroscapa Kell. Pacific 3:132. 1854.
Stropholirion Torr. Pacif. R. Rep. 4: 149. 1856.
Veatchia Kell. Proc. Calif. Acad. 2:11. 1863.
Rupalleya Morière, Bull. Soc. Linn. Norm. 8:317. 1864.
Dipterostemon Rydb. Bull. Torrey Club 39:110. 1912.

In this genus only the basic synonyms of species are given, rather than all nomenclatural combinations that have been made. At one time or other most of the species have been referred to *Milla, Hookera, Triteleia,* or various other genera. To include all these names would increase appreciably the bulk of this treatment without adding greatly to its value.

[5] Since the present list was sent in for publication Mr. Robert F. Hoover has published several papers on the genus **Brodiaea.** He now recognizes three genera: **Brodiaea, Triteleia,** and **Dichelostemma.** Although this segregation is not here accepted, a number of changes have been made in this enumeration while in proof, in order that it may correspond with his retypification of several species and the reduction of others to synonymy. Mr. Hoover has described also several new species. The papers referred to are: "A Definition of the Genus **Brodiaea"** (Bull. Torr. Club 66:161. 1939), "Revision of the Genus **Brodiaea"** (Amer. Midl. Nat. 22:551. 1939), and "The Genus **Dichelostemma"** (Amer. Midl. Nat. 24:463. 1940). The revision of **Triteleia** has not yet been published.—**C. V. M. Feb. 5, 1941.**

1. BRODIAEA AURANTEA (Kell.) Morton, comb. nov.
Calliprora aurantea Kell. Proc. Calif. Acad. 2:20. 1863.
Brodiaea gracilis Wats. Proc. Amer. Acad. 14:238. 1879.
RANGE: California.
2. BRODIAEA APPENDICULATA Hoover, Madroño 4:130. 1937.
RANGE: California.
3. BRODIAEA BICOLOR SUKSD. West. Amer. Sci. 14:2. 1902.
RANGE: Eastern Washington.
4. BRODIAEA BRIDGESII Wats. Proc. Amer. Acad. 14:237. 1879.
RANGE: California.
5. BRODIAEA CALIFORNICA Lindl. Journ. Hort. Soc. London 4:84. 1849.
Brodiaea grandiflora var. *elatior* Benth. Pl. Hartw. 339. 1857.
Brodiaea grandiflora var. *major* Baker, Journ. Linn. Soc. 11:377. 1871.
Hookera leptandra Greene, Pittonia 1:74. 1887.
Hookera synandra Heller, Bull. S. Calif. Acad. 2:65. 1903.
Brodiaea californica var. *leptandra* Hoover, Amer. Midl. Nat. 22:570. 1939.
RANGE: California.
6. BRODIAEA CONGESTA Smith, Trans. Linn. Soc. 10:3: pl. 1. 1811.
RANGE: Washington to Santa Clara County, California.
7. BRODIAEA CORONARIA (Salisb.) Jeps. Madroño 1:61. 1917.
Hookera coronaria Salisb. Parad. Lond. pl. 98. 1808.
Brodiaea grandiflora Smith, Trans. Linn. Soc. 10:2. 1811.
Brodiaea grandiflora var. *macropoda* Torr. Pacif. R. Rep. 4:149. 1856.
Brodiaea terrestris Kell. Proc. Calif. Acad. 2:6. 1859.
Brodiaea Torreyi Wood, Proc. Acad. Phila. 20:172. 1868.
Hookera rosea Greene, Bull. Calif. Acad. 2:137. 1886.
?Brodiaea synandra var. *insignis* Jeps. Fl. Calif. 1:288. 1922.
Brodiaea Howellii Eastw. Leafl. West. Bot. 2:111. 1938. Not Wats. (1879).
Brodiaea coronaria var. *rosea* Hoover, Amer. Midl. Nat. 22:560. 1939.
Brodiaea coronaria var. *kernensis* Hoover, op. cit. 561.
Brodiaea coronaria var. *macropoda* Hoover, op. cit. 562.
RANGE: British Columbia to southern California.
8. BRODIAEA CROCEA (Wood.) Wats. Proc. Amer. Acad. 14:238. 1879.
Seubertia crocea Wood, Proc. Acad. Phila. 20:172. 1868.
RANGE: Northern California.
9. BRODIAEA DISSIMULATA Peck, Torreya 32:147. 1932.
RANGE: Oregon.
10. BRODIAEA DOUGLASII Wats. Proc. Amer. Acad. 14:237. 1879.
Triteleia grandiflora Lindl. Bot. Reg. 15: under pl. 1293. 1829.
Brodiaea grandiflora Macbr. Contr. Gray Herb. n. ser. 56:9. 1918. Not Smith (1811).
RANGE: British Columbia south to Oregon, east to Montana and Utah.
11. BRODIAEA ELEGANS Hoover, Amer. Midl. Nat. 22:555. 1939.
Brodiaea coronaria var. *mundula* Jeps. Fl. Calif. 1:287. 1921.
Brodiaea elegans var. *mundula* Hoover, Amer. Midl. Nat. 22:557. 1939.
RANGE: Oregon and California.

12. BRODIAEA FILIFOLIA Wats. Proc. Amer. Acad. 17:381. 1882.
RANGE: Southern California.
13. BRODIAEA HENDERSONII Wats. Proc. Amer. Acad. 23:266. 1888 (May).
Triteleia Hendersonii Greene, Pittonia 1:164. 1888 (Feb.).
RANGE: Southern Oregon and northern California.
Note: *Triteleia Hendersonii* Greene and *Brodiaea Hendersonii* were founded on different types. Greene's name is the older, but it can not validly be transferred to *Brodiaea*. However, when the genus Triteleia is recognized, the correct name is *T. Hendersonii* Greene, not *T. Hendersonii* (Wats.) Greene, as given by some authors.
14. BRODIAEA HOWELLII Wats. Proc. Amer. Acad. 14:301. 1879.
RANGE: Washington and Oregon.
15. BRODIAEA HYACINTHINA (Lindl.) Baker, Gard. Chr. III. 20: 459. 1896.
Hesperoscordum hyacinthinum Lindl. Bot. Reg. pl. 1293. 1829.
Hesperoscordum lacteum Lindl. Bot. Reg. 19: pl. 1639. 1833.
Scaduakintos umbellaris Raf. Fl. Tell. 4:23. 1838.
Hesperoscordum Lewisii Hook. Fl. Bor. Amer. 2:185. pl. 198. 1840.
Veatchia crystallina Kell. Proc. Calif. Acad. 2:11. 1863.
Allium Tilingii Regel, Acta Hort. Petrop. 3, pt. 2:124. 1875.
Brodiaea lactea var. *lieacina* Wats. Proc. Amer. Acad. 14:239. 1879.
Brodiaea lactea var. *major* Purdy, in Bailey, Stand. Cycl. Hort. 1: 182. 1900.
RANGE: British Columbia and Idaho, south to southern California.
16. BRODIAEA IDA-MAIA (Wood) Greene, Pittonia 2:250. 1892.
Brevoortia Ida-maia Wood, Proc. Acad. Phila. 19:82. 1867.
Dichelostemma Ida-maia Greene, Man. Bay Region Bot. 318. 1894.
RANGE: Southern Oregon and northern California.
Note: The names *Brodiaea coccinea* A. Gray (Proc. Amer. Acad. 7:389. 1867) and *Brevoortia coccinea* Wats. (Proc. Amer. Acad. 14:239. 1879) are illegitimate and have no nomenclatural standing by Section 12 Article 60 of the International Code, for they were superfluous at the time they were proposed, being merely an arbitrary change of name because of personal dislike for the name *Ida-maia*.
17. BRODIAEA JOLONENSIS Eastw. Leafl. West. Bot. 2:111. 1938.
RANGE: Monterey to San Diego County, California.
18. BRODIAEA LAXA (Benth.) Wats. Proc. Amer. Acad. 14:237. 1879.
Triteleia laxa Benth. Trans. Hort. Soc. London II. 1:413. pl. 15. 1835.
Triteleia candida Greene, Bull. Calif. Acad. 2:139. 1886.
Triteleia angustiflora Heller, Bull. So. Calif. Acad. 2:66. 1903.
Brodiaea laxa var. *nimia* Jeps. Man. Fl. Calif. 225. 1923.
Brodiaea laxa var. *Traceyi* Jeps. loc. cit.
RANGE: California.
19. BRODIAEA LEACHIAE Peck, Torreya 32:147. 1932.
RANGE: Oregon.

20. BRODIAEA LEMMONAE Wats. Proc. Amer. Acad. 20:376. 1885.
RANGE: Arizona.

21. BRODIAEA LUTEA (Lindl.) Morton, comb. nov.
Ornithogalum ixioides Ait. f. Hort. Kew. ed. 2. 2:257. 1811.
Calliprora lutea Lindl. Bot. Reg. 19: pl 1590. 1833.
Brodiaea ixioides Wats. Proc. Amer. Acad. 14:238. 1879. Not Sims (1823).
RANGE: California.

21a. BRODIAEA LUTEA var. LUGENS (Greene) Morton, comb. nov.
Triteleia lugens Greene, Bull. Calif. Acad. 2:142. 1886.
RANGE: California.

22. BRODIAEA MINOR (Benth.) Wats. Proc. Amer. Acad. 14:236. 1879.
Brodiaea grandiflora var. *minor* Benth. Pl. Hartw. 340. 1857. (nomen).
Brodiaea Purdyi Eastw. Proc. Calif. Acad. II. 6:427. pl. 58. 1896.
Brodiaea nana Hoover, Leafl. West. Bot. 1:225. 1936.
Brodiaea minor var. *nana* Hoover, Amer. Midl. Nat. 22:566. 1939.
RANGE: California.

23. BRODIAEA MODESTA Hall, Univ. Calif. Publ. Bot. 6:166. 1915.
RANGE: Northern California.

24. BRODIAEA MULTIFLORA Benth. Pl. Hartw. 339. 1857.
Brodiaea grandiflora var. *brachypoda* Torr. Pacif. R. Rep. 4:149. 1856.
RANGE: Oregon to central California.

25. BRODIAEA ORCUTTII (Greene) Baker, Gard. Chr. III. 20:214. 1896.
Hookera Orcuttii Greene, Bull. Calif. Acad. 2:138. 1886.
Hookera multipedunculata Abrams, Bull. Torr. Club 32:537. 1905.
RANGE: Southern California.

26. BRODIAEA PALLIDA Hoover, Leafl. West. Bot. 2:129. 1938.
RANGE: Tuolumne County, California.

27. BRODIAEA PEDUNCULARIS (Lindl.) Wats. Proc. Amer. Acad. 14:237. 1879.
Triteleia peduncularis Lindl. Bot. Reg. 20: under pl. 1685. 1834.
RANGE: Northern California.

28. BRODIAEA PULCHELLA (Salisb.) Greene, Bull. Calif. Acad. 2:133. 1886.
Hookera pulchella Salisb. Parad. Lond. under pl. 98. 1808.
Brodiaea parviflora Torr. Pacif. R. Rep. 2:125. 1855.
Brodiaea capitata Benth. Pl. Hartw. 339. 1857.
Brodiaea capitata var. *pauciflora* Torr. Bot. Mex. Bound. 218. 1859.
Brodiaea insularis Greene, Bull. Calif. Acad. 2:134. 1886.
Brodiaea capitata var. *insularis* Macbr. Contr. Gray Herb. 56:9. 1918.
Dichelostemma pulchellum var. *pauciflorum* Hoover, Amer. Midl. Nat. 24:471. 1940.
RANGE: Oregon to Lower California, Nevada, Utah and Arizona, the var. *pauciflora* from southern California to New Mexico and Sonora.

29. BRODIAEA SCABRA (Greene) Baker, Gard. Chr. III. 20:459. 1896.
Calliprora scabra Greene, Erythea 3:126. 1895.
Calliprora scabra var. *analina* Greene, loc. cit.
RANGE: Southern Oregon and California.

30. BRODIAEA STELLARIS Wats. Proc. Amer. Acad. 17:381. 1882.
Hookera stellaris Greene, Bull. Calif. Acad. 2:137. 1886.
RANGE: Northern California.
31. BRODIAEA VENUSTA (Greene) Jeps. Fl. Calif. 1:291. 1921.
Brevoortia venusta Greene, Pittonia 2:230. 1892.
RANGE: Northern California.
32. BRODIAEA VOLUBILIS (Morière) Baker, Journ. Linn. Soc. 11:377. 1871.
Macroscapa volubilis Kell. Pacific 3:132. 1854.
Stropholirion californicum Torr. Pacif. R. Rep. 4:149. 1856.
Rupalleya volubilis Morière, Bull. Soc. Linn. Norm. 8:317. 1864.
RANGE: California.
NOTE: The name is incorrectly written by Jepson as *B. volubilis* (Kell.) Baker. No such combination was made by Baker, who did not transfer *Macroscapa volubilis* Kell. to *Brodiaea,* but rather *Rupalleya volubilis* Morière. It is merely a coincidence that the same specific name was chosen by both authors, for the species were described independently as new. Consequently, although *volubilis* Kell. is the oldest specific name, it is not now available under *Brodiaea.* Similarly *Stropholirion californicum* also antedates *volubilis* Morière, but the specific name can not be used because of conflict with *Brodiaea californica* Lindl.

DOUBTFUL SPECIES

33. SEUBERTIA OBSCURA Borzi, Bol. R. Ort. Bot. Palermo 1:18. 1897.
34. CALLIPRORA ALBIDA Borzi, op. cit. 20.

V. MILLA Cav. Ic. 2:76. 1793.

Askolame Raf. Fl. Tell. 2:11. 1837.

1. MILLA BIFLORA Cav. Ic. 2:76. pl. 196. 1793.
Askolame biflora Raf. Fl. Tell. 2:11. 1837.
RANGE: Arizona and New Mexico; Mexico. Reported from Texas.

VI. MUILLA Wats. Proc. Amer. Acad. 14:235. 1879.

1. MUILLA CORONATA Greene, Pittonia 1:165. 1888.
RANGE: Southern California.
2. MUILLA MARITIMA (Torr.) Wats. Proc. Amer. Acad. 14:235. 1879.
Hesperoscordum maritimum Torr. Pacif. R. Rep. 4:148. 1856.
Allium maritimum Benth. Pl. Hartw. 339. 1857.
Milla maritima Wats. Bot. King's Exp. 354. 1871.
Nothoscordum maritimum Hook. f. Bot. Mag. 27: under pl. 5896. 1871.
Bloomeria maritima Macbr. Contr. Gray Herb. n. ser. 56:8. 1918.
RANGE: California.

3. MUILLA SEROTINA Greene, Erythea 1:152. 1893.
Bloomeria maritima var. *serotina* Macbr. Contr. Gray Herb. n. ser. 56:8. 1918.
RANGE: Southern California and northern Lower California.
4. MUILLA TENUIS Congdon, Zoe 5:135. 1901.
RANGE: California.
5. MUILLA TRANSMONTANA Greene, Pittonia 1:73. 1887.
Bloomeria transmontana Macbr. Contr. Gray Herb. n. ser. 56:8. 1918.
RANGE: Nevada.

VII. NORTHOSCORDUM KUNTH, Enum. 4:457. 1843.

Geboscon Raf. Cat. Bot. Gard. Trans. Univ. 14. 1824 (nomen).
Pseudoscordum Herb. Amaryll. 11. 1837 (nomen).
Oligosma Salisb. Gen. 85. 1866.
Hesperocles Salisb. loc. cit.

1. NOTHOSCORDUM BIVALVE (L.) Britt. in Britt. & Brown, Ill. Fl. N. U. S. 1:415. 1896.
Ornithogalum bivalve L. Sp. Pl. 306. 1753.
Allium ornithogaloides Walt. Fl. Car. 121. 1788.
Allium striatum Jacq. Coll. Suppl. 51. 1796.
Ornithogalum pulchellum Salisb. Prod. 239. 1796.
Allium ornithogaloides Bosc ex Poir. Enc. Suppl. 1:265. 1810.
?Allium hyemale Raf. Fl. Lud. 19. 1817.
Nothoscordum striatum Kunth, Enum. 4:459. 1843.
Nothoscordum ornithogaloides Kunth, op. cit. 460.
Pseudoscordum striatum Torr. Pacif. R. Rep. 2:176. 1855.
Oligosma bivalve Salisb. Gen. 85. 1866.
Allium bivalve Kuntze, Rev. Gen. 3, pt. 2:312. 1898.
Allium bivalve var. *striatum* Kuntze, loc. cit.
Geboscon bivalve House, N. Y. State Mus. Bull. 233-234:66. 1921.
RANGE: Virginia to Florida, west to Nebraska and Texas; tropical America.
2. NOTHOSCORDUM INDORUM (Ait.) Nichols. Dist. Gard. 2:447. 1887-89.
Allium inodorum Ait. Hort. Kew. 1:427. 1789.
Allium fragrans Vent. Hort. Cels. pl. 26. 1800.
Nothoscordum fragrans Kunth, Enum. 4:461. 1843.
Hesperocles fragrans Salisb. Gen. 85. 1866.
Geboscon inodorum Thell. Mem. Soc. Cherbourg 38:168. 1912, in syn.
Geboscon fragrans House, N. Y. State Mus. Bull. 233-234:67. 1921.
RANGE: Southeastern United States and tropical America.
3. NOTHOSCORDUM TEXANUM M. E. Jones, Contr. West. Bot. 17:21. 1930.
RANGE: Arizona and Texas.

ALLIUM CORYI, M. E. JONES

H. B. Parks

Texas Agricultural Experiment Station

Dr. H. J. Cottle (1876-1931) Biology Department, Sul Ross State Teachers College, Alpine, Texas, was one of those who early realized the immense importance of range investigation. From 1925 up to the time of his death Dr. Cottle carried on an intensive ecological investigation of range conditions in the Alpine area and at some time during that period collected on the highlands near Alpine a small yellow flowered lilaceous plant. In 1929 a popular account of the result of these range investigations was published in a San Antonio newspaper in which mention was made of the yellow flowered onion and a technical name assigned to it.

The results obtained by Dr. Cottle in his range investigation are found in a paper entitled "Studies in the Vegetation of Southwest Texas" which appeared in Ecology Volume 12, pages 105-155. This publication, however, did not mention the yellow flowered onion or give the name assigned to it by Cottle.

Under the date of December 1, 1929, Bulletin 3 of the West Texas Historical and Scientific Society contains a paper entitled "Contributions to the Family Liliaceae" by V. L. Cory, Texas Agricultural Experiment Station in which he states:

"In the autumn of 1927 the writer examined the specimens of a small yellow-flowered liliaceous plant that apparently was undescribed. These plants were collected in the mountains near Alpine by Professor H. J. Cottle, of the Sul Ross State Teachers College. The status of this species is not known to the writer, and a report concerning the same would be welcomed."

In "Contributions to Western Botany Number 17" Marcus E. Jones, A. M., under the date of September 3, 1930, on page 21, gives the description of a new species of *Allium*. As this publication was not widely distributed the original description is here reproduced that it may be easily available:

"*Allium Coryi.* Allied to reticulatum group. Growing on grassy plains at Alpine, Texas, April 26, 1930. Plants about six inches to a foot high, slender, erect, with 2-3 basal leaves half as long as peduncle which are very narrow and straight. Bulbs ovate, with very many yellowish-brown reticulated coats from which the very thin and hyaline membrane has disappeared leaving the meshwork only. Bulbs propagating by division as in *Nuttallii*. Sheaths of the umbels about as long as pedicels (1-2 inches). Pedicels slender. Flowers about 10, chrome-yellow, 3-5 mm. long, rather ovate. Perianth segments oblong-ovate triangular-acute, the outer ones with strong midrib. Ovary globose, crowned with thin and flat low crests on the angles. Odor alliaceous. One tries very hard to put this in Nothoscordium, but the bulbs and

H. B. Parks, San Antonio, Texas See page 87

Allium Coryi, M. E. Jones. Clump grown from bulbs collected in the type locality.

Plate 174

color are that of an onion. This is the only native yellow onion. Anthers elliptical, on filaments nearly as long as the perianth. Dedicated to V. L. Cory of Sonora, Texas, an indefatigable botanist."

In that part of the "Contributions to Western Botany Number 18" which Jones printed on his hand press, distributed to those he considered his friends, on page 31, is found the following:

"*Allium Coryi,* Jones, I found abundant at Madera Springs on gravelly and sandy slopes on the edge of the live oaks on the north side of the Davis Mountains. The type locality was at Alpine on the southern side. The flowers are often tinged with red."

M. E. Jones is but a name to most botanists and the following is given in memory of one of the most spectacular of the West Coast botanists. He was born in Iowa almost one hundred years ago, taken west by his parents and became one of the first naturalists in the far west to connect investigation and commerce. His botanical studies of Utah and the surrounding states made him a correspondent of Gray and his school of botanists. His knowledge relative to plants, minerals, and chemistry brought him into state courts in the litigation between smelteries and land owners. He was a man of strong personality and did not hesitate to express his opinion on any subject whatever. He created many enemies and a host of friends. His publications are rather numerous but are little known.

His enormous herbarium was purchased some twenty years ago by Pomona College, Claremont, California, and he was placed in charge of the same as curator emeritus. In the years that followed he made numerous long trips and secured numerous specimens and new species for the Pomona collection. During his eightieth year incited by the references to things botanical found in the publications of the West Texas Historical and Scientific Society, in the spring of 1930 he made a trip to Texas in a dilapidated automobile. On this trip he made a visit to localities mentioned in the Bulletin to which references have been made, collected the yellow flowered onion and described it as cited. The next spring Jones made another trip into Texas and Mexico and passing through Trans-Pecos Texas collected the onion a second time at Madera Springs. It is to be said in praise of Jones that he was an untiring botanist, collected many years under trying circumstances and left as a memento a magnificent herbarium at Pomona. He was the stormy petrel of Western Botany, always in the rough, and his death was an appropriate end to his tempestuous career. He was killed in an automobile accident while on a collecting trip in 1934.

In the spring of 1936, V. L. Cory and H. B. Parks of the Texas Agricultural Experiment Station made a botanical expedition through Trans-Pecos Texas. The night of April 10 was spent in the club house at Madera Springs (altitude 6400 feet). The weather was extremely dry and cold but early the next morning the entire flats around the lake were golden yellow from the blossoms of *Allium Coryi*, M. E. Jones. Abundant herabarium material was taken as well as bulbs for planting. This expedition worked southwest and *Allium Coryi* was found in the

Glass Mountains, on the mesa at the type locality south of Alpine, and in many places southwest. It was not found however in the Chisos Mountains. In no instance were plants found that showed a red color on the outside of the perianth as stated by Jones.

The bulbs were brought to the Agricultural Research Laboratory at San Antonio and immediately planted. Leaves appeared in June and remained green throughout the summer. In the spring of 1937 on March 25 three bulbs put up stems each of which bore from ten to fifteen of the beautiful golden yellow onion flowers. (Plate 174). The umbels are dense. The flowers open one at a time but the perianths persist giving a bloom of two weeks to the umbel. The seed pods are well formed by the time the perianth seres and capsules dehisce within three weeks. The plant multiplies by offsets as well as by seed. The original plantings have bloomed every spring up to date. The plants that started from one bulb now have from eight to ten and in the spring of 1939 in spite of the fact that it was the driest spring known in the San Antonio area produced many scapes of these beautiful golden flowers. This year in place of one of the scapes to a plant the cluster contained from ten to twelve. This onion has thus proven that it can stand hot dry weather and low elevation as well as a moist cool temperature and a high altitude. The plant gives excellent service as an ornamental. The scapes rise from six to eight inches and bloom through a period of two weeks. The yellow color is very pleasing and the flower is fragrant. The only drawback is the intense onion odor that broken leaves or cut stems emit. From the trial made here this plant is recommended as an ornamental. Due to the fact that no picture of this plant has appeared and that it is believed it will soon occupy a space in all bulb gardens as a new yellow flowered hardy lily the original description and picture are herewith given.

November 28, 1939.

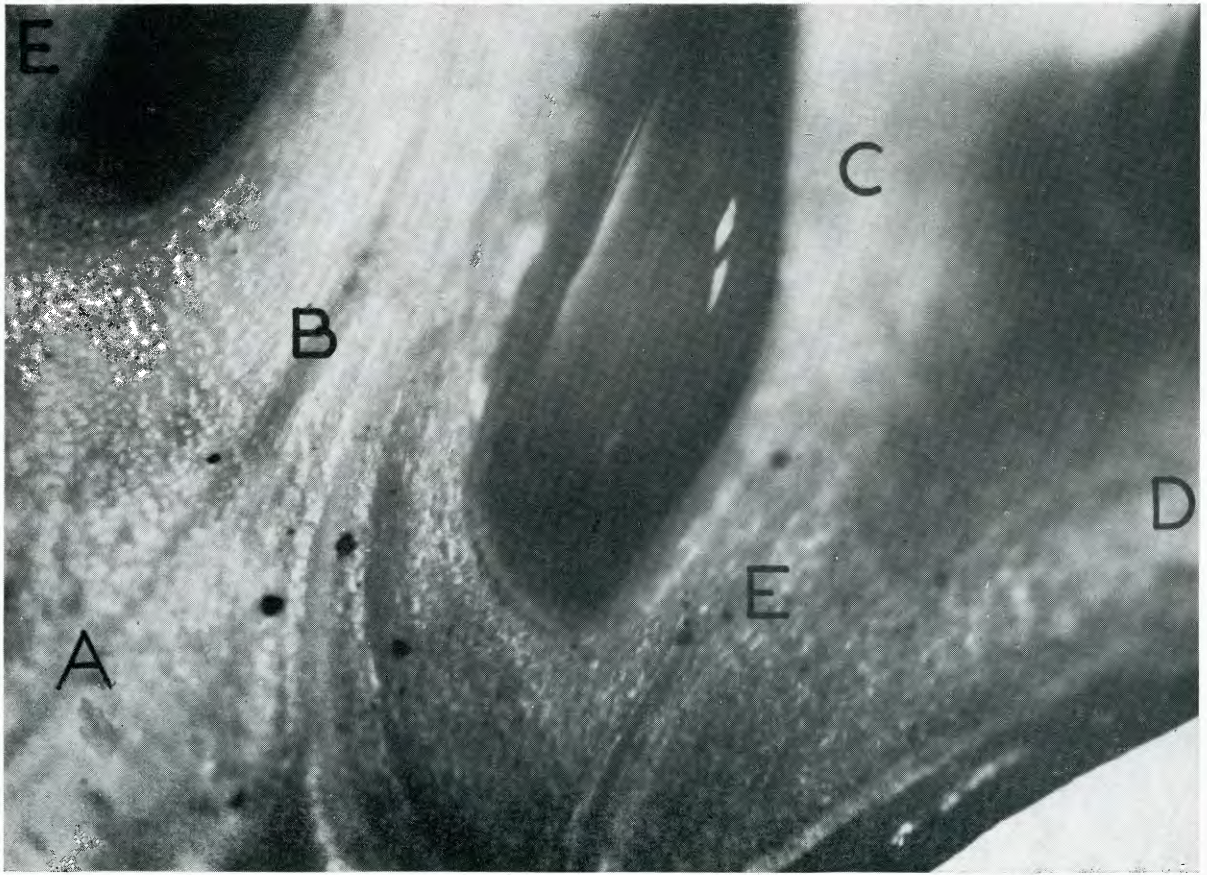
PHYLOGENETIC POSITION OF SPREKELIA

HAMILTON P. TRAUB, *Maryland*

In 1938, bulbs of *Sprekelia formosissima* were collected by Mulford B. Foster, of Orlando, Florida, on one of his plant exploration trips into Mexico. Some of these bulbs were presented to the writer who made a detailed description of the plants when they flowered, and these data are the basis of the present brief note on the probable affinity of this Genus.

Pax and Hoffman[1] have placed *Sprekelia* in the same tribe with *Amaryllis* Linn. (syn. *Hippeastrum* Herb.) where it now appears that it does not happily belong. The members of the Tribe Amarylliseae (syn. Hippeastreae) with two separate spathe valves and with usually more than one flower to the umbel are apparently more primitive, as far as these important characters are concerned, than the members of the Tribe

[1] Pax, F., and Hoffman, K. Amaryllidaceae in Engler & Prantl, Natuerlichen Pflanzenfamilien. Vol. 15a. 2nd. ed. Leipzig. 1930.



R. B. Piper

See page 89

Sprekelia formosissima; photomicrograph showing portion of longitudinal section of flower; Approx. X32. A, apex of ovary; B, base of style; C, base of staminal filament; D, base of perianth-segment; E, tube.

Plate 175

Zephyrantheae with spathe united into a tube for part of its length, and with usually one flower to the umbel. Apparently *Sprekelia* was classified as indicated on account of its superficial resemblance to *Amaryllis Cybister*. Baker,[2] for instance, claims that Amaryllis Cybister connects the Genus *Sprekelia* with the Genus *Amaryllis* Linn. (syn. *Hippeastrum* Herb.), but no reasons are given.

In *Sprekelia,* there is one flower to the umbel, the spathe is united into a tube for part of its length, and it differs from other Zephyrantheae mainly in having zygomorphic or irregular perianth segments. With reference to other taxonomic characters, the descriptions on record state that the stamens are declinate, and that there is no tube. However, the photomicrograph of the longitudinal section of the base of the perianth, Plate 175, shows unmistakably that there is a tube although it is very short, approximately 3 mm. long. The stamens are unequal of four different lengths as shown in Plate 187. Structurally *Sprekelia* may be described as a *Habranthus*[3] with a zygomorphic perianth. With reference to the corona, *Sprekelia* shows slight development, minute scales, as contrasted with *Amaryllis Cybister*, which has a prominent incurved corona. This latter development, together with the zygomorphic segments in *Amaryllis Cybister,* indicates that it is the most highly developed species in the line of evolution represented by Subgenus Omphalissa within the Genus *Amaryllis.*[4]

It appears therefore that one should be careful not to confuse parallel development with close relationship. *Sprekelia* apparently represents the highest development, a climax genus, in the particular line of evolution in the Zephyrantheae rather than an offshoot from *Amaryllis Cybister* to which it has merely a superficial resemblance, the zygomorphic perianth representing only a parallel development.

BODANT HYBRID AMARYLLIS

I was asked some time ago for photographs of some of the amaryllis hybrids that we have raised at Bodant. I had two taken this year with a ruler along side, and I have pleasure in enclosing you copies thereof in case you may think them suitable for publication. I am,

Yours sincerely,
—Aberconway

Bodant, Tal-y-Cafn, N. Wales,
10th. June, 1938.

Editorial Note. The photographs of the Bodant hybrid amaryllis are reproduced in Plate 176. We are grateful to Lord Aberconway for these very interesting illustrations.

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[2] Baker, J. G. Handbook of the Amaryllideae. London. 1888.
[3] Sealy, J. R. Zephyranthes, Pyrolirion, Habranthus and Hippeastrum. Jour. Roy. Hort. Soc. Vol. LXII, Part 5, May 1937; pp. 195-209.
[4] Traub, H. P., and Uphof, J. C. Th. Further revision of the Genus Amaryllis (Linn. ex parte) (Syn. Hippeastrum Herb.). Herbertia 6: 146-154. 1939.

CRINUM FORBESIANUM

Sarah V. Coombs, *New York*

This interesting amaryllid is, so far as I have been able to discover, not in cultivation in the United States. I should be glad to find that I am mistaken and that there may be a chance for some of us to procure fresh seeds so that the handsome flower may be seen and cultivated.

I came upon it in Africa, a patch of bright pink in a wilderness of the gray stones of some old ruins. Zimbabwe in the heart of Southern Rhodesia is a strange place, far from civilization. The ruins which lead travelers to the spot cover a wide hilltop with fortifications and the plain below with the great walls of a temple area, its cone-shaped monument, probably sacred to the Sun God, its wide meeting-places, winding corridors and inner courts. It is a remarkable group of ruins, lying in a valley among hills which are scraped so smooth that they almost shine, suggesting the action of glaciers, though South Africa has had no Ice-age. On the tops of the hills are stone figures, some of which resemble human beings and animals, the shapes the result of erosion. One, which looked like an antediluvian beast or bird, was my guiding mark when I botanized through that wild country, rich in flowers of great interest. After wandering and botanizing for an hour or two through thickets of mimosa and other trees of the "Thorn Bush" type, I would come out into a small clearing and my beast on his hilltop would tell me where I was, a true favor, since getting lost is my easiest game. Each time the creature had a different expression, as seen from different quarters. Sometimes he looked fierce, sometimes he was just non-committal but often he had an odd, sinister grin, so that I came at last to have an almost superstitious feeling about him.

The place was strange, the great ruins unexplained. Even the sunlight, though brilliant, had a metallic quality, green-yellow and hard. Though the buildings have been ascribed to eight different races or nationalities, Persians, Arabians, Phoenicians, Syrians, etc., and each theory has its advocates, I like to hope that the question will never be settled beyond doubt as to the builders of those twenty-foot walls. My beast did finally seem to be telling me that the valley and its ruins should be left to the spirits of the race who did such a marvellous piece of work and that white people with their notions were out of place. The foolish feeling grew on me and truly fascinating as the place was and much as I was excited by it and the wonderful variety of flowers, I was not sorry to go, when the time came. Among the specimens I brought back were those of a small gladiolus which the experts were unable to identify. It was probably a new species. Zimbabwe was queer even to the last for the long night drive to catch a midnight train on the branch railroad was through a wild country which had leopards and lions and other fierce beasts, the only human habitations being a few native kraals.

It was when I was wandering quite alone one day through the ruins outside the temple walls, ruins probably those of the homes of the priests or temple attendants, with few traces of vegetation just there

Lord Aberconway, Bodant, N. Wales See page 89

Hybrid Amaryllis raised at Bodant with ruler along side to indicate size; upper, approx. 7 inches wide; lower, 9 inches wide.
Plate 176

except some tree euphorbias and a few small succulents, that my eye was caught suddenly by a gleam of pink. The flower-cluster was gorgeous, 20-30 great trumpet-shaped flowers and buds, 7-8 inches long, pink with a broad crimson line down the outside of the segments and with long prominent stamens. The scape was short, stout, less than a foot long. The leaves had not developed. The spathe-valves were triangular, red-tinted, 3-4 inches long. Both the Flora Capensis and Lt. Col. Grey speak of the flower as white with a crimson streak, but my impression of the flower and the description I wrote at the time was of a pink flower and I have the same impression of ones which I saw growing in the Botanical Garden at Kirstenbosch, later.* There may be variations in color, or those I saw, if white in background, were heavily overlaid with pink or crimson.

I resolved to have some of the bulbs so when I went back to the small hotel where I was the only guest, I asked the proprietor if he could find some for me. He assented and sent two of the native boys to dig some of the "pink lilies" for me. I was leaving that night and was traveling with suitcases, cameras, herbarium specimens, a large roll with plants, a typewriter, etc., and though I looked when en route rather like the natives who carry their bedding when they travel, I was ready for any adventure but I admit that when I saw the bulbs, my heart misgave me. There were four of them and they were as big as my head! I knew there would be in that wild place neither paper nor box. However, I knew also that I would take them if I had to tie them with cord and hang them around my neck so it was just a question of finding the best way.

At that moment, as I was gazing at them, the man spoke up: "I have just remembered", he said, "you can't take any plant out of Southern Rhodesia, because we have a quarantine for foot and mouth disease" and alas! it was so. At that particular time, the quarantine was very strict and I had to leave my lovely "pink lilies" behind. I tried in every way later, in Johannesburg and Cape Town to have the rule lifted so that I could send for them but to no avail. Even to have them sent O.H.M.S. (On His Majesty's Service) to the Botanical Garden at Kirstenbosch and share them was not possible so they are still in Southern Rhodesia and I hope they were replanted as was promised. I received some seeds from Kirstenbosch later but they did not sprout. I shall always regret that I had to leave the splendid bulbs behind.

CRINUM ERYTHROPHYLLUM

WYNDHAM HAYWARD, *Florida*

Crinum erythrophyllum, Carey, is the name of the species which is the subject of this note. This species is recorded by William Herbert on Page 258 of his Amaryllidaceae, 1837, and the reference given is as follows: "Bot. Mag. 47.2121. p. 7. Ex Rangoon, foliis saturate sanguineis. Dr. Carey lost this remarkable plant without having seen its

* See Plate 53, Herbertia, Vol. 4. 1937.

R. B. Piper

See page 95

Amaryllis procera; plant that bloomed at Orlando, Fla.

Plate 177

flower, and vainly attempted to obtain it and Macrocarpon again. There is no doubt of its being a distinct species, but I cannot tell what are its affinities. Leaves as red as those of a red cabbage.'' J. G. Baker disregards this species entirely in his treatment of the Crinums in his Handbook of the Amaryllideae, 1888.

In 1934 the writer obtained a shipment of mixed *Crinum* bulbs from the nursery firm of Hla Maung Bros., Rangoon, Burma, several hundred bulbs in all. Of these, more than 100 proved to be the red leaved *Crinum* recorded by Carey and Herbert, but otherwise unknown so far as ascertained by the writer.

Several of these bulbs bloomed in the summer of 1935, but they proved to be a difficult subject, as Carey experienced in the first place, according to the Herbert quotation. Instead of establishing themselves they grew smaller and smaller, and in four years time, not a single bulb survives at Lakemont Gardens. However, specimens were sent to the New York Botanical Garden,* Maj. Albert Pam,* Wormley Bury, Herts., England and to the late Al. G. Ulrich, St. Louis, Mo., so it is hoped that it may still be in cultivation with them.

The bulbs of *Crinum erythrophyllum* had short, curling, sprawly leaves, not over a foot long and an inch to two inches broad and narrowing to a point. The bulbs were small, to 2½ or 3 inches in diameter. The foliage was wine colored in full light. The flowers were on a slender scape, about pencil size, under a foot in height, with three or four white flowers, having long (3 to 4 inches) linear-lanceolate petals, much like *Crinum pratense* and varieties.

SPATHES OF AMARYLLIS PROCERA

HAMILTON P. TRAUB, *Florida*

In 1938, Mr. E. J. Anderson of Palm Beach, Florida, presented to the Society two bulbs of the Blue Amaryllis, *Amaryllis procera*, from a lot that he had imported from Brazil (See Plate 190). We had attempted to grow this species before and apparently we made every possible cultural mistake. After some complete failures, it was noticed that plants given partial shade began to thrive and grew intermittently throughout the year in the open in Florida. Finally the plants in partial shade were placed under a frame covered with window-screen to keep out the Lubber grasshoppers. They continued to grow on satisfactorily. From these experiences we concluded that this species should be given partial shade.

When the bulbs from Mr. Anderson arrived, we were prepared. They were planted in a large clay pot in a soil mixture of ½ granulated peat, ¼ sharp sand, and ¼ compost. To this mixture a few handfuls of coarsely ground charcoal and oyster shell were added. The plants were placed in a cool greenhouse with all glass painted with whiting except the north side so that they received no direct sunlight. Under

* Will those who have received these bulbs please report. Photographs of the plant in flower are wanted for Herbertia. —Ed.

these conditions, the plants thrived and pleasantly surprised us in early April when one of the bulbs flowered as shown in Plate 177. The plants were then placed in the Orchid House at the Mead Botanical Garden, Orlando-Winter Park, where the public had the opportunity of viewing it.

Fig. 51. Amaryllis procera; portion of specimen (Traub No. 119) showing four spathes—two large and two smaller.

It was noticed at once that there were more than two spathes—two larger and two smaller—as shown in Fig. 51. Apparently the description of the Genus *Amaryllis* (Sealy, J. R., Jour. Roy. Hort. Soc. Vol. LXII: 195-209. 1937) must be amended in this particular if this species

is to be accomodated. It would be worth while to re-examine the other species of *Amaryllis* from the standpoint of the number of spathe valves. I have a vague memory of seeing some hybrid amaryllis with more than two spathes, and it may well be that some of the other species from which they were derived may show similar variation.

Even if this character could be established as distinctive for this species, it would not be of sufficient weight to warrant the elevation of the Subgenus Worsleya to the rank of a genus. However, if such a character were distinctive and were reinforced by differences in seed character, seed maturation time, and leaf shape, the sum total might be sufficient to establish a new genus. However, for the present no change is proposed in order that the whole Genus *Amaryllis* may be studied further before making a final decision.

AMARYLLIS BLUMENAVIA

Hamilton P. Traub, *Florida*

We are indebted to the Division of Plant Exploration and Introduction, Bureau of Plant Industry, U. S. Department of Agriculture, for a number of fine amaryllids. A few years ago, the Society received, among others, bulbs labeled P. I. 118814, *Hippeastrum breviflorum*, from Mr. Morrison for the trial collection. In 1940, this introduction flowered in Florida, Plate 178, and this event is the subject of this brief note.

The plant, Plate 178, corresponds fairly well with Sealy's description of *Amaryllis blumenavia,* including the seed character, (Curtis's Bot. Mag. tab. 9504. 1937; Herbertia 6:153-154. 1939), except in the shape of the bulb and leaf, and the relative freedom of the spathe valves. A summary of these differences is presented in the following table:

Character	*Amaryllis Blumenavia*	*P. I. 118814*
Bulb	globose	subglobose
Leaf shape	petioled	lanceolate
Freedom of spathes	split to base	not split entirely to base

Although the differences are somewhat marked in the characters cited above, it appears that this plant represents merely a variety of *Amaryllis Blumenavia.* Numerous species have been described in Amaryllidaceae on the basis of lesser differences than these, but this should be discouraged in the future. It is to be hoped that the time will come when such variations as these will be considered as showing evolutionary tendencies within the species rather than well established self perpetuating groups entitled to specific rank.

R. B. Piper

See page 96

Amaryllis Blumenavia

Plate 178

OFFICIAL DATA CARD FOR HEMEROCALLIS *

J. Marion Shull, *Maryland*

Interest in the Daylily, or *Hemerocallis,* has grown by leaps and bounds in recent years and is still growing. The number of breeders now working with this interesting material have so multiplied their numbers and so extended the variation of color and form and habit of growth that ordinary methods of description have broken down, are no longer adequate to provide the desired means of comparison or differentiation.

This happens in any plant group under similar circumstances, and the daylily has now reached that stage where some uniform scheme of registry and description is necessary if useless and confusing duplications are to be avoided.

Already the leading commercial catalogs dealing with *Hemerocallis* present many descriptions that do not sufficiently differentiate. Sometimes the same clone will be described on the basis of different salient features, or again two distinct clones may be described only to the extent of features in which they are similar and the reader is correspondingly confused or left unenlightened.

The data card here presented is designed to provide quick and accurate reporting of all clones on a basis that will permit instant close comparison one with another. To use the card it is only necessary to underscore the appropriate descriptive word, or if it is desired to indicate a position intermediate between them the underscore simply passes from one to the other. By this means a highly accurate description is available for quick reference. Where added information seems desirable it can be covered in the ample space left for remarks. To show how simply and accurately the Data Card operates, and to introduce its use to those working with *Hemerocallis,* Dr. Traub has kindly contributed one with nearly complete marking descriptive of his variety, *La Tulipe.* This is reproduced herewith as an illustration (Plate 179).

This data card is reasonably self explaining but what follows may help to secure a uniform and unhesitating interpretation. Name of clone is placed in upper left corner of the card, on both sides to serve as a guide for alphabetic filing and easy reference.

Under "growth" the plant as a whole in its vegetative performance is described. Weak growers will only seldom be listed, for unless some extreme merit of flower, blooming season, or what not, justifies perpetuation such weak growers should never be retained. "Habit" deals with the making of long or short rhizomes or runners, the former resulting in such aggressive spreading as shown in *Europa* and *Margaret Perry,*

* The data card for daylilies here represented, prepared by J. Marion Shull, a member of the Daylily Committee, was officially adopted by the Board of Directors of the Society in 1940. This data card fills a long felt want, and Mr. Shull is to be congratulated on his excellent job. It is recommended that such a card properly filled out accompany each new request for registration, and that it be used to describe clones generally so that all descriptive work will be on a comparative basis.—Ed.

AMERICAN AMARYLLIS SOCIETY OFFICIAL DATA CARD—HEMEROCALLIS

NAME La Tulipe WHERE GROWN Orlando, Fla.

ORIGINATOR H. P. Traub INTRODUCER same YEAR 1939

PARENTAGE secured by using mixture of 25 or more pollens.

GROWTH—Weak, moderate, vigorous. Habit: spreading, compact. Roots: fleshy, slender, cylindrical, fibrous; long, short. Rate of increase: slow, rapid. Height of foliage mass 1½ ft.
FOLIAGE—Erect, arching, recumbent; slender, broad; yellow-green, blue-green; evergreen, deciduous.
SCAPE—Erect, drooping; slender, heavy, graceful, stiff. Branches: none, few, many compound.
Height 2½ ft. No. of buds 6-8 Season: early, medium, late. Bloom periods 2
Date 1st bloom mid Apr., last Late June.
FLOWER (as a whole)— Large, medium, small. Single, double. Front view: spidery, star-like, full.
Side view: funnel, wide spread, recurved; regular, irregular, bizarre. Blooming: day, night, extended.
Diameter as naturally standing 3" in. Fragrance: wanting, pronounced; pleasant, unpleasant.
Carriage: vertical, horizontal. Fading, sun resistant. Quick shedding, persistent.
*COLOR—Self, bicolor, polychrome, blend. Color effect in mass Dark Cardinal 6-L-8
Segments: Petals _____ in. long; _____ in. wide. Color "
Sepals _____ in. long; _____ in. wide. Color lighter Dark Cardinal
Color of throat Sulfur Yellow Color of eye zone scarcely perceptible
REMARKS † Flower wide shaped, and longer than wide;
Size of segments not determined as yet
SUBSTANCE—Thin, medium, heavy. TEXTURE—Smooth, crinkled, spangled.
CHIEF MERITS OR OUTSTANDING QUALITIES. Color & with distinct growth habit & flower shape (OVER)

NAME La Tulipe AWARDS 1st. Class certificate A.A.S. 1940

REMARKS IN GENERAL:
Beautiful and outstanding, but is most important for further breeding work;
Fades somewhat in late afternoon in full sun and should be given partial shade for best results.

* Refer to A Dictionary of Color by A. Maerz and M. R. Paul or to Royal Horticultural Society Colour Chart, when possible.

NAME OF PERSON REPORTING H. P. Traub

DATE 11-15-40 ADDRESS U.S. Hort. Sta., Beltsville, Md.

For full description of card read article by J. Marion Shull in 1940 Herbertia. Fill in blank spaces and underline words which describe daylily named. Please give FULL INFORMATION. Return completed card for registration to ELMER A. CLAAR, Chm. Daylily Comm., 1301 Chestnut Ave., Wilmette, Illinois. (OVER)

Official Data Card for Hemerocallis, actual size 3 inches by 5 inches, showing front and reverse sides; filled out for the clone, **La Tulipe.** This shows how simply and completely the description can be made despite the small space allotted. Note under "Foliage" how a medium or intermediate width of leaf is indicated; and again under "Flower," the intermediate condition as to sun resistance, which is further re-enforced under "Remarks in General."

The data were taken from a garden diary, and the card is not completely filled out, lacking the length and breadth measurements of flower segments. Nor is the seed parent indicated under "Parentage." In this case the fact is unknown.

Plate 179.

a trait that makes these and similar clones undesirable in the intimate garden, but great for broad landscaping, whereas those with short rhizomes form compact clumps that may remain many years with very slight encroachment on neighboring garden freeholders. Root characters are of less immediate importance in the garden but may help in identification of clones.

"Rate of increase", the rate of multiplication of new fans, varies no doubt partly with soils and climatic conditions but it is also a matter of hereditary difference. With me *George Yeld* is very slow of increase and *Mikado* quite the reverse.

Height of foliage mass does not refer to length of leaves but to the naturally standing mass which is of importance in landscape effect. Foliage may stand stiff and erect or may arch over gracefully, or it may actually sprawl, and these attitudes, with the difference in normal color from yellow- to blue-green are of significance in the garden plan. Some remain with reduced but still green foliage throughout the winter and so are characterized as evergreen whereas clones like *H. Middendorffii* disappear entirely even by late summer and have earned the descriptive term "deciduous".

There is great variation in the scape or flowering stem. Of course all will lean over away from nearby shade and toward the light but even in the open some will arch over instead of standing erect, even to the extreme of sprawling indicated by "recumbent". Some stems are slender and wiry, others thick, and either may be stiff or graceful in carriage. Branching may go all the way from capitate (wanting) as in *H. Middendorffii*, to compound as in *Queen Mary* and the multifloras. Compound branching is a prime quality for on this depends the number of blooms that may be out at one time as well as the total number of flowers per scape. Number of buds (flowers) will naturally be set at the maximum by the person reporting and this is all right except that stems obviously abnormal, such as may sometimes result from fasciation or possibly from frost injury, should not be made the basis of bud count.

In the lower south some clones bloom repeatedly and even in more northern latitudes some at least occasionally bloom a second time, so provision is made for noting this feature under "blooming periods", but this is not to be confused with date of first and last bloom in locality where reported.

It is not possible to cover every variation of flower character but the principal characteristics are here included. By "spidery" is meant a flower whose segments are long and strap-like. With somewhat wider and pointed segments the flower becomes "star-like", while the term "full" has long been in use for flowers with broad or decidedly overlapping segments. This description is further augmented under petals and sepals where provision is made for actual measurement of length and width.

The "side view" is more variable but several main attitudes are provided for on the way from a narrowly open *Cissy Giusseppe* to the wide-spread and recurved *Shirley*. Aside from the general aspect there

may be great irregularity of carriage owing variously to a long thrust-out lower segment, an unusual angle of flower face, the twisting or curling of segments, or something of a hose-in-hose effect where petals and sepals bend back at different levels. Clones like *Ophir* and *Sir Michael Foster* are quite regular but *Wau-bun* and others may be designated as "irregular" or even "bizarre" with added mention under "remarks" when desirable.

Under "blooming" reference is had to the time of day during which flowers are effective. Day bloomers are those that open in the morning and close by evening or night and include the great bulk of effective garden varieties. Even among these there is considerable variation. *Europa* is a sleepy-head, not well open till around nine o'clock, and retires fairly early in the evening. Many others open during the night, greet the break of day fully out, and remain in full display till after dusk. Others like *Calypso* open in the afternoon or evening and remain till ten o'clock or noon of the following day, dependent somewhat on light and temperature. These are the most useful of the night bloomers. An occasional night bloomer operates only at night and over a short period, not open until dusk and gone before morning, and are only useful for gardens enjoyed at night or for cut flowers at night, when most daylilies are a dead loss. For those few whose periods extend twenty-four hours or more the term "extended" is used.

"Carriage" covers flower position relative to the stem and is almost though not quite as varied as in the true lilies.

Many daylilies bleach or fade in hot bright sunshine. Lemon yellow may bleach to near white by midafternoon—but that does not warrant describing them as "white" daylilies. Darker colors are more likely to suffer because they absorb more heat than do lighter colors. These are apt to fade to more nearly the color of manilla wrapping paper. In a few cases the so-called "pink" daylilies become more nearly pink in late afternoon than in the morning—may in rare instances be a lovelier color than before fading. Others both dark and light remain practically unaffected by the sun. A clone need not be discarded because it lacks resistance to strong sunshine but this weakness needs to be known and the variety given a position in whole or at least partial shade.

After blooming, those clones are most useful that drop their spent flowers quickly so provision is made for recording desirable quick shedding or indicating the persistence of spent flowers which gives a messy, unclean appearance unless deliberate care is taken to remove them day by day.

Under "Color" four general types are recognized; the selfs in which there is no marked variation from one color throughout the segments. Clones like *Hyperion, Goldeni, Ophir,* are typical selfs, the greenish tone at throat not voiding the term. "Bicolor" best applies to those wherein the color of petal segments is notably different from that of the sepals. With several distinct colors prominent in the same flower the term "polychrome" is correct. "Blend", on the other hand is not so definite. It can only mean a more or less actual blending of such

colors as occur habitually in daylilies, where the colors do not stand out clearly against each other or in definite patterns. It can not be specific as in Iris where "blend" means the combining of yellow with anthocyanin purples. Still it will be a useful descriptive term in certain cases. Special pattern or peculiarities of color arrangement must be left for inclusion under "remarks".

When possible the color of petals and sepals should be recorded in terms of a standard color nomenclature,* but aside from these more minute details a given variety will possess a mass color value, as lemon yellow, golden, orange, brown, etc., in garden effect, and for this reason a place is provided for recording this broader statement of color. A *Mikado,* despite its striking petal spots, may still classify as yellow in mass.

In some varieties the throat color is quite distinct and in many there is a heightening of color on petals just beyond the throat producing a roughly circular or triangular eye effect that has come to be known as the "eye-zone". It may be so faint as to be scarcely distinguishable or it may be very pronounced. It may be an enhancement or a detraction but in either case it provides a useful mark of varietal differentiation and when distinctive needs to be included in the description.

Substance and texture may seem of minor importance in a flower that lasts but a day. However, texture, the peculiar variations of flower surfaces, may be of considerable value at close range, where the spangled or gold dust effect, or a pattern of intricate crinkling may be fully appreciated.

The card still leaves some voids, such as the occasional distinctive midrib, the color of unopened buds, or the differing color of the outer surfaces of segments, but these rarer items can be best be taken care of under "remarks".

For the sake of future development it would be desirable to have all older clones subjected to the uniform description made possible by this data card at as early a date as possible, and then it might be well to stipulate that a properly scored card be filed with each new request for registration.

DAYLILIES RATED FOR GARDEN VALUE, SEASON 1939

GEORGE DEWITT KELSO, *Rhode Island*

[After making a particularly brave fight over an extended period, Mr. George DeWitt Kelso passed away on February 8, 1940. Before his death, he completed with great effort the following Daylily Report for 1939. Much credit is due him on account of his will power for he could often work only a few minutes at a time. All who knew him feel a great personal loss in the passing of this fine personality who radiated friendship, and never lost his youthful enthusiasm. Mr. Kelso's passing means a great loss from the standpoint of the advancement of *Hemerocallis.*

* "A Dictionary of Color" by A. Maerz and M. R. Paul; or the "Royal Horticultural Society Colour Chart."

He not only *pioneered* in making the first attempts in evaluating daylilies, but also kept up an unflagging interest in this field as indicated in this the fourth symposium rating of daylilies.—Harold S. Tiffany, Waltham, Mass., March 1, 1940.]

The numerical values assigned to the letters indicated in the tables presented are as follows: A=9.5 (Excellent); B=8.5 (Good); C=7.5 (Fair); and D=6.5 (Discard). Forty growers participated in the symposium, and 248 clones were rated—124 clones in commerce for a number of years, and 124 clones, mostly recently introduced clones, written in by voters.

TABLE 1. Rating of daylilies for garden value; comparison of ratings of the first ten standard clones for the past four years. Prepared by George DeWitt Kelso, Providence, R. I.

1939—124 clones; 40 persons participating

	Rating	Votes A	B	C	D
*1. Mikado (Stout)	9.39	33	4		
*2. Hyperion (Mead)	9.36	31	5		
3. Patricia (Stout)	9.34	23	2	1	
4. Bagdad (Stout)	9.21	22	7	1	
5. Rajah (Stout)	9.21	16	4	1	
*6. Ophir (Farr)	9.20	27	9		
7. Anna Betscher (Betscher)	9.20	21	9		
*8. George Yeld (Perry)	9.16	23	5	1	1
*9. Wau-Bun (Stout)	9.08	22	11		
10. Maculata	9.08	11	12		

1938—321 clones; 25 persons participating

*1. Mikado (Stout)	9.45	20	1		
2. Patricia (Stout)	9.37	15		1	
*3. Hyperion (Mead)	9.33	20	4		
*4. Ophir (Farr)	9.32	16	6		
5. Anna Betscher (Betscher)	9.21	15	6		
6. Golden Dream (Betscher)	9.13	12	7		
*7. Wau-Bun (Stout)	9.13	12	7		
*8. George Yeld (Perry)	9.13	14	4		
9. Bagdad (Stout)	9.10	10	4	1	
10. Sunny West (Sass)	9.07	11	1	1	1

1937—163 clones; 8 persons participating

1. Bijou (Stout)	9.5	4			
*2. Mikado (Stout)	9.5	6	1		
*3. Ophir (Farr)	9.1	6	1	1	
4. Pale Moon (Cleveland)	8.9	3	1	1	

*5. George Yeld (Perry)	8.8	5	2		1
6. Cressida (Betscher)	8.7	4	2	2	
*7. Wau-Bun (Stout)	8.6	1	5		
*8. Hyperion (Mead)	8.6	5	2		
9. Golden Dream (Betscher)	8.6	3	2	2	
10. Mrs. A. H. Austin (Betscher)	8.6	4	1	3	

1936—21 clones; 9 persons participating

*1. Mikado (Stout)	9.4	7	1		
*2. Hyperion (Mead)	9.4	7	1		
*3. Ophir (Farr)	9.3	6	1		
4. Golden Dream (Betscher)	9.3	6	1		
*5. George Yeld (Perry)	9.1	5	1	1	
6. Goldeni (Betscher)	9.0	4	1	1	
*7. Wau-Bun (Stout)	8.9	5	3	1	
8. Cressida (Betscher)	8.9	4	2	1	
9. Radiant (Yeld)	8.7	2	2	1	
10. Soudan (Stout)	8.5	1	4	1	

TABLE 2. Evaluation of 124 standard daylily clones; sponsored by Roger Williams Park, Providence, Rhode Island, and Waltham Field Station, Massachusetts State College, Waltham, Mass.; Compiled by George DeWitt Kelso, 100 Fountain Street, Providence, R. I.; 40 growers participated; season 1939.

Clone	Total Vote	Rating	Votes A	B	C	D
A. E. Kunderd	6	7.5	1	1	1	3
Ajax	17	8.44	5	9		3
Amaryllis	24	8.62	8	13	1	2
Anna Betscher	30	9.20	21	9		
Apricot	24	9.04	13	11		
H. Aurantiaca	13	8.27	3	7		3
Aurantiaca major	11	8.50	4	5		2
Aureole	20	8.40	4	13		3
Bagdad	30	9.21	22	7	1	
Bardeley	17	7.73	2	7	1	7
Bay State	23	8.41	7	11	1	4
Beacon	6	8.66	3	2		1
Bijou	27	9.05	16	10	1	
Burbank	9	7.83	1	4	1	3
Byng of Vimy	17	8.55	8	5	1	3

* Clones starred in this table appear among the first 10 in all four years.

Clone	Total Votes	Rating	Votes A	B	C	D
Calypso	26	8.57	12	8	2	4
Chengtu	20	8.45	6	8	5	1
Chrome Orange	10	9.10	8	1		1
Cinnabar	33	8.83	11	22		
Circe	12	8.58	6	2	3	1
Cressida	29	8.77	14	12		3
Crown of Gold	7	8.50	2	4		1
Curlypate	10	7.90	1	5	1	3
Dauntless	19	8.92	12	3	1	2
Dawn	21	7.78	2	9	3	7
Dazzler	9	8.61	3	5		1
D. D. Wyman	28	8.35	13	11	1	3
Dover	18	8.22	6	6	1	5
E. A. Bowles	15	8.30	5	5	2	3
Earliana	11	8.68	5	3	3	
Emily Hume	12	8.41	6	2	1	3
Estmere	21	8.26	3	14		4
Flamid	13	7.80	1	7		5
H. Flava	27	88.61	9	15		3
Flavina	8	8.62	5	1		2
H. Flore pleno	13	8.19	1	9	1	2
H. Fulva Europa	15	8.36	2	11		2
H. Fulva Jap	3	8.50	2			1
H. Fulva Chinese	4	9.22	3	1		
H. Fulva maculata	23	9.02	11	12		
H. Fulva Rosea	20	8.70	15	4	1	
Gaiety	10	9.30	9		1	
George Yeld	30	9.16	23	5	1	1
Gloaming	8	8.62	5		2	1
Gloriana	10	8.30	3	2	5	
Gold Dust	28	8.25	3	20		5
Gold Imperial	16	8.81	9	5		2
Golden Bell	15	8.50	3	10	1	1
Golden Dream	24	8.95	15	7		2
Golden Empress	7	7.78		3	3	1
Golden West	14	9.42	13	1		
Goldeni	26	8.53	6	20		
H. Gracilis	19	7.81	2	8	3	6
Gypsy, fulvous	18	7.38	4	7		7
Highboy	13	8.11	3	5	2	3
Hyperion	36	9.36	31	5		

Clone	Total Votes	Rating	Votes A	B	C	D
Imperator	23	8.71	9	12		2
Iris Perry	21	8.78	8	12		1
J. A. Crawford	29	8.64	13	13		3
James R. Mann	21	8.26	6	9	2	4
J. S. Gaynor	13	9.03	9	3		1
H. Kwanso	21	8.16	3	13		5
Kwanso var. fol.	13	8.34	3	7	1	2
Lady F. Hesketh	23	8.45	10	7	1	5
Lemona	26	8.26	11	7		8
Lemon King	19	7.86	2	10		7
Linda	19	8.81	11	4	3	1
Lovett's Lemon	10	8.30	2	6		2
Lovett's Orange	7	7.07		2		5
Marcus Perry	11	8.86	7	2	1	1
Margaret Perry	30	8.53	9	17		4
Mary Florence	15	8.43	6	4	3	2
Mary Stoker	10	8.40	3	5		2
May Sadlier	10	8.30	3	4	1	2
Midas	25	8.22	6	11	3	5
H. Middendorffii	17	7.85	2	8	1	6
Mikado	37	9.39	33	4		
H. Minor	16	8.37	5	7	1	3
Miranda	5	8.90	2	3		
Modesty	24	8.43	14	7		3
Mrs. A. H. Austin	26	8.52	14	10		2
Mrs. C. L. Leith	8	8.37	4		3	1
Mrs. J. R. Mann	11	7.77	2	4		5
Mrs. Perry	12	8.41	7	1		4
Mrs. W. H. Wyman	28	8.75	13	12		3
H. Multiflora	13	8.27	6	2	2	3
Nocerensis	10	7.90	2	4		4
Ophir	35	9.20	27	9		
Orangeman	16	7.87	2	8		6
Pale Moon	16	8.62	8	4	2	2
Parthenope	9	8.05	2	4		3
Patricia	26	9.34	23	2	1	
Pollyanna	7	8.07		3	2	2
Queen Mary	14	8.64	6	5	2	1
Queen of May	21	8.92	9	12		

Radiant	26	8.42	9	11	1	5
Rajah	21	9.21	16	4	1	
Royal	21	8.11	4	11		6
Semperflorens	7	8.50	3	2	1	1
Serenade	21	8.73	11	6	2	2
Shirley	13	8.57	7	3		3
H. Sieboldi	8	7.50		4		4
Sirius	17	8.61	9	4	1	3
Sir M. Foster	30	8.20	10	11		9
Sonny	19	8.97	12	5	1	1
Soudan	29	8.97	17	10	1	1
Sovereign	22	8.04	4	11		7
Stalwart	10	8.50	4	3	2	1
Star of Gold	9	8.38	4	2	1	2
Summer Multiflora Hybrids	17	7.91	5	2	5	5
Sungold	10	8.20	3	3	2	2
Sunkist	13	7.57		6	2	5
Sunny West	23	8.89	14	6	1	2
Tangerine	13	8.73	5	7		1
The Gem	24	8.29	3	16		5
Thelma Perry	10	7.40		3	3	4
Vesta	27	8.87	10	17		
Viscountess Byng	21	7.50	1	8	4	8
Vulcan	14	8.78	9	1	3	1
Wau-Bun	33	9.08	22	11		
Winsome	25	8.78	10	12	1	2
Wolof	16	8.81	10	2	3	1
Woodlot Gold	12	7.91	1	7		4
Yellow Hammer	7	8.35	1	5		1

TABLE 3. Evaluation of 124 daylily clones written in by voters, season 1939; Those marked (*) have already appeared on the discard list. Sponsorship as indicated in Table 1.

	Votes					Votes			
Clone	A	B	C	D	Clone	A	B	C	D
Afterglow			1		Baroni*	1		1	
Alba Straita				1	Beauty of Kent	1			
Aloma	1				Beloit		2		
Amber			1		Berenice	1			
Audrey Blaser	1				Betty	1			
Aurelia	1				Bold Courtiere	1			
Autumn Haze			1		Boutonniere	4		1	
					Brownie	1			

Clone	A	B	C	D
		Votes		
Carnival	1			
Charmaine	1			
Cecil Houdyshel	1			
Ceres			1	
Chisca			1	
Chrysolora	1			
Cissie Guiseppe*	1			1
Craemore Henna	1			
Craemore Ruby	1			
Crepe				1
Dainty	1			
Dorothy McDade	2			
Dr. Hughes	1			
Dr. Regel*	2			
Dr. Stout	1			
Duchess of Windsor	1			
Elizabeth Pike			1	
Enchantress	2			
Erica	1	1		
Estelle Friend	1			
Fisher Variegated	1			
H. Flava major*				1
Florham*	2			
Framingham			1	
Fred Howard	1			
Fulva Rosea Pastel	1			
Fulvola	2			
Giant Orange	1			
Gladys Perry				1
Glow			1	
Glowing		1		
Golden Byng of Vimy	1			
Golden Fulva		1		
Golden Glow	1			
Gold Standard*				1
H. Graminea			1	1
Hankow	2	1		
Hannah Dustin	1			
Harvest Moon*	1			
Helen Campbell			1	
John Greenleaf Whittier	1			
Jubilee	1			
Judge Orr	1			
June Boissiere	1			
Kwanso Virginica	1	1		
Lady Londonderry			1	
Lady Marie Stewart			1	
La Tulipe	1			
Large Gold	1			
Lemon Queen		2		
Luteola*				1
Luteola major*		1		
Mabel Hibberson			1	
Majestic	2			
Mandarin*		1		
Mangol	1			
Marigold		1		
Mayor Starzynski	1			
Mildred Crpet	1			
Mona			1	
Moonbeam	1			
Moonstone			1	2
Mrs. John J. Tiggert	1			
Mrs. Vieusseau	1			
Mada	1			
Ochroleuca*	1	1		
Omphale	1			
Orange Vase	1		1	
Oriole				1
Pandora	1			
Peach Blow		1		1
Peony Red	1			
Perry's Pigmy			1	
Persian Princess				1
Petra	1			
Pink Lass		1		
Pink Lustre	1	1		
Pride of Merrimac	1			
Princess	2			
Princess Elizabeth	1			

Clone	Votes A	B	C	D
Ralph Schrieve	1			
Rayon d'Or	1			
Reba Cooper	1			
Reggie Perry	1	1		
Rhodes	1			
R. I. Lemon	1			
Robin Redbreast	2			
Rose Queen			2	
Russell Wolfe	1			
Saturn	2			
Sharon			1	
Shekinah	1	1		
Sir Chandra			1	
Sir William	1			
Springtime			1	
Starlight			2	

Clone	Votes A	B	C	D
Summer Eve		1	1	
Sunburst			1	
Sunset*			2	
Taplow Orange			1	
Taruga	2			
Theron	1			
H. Thunbergii*	1			2
Victory Taierhchwang	1			
Warren T. Hutchins	1			
Wekiwa	1			
Woodridge	1			
Winnie Nightingale	2	2	1	
Yellow Wonder			1	

TABLE 4. List of 17 best clones for 1939, and list of 24 clones to be discarded.

List of 17 clones scoring 9.00 or better

Mikado	(9.39)	Ophir	(9.20)	Apricot	(9.04)
Hyperion	(9.36)	Anna Betscher	(9.20)	Bijou	(9.05)
Patricia	(9.34)	Geo. Yeld	(9.16)	Chrome Orange	(9.10)
Bagdad	(9.21)	Wau-Bun	(9.08)	Gaiety	(9.30)
Rajah	(9.21)	Maculata	(9.02)	Golden West	(9.42)
				J. S. Gaynor	(9.03)
				Fulva Chinese	(9.22)

List of 24 clones receiving 5 or more discard votes

Bardeley
Dawn
Dover
Flamid
Gold Dust
H. Gracilis
Gypsy
H. Kwanso
Lady F. Hesketh
Lemona
Lemon King
Lovett Orange
Midas
Mrs. J. R. Mann
Orangeman
Radiant
Royal
Sir M. Foster
Sovereign
Summer Multiflora Hybrids
Sunkist
Viscountess Byng
The Gem
Middendorffii

DAYLILY MUSINGS AND 1940 EXPERIMENTAL DAYLILY POLL

ELMER A. CLAAR, *Illinois*

[Editorial Note.—The energetic Chairman of the Daylily Committee presents here some stimulating thoughts on the present status of the daylily, and these will be much appreciated by all members, especially the recommendation that daylily clones be evaluated by a competent group of judges, and that the work of the judges be checked by a symposium rating of the members on a regional basis. When one considers the present status of the daylily such recommendations are exceedingly valuable. His other suggestions are also worth considering seriously by all interested in the daylily.

Pending the appointment of the other members of the Committee, and the taking of a comprehensive official poll, the Chairman has undertaken an interesting experimental poll, following in some particulars, the earlier work of the late George DeWitt Kelso. He has grouped the clones into three classes, and those introduced more than three years ago are the subject of the experimental poll. The classification of the clones under color classes in Table 1, clones introduced from 1937 to 1940, is of course tentative, and the Chairman welcomes suggestions as to any desirable changes. Such a classification is very valuable and it is hoped that all will help to perfect this one, and also similar ones to be made in the future.

The Chairman of the Daylily Committee is to be highly commended for his accomplishments during his first year in office. —*Ed.*]

DAYLILY MUSINGS

Impressions that I have concerning the daylily situation at the present time are presented as follows.

Interest in daylilies has been growing by leaps and bounds, yet the daylily still means either a yellow or an orange flower to most people. More and more hybridizers are becoming interested in daylilies and it is hoped that the day is not far distant when pink, red, raspberry, rose, ivory, purple, bicolor and polychrome daylilies will be widely distributed. However, these newer hybrids are not widely distributed and even very few gardeners have ever seen some of the newer colors in daylilies.

Daylilies are slow propagators and it is well to remember that they have not been propagated very long; the oldest hybrid that I know, Apricot, was exhibited for the first time in London in June, 1892 by the late George Yeld. Inasmuch as I was born about this time, I refuse to consider this flower very old. George Yeld appears to have been the only one interested in hybridizing daylilies until Willy Mueller became active in the early 1900's. Dr. Stout has been interested in daylilies for many years but Mikado was described in House & Garden for the first time in June, 1929 and Cinnabar was offered to the trade by the Farr Nursery in 1930, so there can't be so very many of these plants in existence. Carl Betcher has been interested in daylilies all his life but

many of his introductions were offered about 1929; for example, *J. A. Crawford*—1929; *Bay State*—1929.

Recently I have talked about daylilies before a number of garden clubs and shown my color slides and movies. I have been impressed by the fact, for example at the meeting of the American Gardeners' Association which has a membership of about one hundred and fifty professional gardeners in and around Chicago, that very few of these folks had seen many of the newer hybrid daylilies.

I think one of the problems of our Society is to get a wider distribution of good daylilies. Plants may be grown from seeds, by proliferations, crown division and other variations of vegetative propagation. The quickest method would be by distributing seeds of daylilies. It is hoped that it will be possible to fix a general type in color, size and shape so that they will reproduce with reasonable fidelity from seed. It has been done with delphiniums. Dr. Leonian marketed seeds of daylilies for several years and Col. Edward Steichen said that he did not doubt that a large percentage of these would come reasonably true to color description. I am growing a number of plants sent me by Dr. Leonian this year; I'll be able to tell you more about this later. The other methods of propagation are quite slow.

A more rapid distribution of rare colored daylilies might be had if the hybridizers could be persuaded to be less ruthless in the killing of their seedlings of rare color. Those interested in the introduction of daylilies at the present time, as Dr. Stout, Mrs. Nesmith or Dr. Traub, for example, will go through a field of thirty thousand seedlings and select the most vivid "raspberry" colored seedling, move this into the garden to propagate and destroy a hundred other "Raspberry" seedlings not quite so vivid in coloring or not quite so attractive in shape as the one they preserve. In some cases, the difference between a named variety and some of its sister seedlings is so trivial as to be really microscopic. The rest of the "raspberry" seedlings are destroyed even though any one of them would be a real treasure in the garden of more than ninety-nine percent of the garden lovers of America.

Daylilies in the rarer colorings should be grouped in general groups and sold by classes. Reserve fewer and finer individual plants for naming but don't destroy thousands of rare, beautiful plants. If it is proper to sell seeds, it certainly is proper, sensible and I think it could be made good business to sell good seedlings even if each individual plant is not the best in the world.

Another problem the Society should deal with is the excessive number of named clones especially the yellow and orange clones. There is need for a critical study and evaluation of daylilies.

In any plan of evaluation one must first ascertain the specific use that those interested will make of the flower. A flower may satisfy one purpose perfectly and be entirely out of place in another.

If we are interested in a plant for our perennial garden we will look for different qualities that if one is interested in the plants for cut flowers, i.e. a florist's interest, or for hybridizing or for naturalizing.

If the last named one would need a large number, and the price would be most important. Daylilies are also used as a food and this plant is interesting to some people from the point of view of being a "golden vegetable." One wonders if the reds and purples are good food?

If we want a plant for our garden we may be interested in a plant for the rock garden which would be a dwarf or we may be interested in a plant for our perennial beds. If in the front of a perennial bed we again would want a dwarf, a medium plant for the middle and a tall plant for the rear.

If we want a plant for our perennial beds we must also decide the time we wish the plant to bloom, whether it should be an early bloomer, an intermediate, a summer or fall bloomer. We must decide which color we want, and last and very important, what price we will pay for the plant. A price classification might readily group plants that are $1.00 or less and the recent introductions or novelties could be in two classes, one from $1.00 to $3.00 and the others from $3.00 up. All this classification is a distinct bore to us but we don't see how it can be avoided.

If one is going to compare plants fairly they must be grown under similar conditions. We find that a clone may behave differently in Florida and Illinois, for instance. Further there are very few private growers and institutions that have a large collection of daylilies. Still a smaller number grow them under similar conditions. For example, in my own yard I have in 1940 over 275 named daylily clones. Some of the plants are in the shade and some are in the sun, some are facing south, some north, some east, some west, some are four years old and some are one year old. Some bloomed this year, some did not. These plants are certainly not growing under similar conditions. Therefore, the Daylily Committee has decided to divide the country into a number of climatic regions and we plan ultimately to have trial gardens in each of these regions so a truly comparative study of plants grown under similar conditions can be made.

Before we can evaluate daylilies we must adopt a definite plan or yard stick of evaluation. Our Society has adopted the plan used by the American Peony and American Iris Societies.

Some of the practical problems in evaluating daylilies are: (1) Catalogue descriptions are too often wrong. They are often copies of the descriptions by the introducer of the plant. A good example is Mr. Amos Perry's description of *Viscountess Byng* which he describes as a flower of delicate silver gray overlaid with rosy orange. I purchased the flower directly from Mr. Perry and it certainly does not come close to this description. Descriptions of the color of the plant should be carefully checked and when anyone finds a variation it should be reported to the Society so that we can print the truth. (2) Plants are too often mixed. I purchased *Aureole* which is described as an intermediate that blooms in June from one dealer and it bloomed for me in August. Many of the polls returned voted on plants which had this written after it—"The true variety." (3) A plant has often been introduced by one name and the same plant later sold under another name. In other words the same plant has two names. The Society should check this also.

Relative to the daylily poll I believe that it is also true that a symposium, while helpful, results in a considerable number of votes by individuals who have not had an opportunity to see many of the better daylilies. We will get better results when we have selected a group of well informed judges. Then let the symposiums check up on the judges' ratings; this is the proper sphere for symposiums. There is a tremendous possibility for improvement in many of the classes of daylilies. Dr. Stout has suggested some of the aims that he has in respect to these plants in his book on "Daylilies."

Other problems of the Society are as follows: Catalogues in the Northern part of the United States could be more helpful to their clients if they classified the plants offered as to time of bloom, i.e. the early, intermediate, summer and fall bloomers, and then further classify the plants by placing them in each of the broad color classes. This practice would so emphasize the large number of yellow and orange varieties that they would soon be very cheap unless they are very superior.

Dealers' catalogues do not offer a standard size daylily—for example, peonies are usually sold as a standard plant from 3 to 5 eyed. If a one or two-eyed plant is offered it is plainly labeled and is much cheaper. In the expensive daylily hybrids one usually gets a one-eyed plant. I believe that it would be better to say whether one is offering a 1, 3 or 5 eyed plant, making a difference in price for the different sized plants when they are available and giving the purchaser a right to choose what he wants.

Another matter that should be considered is that if a hybridizer or introducer of a flower believes that he has made a mistake in introducing a plant and thereafter refuses to continue to offer it for sale, I believe that other growers should also withdraw it from the market. For example, Farr & Company have withdrawn from the market all of the hybrids of the late B. H. Farr except the lovely Ophir because they believe they are inferior to other present day hybrids. Dr. A. B. Stout says that Browie was introduced by accident and he objects to the sale of this plant. However, it is catalogued by a number of firms and our members should be advised.

Our Society would be interested in having some of our hybridizers tell us more about their crosses. I have noticed for example that Dr. Stout uses *H. aurantiaca* in many of his crosses. Further we should like to see a study of sterilities and a study of diseases and their cure if a daylily has any diseases.

Too often an iris, peony or daylily which has been superseded and out-classed will be described in some catalogues with a very high-rating. Dealers using our ratings should append the year that the rating is made and if there is a subsequent higher or lower rating this should be used.

Again I wish to repeat that I am looking forward with boundless enthusiasm to the not far distant future when I can be growing some of the lovely things that I have seen this year in the trial gardens of breeders, namely, some of the pink, red, raspberry rose and purple daylilies and no doubt someone will sometime produce a white or near white daylily. Wouldn't that be lovely?

Table I. Tentative classification into color classes of clones introduced in 1937, 1938, 1939 and 1940.

Abbreviations:—The following abbreviations for daylily breeders are used in this table:

B.=Betscher, C. Dover, O.
C.=Cook, Paul, Little Silver, N. J.
D.=Dennett, C. N., Amesbury, Mass.
Dr.=Dreer, Henry H., Riverton, N. J.
G&C=Gray & Cole, Ward Hill, Mass.
H.=Hayward, Wyndham, Winter Park, Fla.
L.=Lovett Nursery, Little Silver, N. J.
L&L=Lord, R. P. & E. L., Orlando, Fla.
N.=Nesmith, Mrs. E. N., Lowell, Mass.
P.=Perry, Amos, Enfield, Eng.
Pl.=Plouf, L. Ernest, Lawrence, Mass.
PRG=Port Rose Gardens, Freeport, Ill.
R.=Russell, H. M., Houston, Texas.
S.=Sass, H. P., Elkhorn, Nebr.
Sc.=Schriener, Robert, St. Paul, Minn.
Sh.=Shull, J. Marion, Chevy Chase, Md.
St.=Stout, Dr. A. B., N. Y. Bot. Gard., New York City.
Tr.=Traub, Hamilton, P., Beltsville, Md.
UF=Univ. of Florida, Gainesville, Fla.
W.=Wallace, R, & Co., Tunbridge Wells, Eng.
Wh.=Wheeler, R. W., Winter Park, Fla.

Blooming season and color classes	1937	1938	1939	1940
EARLY: May to June 10				
Selfs & Chromatic Selfs,				
Yellow:				
Orange:	May Morn (N.)			Judge Orr (Sc.)
Red:				Victory Montevideo (Tr.)
INTERMEDIATE: June 11 to June 21				
Selfs & Chromatic selfs,				
Yellow:				Theodore Mead (Tr.)
Orange:		Dover (B.)		
SUMMER: June 22 to July 31				
Selfs & Chromatic selfs,				
Yellow:	Aztec Gold (D.) Beauty of Kent (W.) Circe (St.)	Columbia (L&L) Frank Russell (R.) Gaiety (B.) Golden Fleece (N.) Golden Glow (Tr.) Harvey Russell (R.) Jenny Lee (R.) Miss Annis (R.) Moon Glow (L&L) Spartan (R.) Miller's Daughter (R.) Tury (L&L) C-28 (R.)	Autumn Haze (N.) Buttercup (N.) Gem (N.) Golden Sceptre (N.) Her Highness (PRG) High Boy (G&C) John Blazer (Tr.) Lady Londonderry (P.) Lovett's Yellow (L.) Mildred (PRG) Nankin (N.) Nebraska (S.) Olive (PRG) Audrey Blazer (Tr.) Golden Fulva (B.)	Arctic Star (N.) Beacon (B.) Doe Skin (N.) Gay Lady (N.) Miss Priscilla (N.) Moon Bean (S.) Satsuma (N.) Shangri (Wh.) Yellow Tulip (Wh.) Anitra (Sh.) Musette (Sh.) Glowing Gold (N.) Golden Goblet (N.) Gipsy Flame (N.)
Orange:	Aloma (H.) Fulva Speciosa (W.)	Charlotte Traub (Tr.) Golden Byng of Vimy (P.) Golden Dawn (N.) Howard Russell (R.) Kublai Khan (L&L) U-29 (R.)	Harvest Moon (B.) Milwaukee Orange (PRG) Sally (H.) Stella (PRG) Sungold (Dr.)	Java (N.) Page Boy (N.) Summer Gold (N.) George Kelso (Tr.) Queen Wilhelmina (Tr.) Gipsy Lass (Sh.) Gorgio (Sh.)
Selfs & Chromatic selfs,			Cecil Houdyshel (Tr.) Emperor Jones (H.)	Craemore Henna (Pl.)
Red:		Marconi (H.)	Lenore (H.) Peony Red (Tr.)	Massasoit (N.) Matador (N.)

		Rosita (H.) Wekiwa (Tr.)	St. Joan (Tr.)	Morocco Red (N.) Ruby Supreme (Wh.) Tara (N.) Theron (St.) Rouge Vermilion (Tr.) Fire Red (Tr.)
Brown:				
Cream:			Hesperus (S.) Old Ivory (PRG)	
Purple:	Burgundy (N.)		Tartar Prince (N.)	Highland Chieftain (N.) Purple & Gold (N.) Royalty (N.)
Pink:	Pink Lustre (N.)	Crystal Pink (N.) Dawn Play (N.) Pink Lass (N.) Sweet Briar (N.)	Colleen (N.) Corinne Robinson (Tr.)	My Lady (N.) Pink Charm (N.) Helen Wheeler (Tr.)
Rose:		Cleo (H) Ginger (H.) Heather Rose (N.) Lena Hughes (Tr.) Old Rose (H.)		Eliz. Wheeler (Wh.)
By-Colors:			Boutonniere (St.) Bold Courtier (N.) Festival (St.) Mahogany & Gold (PRG) Mildred Orpet (Tr.)	Herkimer Johnson (Wh.) Nabob (N.) Bali (Wh.) Shauri (Wh.)
Polychrome, Shots & Blends:	Serenade (St.) Sharon (C.) Wm. Pelham (H.) Wolof (St.) Araby (H.) Burmah (N.) Linda (St.) Ralph Wheeler (H.) Saturn (St.)	Algeria (H.) Antares (H.) Barbara Lord (L&L) Carmen (H.) Chloe (N.) Cimarron (L&L) Coralie (L&L) Dr. Hughes (Tr.) Dr. Stout (Tr.) Dusty Stars (R.) Elaine (Tr.) Florida (H.) Gloriosa (Tr.) Golden Shadows (R.) Granada (Tr.) Happiness (Tr.) Harlequin (L&L) Hector (L&L) Indian Chief (Tr.) J. T. Russell (R.) Mauve Rose (Tr.) Mrs. H. H. Dewey (H.) Nubinana (H.) Osceola (II) (H.) Othella (H.) Persian Princess (N.) Romany (L&L) San Juan (Tr.) Sequoia (R.) Stella Rose (L&L) Storm Cloud (R.) Sunbeam (L&L) Sunrise (N.) Vesuvius (L&L) Victor Lord (L&L) Victory Taierhchwang (Tr.)	August Pioneer (St.) Burning Star (N.) Byng of Vimy (P.) Carnival (Tr.) Chengtu (St.) Dazzler (Dr.) Dolly Varden (N.) Estelle Friend (Tr.) E. W. Yandre (H.) Fred Howard (Tr.) Glowing Embers (N.) Gladys Perry (P.) Hankow (St.) J. R. Mann (B.) La Tulipe (Tr.) Mabel Hibberson (P.) Mayor Starzynski (Tr.) Minnie (H.) Petra (N.) Romano (H.) Romany Lass (N.) Reba Cooper (Tr.) Russell Wolfe (Tr.) Sunkissed (P.) Sunset (P.) Sri Chandra (P.) Van Dyke (PRG)	Amulette (N.) Annie Laurie (N.) Antimony (N.) China Sea (N.) Coralline (N.) Debonair (N.) Dragon (N.) Etruscan (N.) Fantasy (N.) Lady Franklin (Wh.) Moon Ray (N.) Mrs. John J. Tigert (UF) Piquate (N.) Rose Star (N.) Sienna (N.) Emberglow (Tr.) Victory Suomussalmi (Tr.) Aristocrat (Wh.) Cadmus (Wh.) Reba Elgar (Wh.) Hindoo Girl (Wh.) Indian Squaw (Wh.) Titania (Wh.) Caroline Vernon (Wh.)
Late Bloomers: Aug. 1 and later:				

1940 EXPERIMENTAL DAYLILY POLL

In the 1939 Kelso poll 40 people voted. I sent my questionnaires this year to these 40 people and an additional 27 making a total of 67 people. I was disappointed in not receiving the votes from some of the people who are best informed about daylilies. These lists should have been sent out earlier but I was unable to organize them any earlier and for this I wish to assume the complete responsibility. I feel that such experimental polls are helpful to daylily enthusiasts and the general public.

In conducting this poll I am first impressed with the fact that a daylily does not give a normal performance until it has grown in one spot for three years. Obviously any plant not in commerce over three years will not be widely distributed and will not be typical. Therefore my first classification has to do with the time the plant was introduced in commerce. This point of view gives us three classes. (1) The first group of plants are those that have not been introduced into commerce. Plants still in the trial gardens of our hybridizers or daylily specialists. It will be interesting from time to time to have description of these new plants in Herbertia by those who have seen them but obviously any vote on this type of plant would not be representative.

(2) The second group of plants are plants introduced in commerce within the last three years—1937, 1938, 1939 and 1940. Any plant less than three years old should be considered as on trial and not rated or compared with established plants in our poll. Therefore I have also excluded this group of plants from the 1940 poll. Plants introduced in commerce in each year should be listed and classified and opinions on these should be set out in Herbertia by those who have seen them. In future polls it would be interesting to compare plants in each classification introduced three years previously. See Table 1, for a partial tentative list of plants introduced in the years 1937, 1938, 1939 and 1940.

(3) The Third group of plants are plants that have been introduced in commerce for over three years, i.e. catalogued by a commercial firm during the year 1936 or earlier. These are the only plants in my opinion worth taking a poll by the members of the Society.

I believe a classification in the North based on the date of the first bloom would be helpful. This classification was divided into four classes dependent upon the date of the first bloom.

The next classification has to do with the color of the flower. We have treated our color classification in the most general way because this is one of the most difficult subjects relating to flowers. The color of a flower is not an inheritant quality but is largely dependent upon the quality of light reflected from its petals. The flower petals are stained with nature's finest vegetable dyes, distributed upon surfaces of limitless variation—smooth, rough, translucent, opaque, grained, crystalline, silken, velvety, mealy, metallic, and so on through an unending range of textures and thicknesses—their shades and intensities being modified by infinite interrelation. In many instances no two petals are the same in

hue or alike on both sides, or of uniform color even on one side. Colors in the same flower vary, not only from one bloom to another, but also from morning to afternoon or the next day, from sun to shade, from varying exposures, from effects of moisture or heat or from succeeding maturities. A device used by many organizations is to print a color with paint or ink on a paper and you compare this paper with the flower to describe its color. This method has very definite limitations. It is hazardous to guess how many hues, tints, tones and shades may be actually dyed. Gladys Miller in her book, "Decoratively Speaking", says, "One record stated there were 40,000 hues from which 100,000,000 colors could be made." Therefore these color charts only have a relatively few colors.

Another difficulty with this method is that the charts show reflected light only, whereas the tints and shades in flowers have translucent petals which glow and shimmer with color by both transmitted and reflected light. Comparing living flowers with dead pigment is therefore only an approximation, an average. We confess that we find it most difficult to visualize the flowers from the color descriptions used in most of our catalogues although they may be based on one or other of the color charts,—Massachusetts Horticultural Society, Royal Horticulture Society, Ridgway's, Hayden's, or *A Dictionary of Color* by A. Maerz and M. R. Paul.

Another fact which makes for confusion is that these color charts use similar descriptive terms for different colors and this is very confusing. For example the Royal Horticultural Society Colour Chart, Vol. 1, designates Sulphur Yellow as No. 1 and Ridgway's corresponding color is Lemon Yellow No. 23. The R. H. S. designates Lemon Yellow as No. 4, and Ridgway shows no corresponding color. R. H. S. calls Chinese Yellow No. 606, Ridgway calls it Apricot Yellow No. 19b. R. H. S. speaks of Apricot as 609, and Ridgway's description of this is a Capucine Yellow. Scarlet in R. H. S. is 19; in Ridgway's the corresponding color is Scarlet-Red No. 3, whereas Scarlet No. 16 in Ridgway's corresponds to Poppy Red No. 16 in R. H. S. Confusion is inevitable in a situation like this. We should either adopt one of these color charts and everyone should use it or use no color chart at all. If this cannot be brought about it would also be helpful if one would indicate what chart they are using. It is our opinion that the color of daylilies should be described in the simplest possible manner and that we will in time be able to select representative superior plants in each of the color classes.

We believe it would be useful to classify our daylilies according to this broad color classification. (a) Monochromes—Selfs and Chromatic Selfs (ignoring the color of the throat of the flower). Under the monochromes we would have, cream, yellow, orange, red, brown, purple, pink and rose. (b) Bi-colors: Under the Bi-colors we would have two subdivisions. 1—Petal one color—sepal another color. 2—Segments one color—spot another color. (c) Polychromes, Shots and Blends: We have not attempted to organize the Polychromes, shots, and blends this year.

These lists omitted some colors and I asked the recipient to add any flowers in the class where they belonged.

My lists after additions and corrections are as follows.

Table 2. Classification of Daylily clones introduced in 1936 or earlier on basis of blooming seasons; further subdivided by color classes.

EARLY BLOOMERS May to June 10th

Apricot	*Flava*	*Minor*
Burbank	*Flavina*	*Olif*
Dumortieri	*Gracilis*	*Orangeman*
Earliana	*Graminea*	*Sovereign*
Estmere	*Gold Dust*	*Tangerine*
Flamid	*Middendorffii*	

INTERMEDIATE BLOOMERS June 10 to June 21

Ajax	*Dr. Regal*	*Modesty*
Aureole	*Flava Major*	*Queen Mary*
Ceres	*Florham*	*Queen of May*
Crown of Gold	*Gloriana*	*Wau-Bun*
Dover	*Golden Dawn*	*Winsome*

SUMMER BLOOMERS

YELLOWS:

Light and Green Yellow:

Baroni	*Lemon Queen*	*Norceriensis*
Calypso	*Lemona*	*Pale Moon*
Canary	*Lovetts Lemon*	*Parthenope*
Chrysantha	*Luteola*	*Patricia*
Citronella	*Luteola Grandiflora*	*Plicata*
Curlypate	*Luteola Major*	*R. I. Lemon*
Dorothy McDade	*Luteola Pallens*	*Reginald Perry*
Gay Day	*Luteola Pallida*	*Sonny*
Globe D'Or	*Mary Florence*	*Soudan*
Golconda	*Mona*	*Starlight*
Gold Standard	*Mrs. Crawford*	*Star of Gold*
Hyperion	*Mrs. W. H. Wyman*	*Sunny West*
Lady Hesketh	*Multiflora Isis*	*Thelma Perry*
Large Gold	*Multiflora Luna*	*Thunbergii*
Lemon King	*Nana*	

Yellow:

Anna Betcher	*Golden Bell*	*Mulleri*
Amaryllis	*Golden Empress*	*Rayon d'Or*
Eldorado	*Gold Imperial*	*Royal*
Garden Gold	*Mercia*	*Woodlot Gold*
Glow	*Mrs. Perry*	*Yellow Hammer*

Orange Yellow:

Alba Striata
Bay State
Chrysolora
Emily Hume
Golden West
Helen Campbell
J. A. Crawford
Mrs. C. L. Seith
Ophir
Shirley
The Gem

ORANGE:

Yellow Orange:

Chrome Orange
Giant Orange
Golden Sceptre
Orange Glow
Orange Vase
Oriole
Pandora
Pyrrha
Radiant
Semperflorens
Summer Eve
Taplow Orange

Orange:

Aurantiaca
Aurantiaca Major
Beloit
Cressida
Erika
Framingham
Golden Dream
Marigold
Mars
Midas
Mrs. A. H. Austin
Multiflora Hybrids
Sirius
Spring Time
Todmorden
Vesta
Winnie Nightingale

Red Orange:

Forrestii
Gypsy
Imperator
Margaret Perry

REDS:

Orange Red:

Cissie Guiseppi

ROSE:

Fulva Rosea (Rosalind)

POLYCHROME & SHOTS & BLENDS:

Bagdad
Bardeley
Berenice
Bijou
Cinnabar
Chengtu
D. D. Wyman
Dauntless
Dawn
E. A. Bowles
Elizabeth Pyke
Enchantress
Europa
Fulva Maculata
George Yeld
Gladys Perry
Gloaming
Iris Perry
J. S. Gaynor
June Boissier
Kwanso Plena
Kwanso Plena fl. var.
Kwanso Virginia
Marcus
Mary Grace
Mary Stoker
May Sadler
Mrs. Vieusseux
Peach Blow
Rhodes
Serenade
Shekinah
Sir William
Stalwart
Sunkist
Sylphide
Viscountess Byng

BI-COLORS

(a) Petal one color Sepal another color.

None

(b) Flower one color Spot on Throat another color.
Mikado, Rajah

Another classification which we believe to be helpful is the height of the scape. We did not use it this year. We would suggest that plants be grouped into the following divisions:

(a) Dwarf and Semi-dwarf — Under 2½ feet
(b) Semi-robust and robust — 2½ Ft. to 5 ft.
(c) Giant — over 5 ft.

The plants would be classified according to price but there was not sufficient time to do this either.

We took a poll from three different points of view.

(1) The ten best daylilies in commerce over three years,—Table 3.

THE TEN BEST DAYLILIES

There were twenty-three lists returned but only 20 people voted on the Ten Best Daylilies in 1940. It is interesting to note that 85 plants were listed by these 20 people. The last five plants were on three lists so that the Ten Best Daylilies in 1940 becomes Thirteen.

Table 3. The Ten Best Daylilies for 1940.

Mikado was on 17 of the 20 lists
Ophir was on 16 of the 20 lists
Hyperion was on 10 of the 20 lists
Wau-bun was on 9 of the 20 lists
Patricia was on 8 lists
Rajah was on 7 lists
Dauntless was on 6 lists
Sunny West was on 5 lists
Soudan, Fulva Rosalind, Golden Dream, Golden West and *Sonny* were on 4 of the 20 lists.

It is interesting to note that there are no Early Bloomers, One Intermediate, *Wau-bun,* and all the rest are Summer Bloomers. Eight of the Summer Bloomers are yellow, (4 light yellow, 3 medium yellow and 1 orange yellow) one orange, two are bi-colors, with the segment one color and a spot of another color and one is a polychrome.

Inasmuch as we threw out a number of votes of plants that were not in commerce for three years we will list below those plants receiving 3 votes,—*Anna Betscher, Bagdad, Bijou, Cressida, Mrs. A. H. Austin, Maculata,* and *Serenade.*

(2) 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 only listed those that received ten votes or more in the yellow and orange classes. We took the average score by adding all the votes on a variety and divided this number by the number of votes received by the flower,—Table 4.

Table 4. Rating of Daylily clones in commerce over three years on a numerical basis; further subdivided by colors.

		No. of Votes	*"A"*	*"B"*	*"C"*
		YELLOW			
Light and Green Yellow					
Patricia	95.00	9	9		
Hyperion	94.09	11	10	1	—
Sunny West	85.00	9	2	5	2
Sonny	86.25	8	3	3	2
J. A. Crawford	85.00	8	2	4	2
Calypso	83.88	9	2	4	3
Flava	81.66	9		6	3
Yellow					
Anna Betscher	89.44	9	5	3	1
Golden Bell	89.00	5	2	3	—
Gold Imperial	87.00	5	1	4	—
Orange Yellow					
Ophir	93.14	8	7	1	—
Bay State	83.35	8	1	5	2
The Gem	82.50	8	1	4	3
		ORANGE			
Yellow Orange					
Radiant	89.00	5	2	3	—
Orange					
Golden Dream	92.14	7	5	2	—
Cressida	88.33	9	3	6	—
Mrs. A. H. Austin	87.85	7	3	3	1
Goldeni	81.25	8	1	3	4
Red Orange					
Imperator	86.66	6	2	3	1

ROSE

Fulva Rosea (Rosalind)	91.00	5	3	2	—

POLYCHROME & SHOTS

		No. of Votes	"A"	"B"	"C"
Chengtu	92.14	7	5	2	—
Bagdad	90.55	9	6	2	1
Serenade	89.44	9	5	3	1
Fluva Maculata	87.50	8	3	4	1
Bijou	87.22	9	4	3	2
George Yeld	86.11	9	2	6	1

BI-COLORS

Petal one color sepal another color	—	—	—	—	—
Flower one color spot on throat another color.					
Rajah	93.00	10	8	2	—
Mikado	91.36	11	8	2	1

(3) We also secured 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. Table 5.

Table 5. The first, second, and third best in each blooming period; further subdivided by color classes.

EARLY BLOOMERS.—Returns were received from 7 people on the Early Blooming varieties and we were able to conclude from this that among the Green Yellows that *Flava* and *Flavina* were 1st and 2nd. Among the Oranges—*Tangerine* is desirable.

There is a very considerable discrepancy between the color classifications of *Earliana, Estmere, Gold Dust, Sovereign* and *Apricot.* We are therefore grouping them together until we have another season to study them.

INTERMEDIATE BLOOMERS.—Returns were received from 7 people again. In the Green Yellow, *Modesty* and *Flava Major* were favorites; while in the Yellows—*Winsome* was the favorite. Among the oranges, *Dover* and *Crown of Gold* were voted desirable.

There is such a general disagreement about color classification of *Sir Michael Foster, Queen of May* and *Queen Mary* that we are going to hold this group over for another year for further study.

It is interesting to note that almost everyone classified *Wau-Bun* as an Orange Yellow except the introducer, who classified it as a yellow. However, inasmuch as it has a bit of fulvous we put it in the Polychromes. Nearly everyone likes *Wau-Bun.*

SUMMER BLOOMERS.—

YELLOWS

(a) *Light and Green Yellow*

	First	*Second*	*Third*
Patricia	8	2	3
Hyperion	6	6	2
Sunny West	1	2	1
Sonny	1	2	2
Starlight	1	—	—
Thunbergii	1	—	—
Star of Gold	1	—	—
Soudan	1	—	—

(b) *Yellow*

Anna Betcher	4	3	1
Golden Bell	4	4	1
Gold Imperial	1	1	1
Amaryllis	1	—	2
Royal	1	—	—
Woodlot Gold	1	—	—

(c) *Orange Yellow*

Ophir	10	5	1
Golden West	5	3	1
Sirius	3		
The Gem	1	1	3
Emily Hume	1	1	2
Bay State	1	—	2

ORANGE

(a) *Yellow Orange*

Radiant	4	2	1
Chrome Orange	4	2	—
Semperflorens	1	1	2
Aztec Gold	1	—	1
Golden Scepter	1	—	—

(b) *Orange*

Mrs. A. H. Austin	3	2	—
Multiflora Hybrids	3	—	1
Golden Dream	2	4	1
Cressida	2	2	3
Aurantica Major	2	—	—
Sungold	1	—	—
Vesta	1	—	—

(c) *Red Orange*

	First	*Second*	*Third*
Imperator	5	3	1
Gypsy	2	1	—
Forrestii Perry's Var.	1	—	—
Margaret Perry	1	—	—

(d) *Orange Red*

Cissie Guiseppi	3	—	—
Sir William	2	—	—

RED

Robin Red Breast	1	—	—

ROSE

Fulva Rosalind	6	3	—

POLYCHROME AND SHOTS

Chengtu	3	1	—
Bagdad	2	1	4
Dauntless	2	2	1
Serenade	1	4	—
George Yeld	1	—	2
Fulva Maculata	1	—	3
Bijou	1	1	—
Sunkist	1	—	—
Viscountess Byng	1	—	—
E. A. Bowles	1	2	1
Europa	2	2	—
Kwanso Plena	5	—	—

BI-COLORS

(a) Petal one color Sepal another color (Nothing in commerce over three years)

(b) Flower one color Spot on Throat another color.

Mikado	13	3	—
Rajah	4	10	1

REVISED PLAN, AND INSTRUCTIONS TO THE DAYLILY COMMITTEE OF THE AMERICAN AMARYLLIS SOCIETY *

The Special Daylily Committee was organized by vote of the Board of Directors for the purpose of evaluating daylily clones. The Committee is to consist of a Chairman, who is to make an annual report for the committee, and not less than four other members to be appointed by the Board. The objectives are to be achieved by means of trial gardens, and jury and symposium ratings of clones at intervals. On recommendation of the Chairman, Mr. Elmer A. Claar, the Board has authorized the appointment of a jury of not less than 20 competent jurors who are to evaluate daylily clones. Such ratings are to be official for the Society, but shall be revised from the standpoint of regional adaptation from time to time on the basis of symposia carried out on a regional basis in which all members of the Society who grow daylilies are to take part.

Trial gardens are to be established in cooperation with the state agricultural experiment stations, colleges and universities, in six or more climatic regions as follows: (1) Middle West (Midland); (2) Northeast; (3) Southeast—all of traditional South, except Florida; (4) Florida (humid subtropics); (5) Southwest; (6) Northwest, (7) other regions—Hawaii, Canada, etc. Details of cooperation are to be worked out by the committee and submitted to the board for approval.

As a basic attack on the problem of discarding inferior clones, jury and symposium ratings are to be carried out for all clones in commerce at intervals as already indicated. Rating is to be on a numerical basis, from 1 to 10, and finally to one decimal point (6.5, 9.7, 7.7 etc.). Clones rating 7.5 or below are to be omitted from the next symposium list, but may be restored for valid reasons. Clones are to appear on one of two lists, (a) those in commerce for more than three years, and (b) those in commerce for less than three years. After each clone has been given a numerical rating by the jury, those rating 7.6 or above are to be arranged according to blooming seasons and submitted to the vote of the daylily growers in the regions. The further arrangement of clones, after numerical ratings have been given, under such categories as (a) color classes, (b) height of plant, (c) drought resistance, (d) decorative value of foliage, particularly in the South, (e) shade tolerance, etc., is to be undertaken as research projects by individual members of the Committee.

In order to put the description of daylily clones on a comparable basis everywhere, the Society has adopted the excellent text for data card (Plate 179) submitted by J. Marion Shull. This text is at present printed on 3″x5″ cards. This data card is to be used in describing both new clones and those already introduced.

The following score card for rating daylily clones, and scheme for conducting symposia are to be followed subject to future revisions:

* Summary of official action by Board of Trustees. —Ed.

Score Card for Rating Daylily Clones

[This score card is subject to future revision and is to be considered as a starting point.]

Character to be scored:	*Method of rating:*	*Possible score:*
Vigor	Plant must be able to stand up under climatic conditions under which it is grown; if plant is weak, deduct at least ¾ of possible score.	10
Foliage	Foliage should be considered from standpoint of its garden decorative value, but deciduous habit should not be penalized in North.	5
Scape, and number of flowers to scape	The flower scape should be considered from standpoint of sturdiness; should not be too sturdy nor too weak; however, such a scape as that of Wau-Bun should be considered as perfect for its type. Consider cleanliness; deduct ½ of possible score if lacking in this particular.	15
Flower shape or form	Many shapes will be recognized so long as they are beautiful.	15
Flower size	All sizes of flowers will be recognized so long as they are well proportioned with reference to the scape—a small flower on a stout scape, for instance, is quite objectionable, and should be penalized a full 8 points.	8
Flower color and texture	The main emphasis should be put on purity of color rather than on mere novelty.	35*
Flower odor	If odor is absent or unpleasant deduct points accordingly; if present and pleasant count the full 2 points.	2
Flower durability	If flower fades in morning in full sunshine, deduct 7 points; if it fades in the afternoon, deduct 3 points. Flowers that do not fade or improve in full sunshine are to receive the full 10 points.	10
	Total	100

* This has been weighted so that no clone of inferior flower color will pass.

Forms for Daylily Symposium of the American Amaryllis Society

Cooperator's name: ..... Address..... Date.....

Region: *Midland.....; Northeast.....; Southeast.....; Fla. (Subtrop.).....; Northwest.....; Southwest.....; Eastern Canada.....; Western Canada.....; Other (fill in).....*.

Note.—Check the region in which you live, or fill in name if your Region is not listed.

Instructions. Please read rating instructions carefully and then rate each species or clone (commonly called "variety") with which you are familiar as a grower, and return this form by October 1, 19....., to Mr. Elmer A. Claar, 1301 Chestnut St., Wilmette, Ill. The complete results will be published in Herbertia.

All daylily growers are requested to cooperate in this symposium rating only the species and clones with which they are familiar.

Ratings. All species and clones listed below, and also others not listed that should be included, and which you are requested to write in, are to be given a numerical rating, using numbers from 1 to 10 for whole numbers, and decimals for values between whole numbers,—3.4; 6.5; 9.7; 6.8; 8.3, etc., etc., depending on the merits of each species or clone. The following values are to be associated with the numbers:

Excellent	9.0 and above
Good	8.0 to 8.9
Fair	7.6 to 7.9
Poor	7.5 and below

In making ratings use should be made of the scale of points for daylilies as set forth in the official score card.

All clones rating lower than 7.6 should be considered as discards for purposes of this symposium, and on this basis clones rating lower than 7.6 in previous symposia are not to be listed any longer for rating. If for any reason any of these clones are adapted to some regions, they should be written in and re-rated. Ratings are to be written in the spaces at the left of the species, varieties and clones.

I. SPECIES AND BOTANICAL VARIETIES

Note. Species and their varieties have been evolved in nature and are therefore not subject to rating on the ordinary basis since they are biological entities recognized in the science of botany. However, they can be rated here as to their garden value and cut-flower adaptibility.

Rating	*Species*	*Rating*	*Species*
1.	*Hemerocallis multiflora* Stout	7.	*Hemerocallis aurantiaca* Baker, *aurantiaca* var. major Baker
2.	*Hemerocallis flava* Linn.	8.	*Hemerocallis exaltata* Stout
3.	*Hemerocallis minor* Miller	9.	*Hemerocallis Forrestii* Diels
4.	*Hemerocallis serotina* Focke (syn. *H. Thunbergii)*	10.	*Hemerocallis plicata* Stapf
5.	*Hemerocallis citrina* Baroni	11.	*Hemerocallis nana* Forrest & Smith
6.	*Hemerocallis fulva* Linn., *fulva* var., *rosea* Stout	12.	*Hemerocallis Dumortierii* Morren
		13.	*Hemerocallis Middendorffii* Trautv. & Meyer

Write in and rate any other species or botanical varieties in the space below:

____ _____ ____ _____

____ _____ ____ _____

II. CLONES IN COMMERCE FOR MORE THAN THREE YEARS

Abbreviations for daylily breeders and climatic regions: (To be standardized by Daylily Committee).

Rating	Clone	Rating	Clone
——	*Ajax* (W. M., 1908)	——	*Goldeni* (B., 1929)
——	*Apricot* (Y., 1892)	——	*Gypsy* (B., 1929)
——	*Bijou* (St., 19.....)	——	*Hyperion* (M., 1925)
——	*Cressida* (B., 1929)	——	*Mikado* (St., 1929)
——	*Estmere* (Y., 1906)	——	*Modesty* (B., 1929)
——	*Gold Dust* (Y., 1906)	——	*Ophir* (F., 1924)

Etc., Etc., Etc.

III. CLONES IN COMMERCE LESS THAN THREE YEARS

Arrange as in II. above.

REGISTRATION OF NEW CLONES

Descriptions of new clones of hybrid amaryllids and alstroemerids 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.

Wyndham Hayward, Winter Park, Fla. See page 131

Hybrid Amaryllis—Louise Hayward

Plate 180

Hybrid Amaryllis Clones

Introduced by R. W. Wheeler, Winter Park, Fla.

BEACON (184) Leopoldi, Type A. Large flower, 8 inches, of very wide rounded petals and exceptionally fine form. The edges of the petals are frilled in the center of the flower. The color is a brilliant, deep red with violet tones, darker in the center and shading out lighter towards the edges, especially on the lower petals. First Prize in its Class; First Class Certificate; Best Flower in the Show. Southeastern Amaryllis Show of the American Amarylis Society 1940.

KILLARNEY (1-42-1) Leopoldi, Type A. A medium size flower with wide, rounded petals and of good, compact form. Petal tips slightly recurved. The color is a very dark red, darker in the throat and satiny. No mottling or any other color than red. First Prize in its Class and First Class Certificate, Southeastern Amaryllis Show 1940.

LAKEMONT (1-46-6) Leopoldi, Type A. Medium to large flower, which opens with a fairly flat face and petal tips slightly recurved. The color is solid red, clean to the throat, which is dark. The texture is velvety. First Prize in its Class and First Class Certificate, Southeastern Amaryllis Show 1940.

LILLIAN YOST (139) Leopoldi, Type A. Very large flower, 8 to 9 inches. Very wide, rounded petals which open wide with a slightly curved face. The ground color is shell pink, with darker rose pink feathering especially on the two upper petals.

PINK PEARL (6-18-7) Reginae, Type A. Large flower, 8 inches, with wide, semi rounded petals which open well. This is a solid, true pink Amaryllis, the color being close to Debutante Pink, 1-G-7. There is a little deeper pink feathering in the center and some pale green deep in the throat.

PRIAM (156) Leopoldi, Type A. Very large flower, 8 to 9 inches, with very wide, rounded and cupped petals, forming a slightly convex face. The color is a vivid, light red, on the salmon, with no discoloration in the throat.

ROYAL GARNET (1-43-12) Leopoldi, Type A. This is a large flower, 7¼ inches, with wide, rounded petals. It opens with an exceptionally shallow trumpet. The color is a very dark red, darker in the throat, and an all over satiny appearance.

SUNRISE (1-39-6) Leopoldi, Type A. Medium size of good form with very recurved petals. The color is a soft light red with darker red feathering towards the center and a little frosted effect on the lower petals.

SUSAN HOUGH (6-49-11) Reginae, Type A. A large flower with very wide but pointed petals, the petal tips being very recurved and the trumpet shallow. The color is Old Rose, 4-I-2, shading to lighter on the outside and through the center of the petals, and to deeper towards the center of the flower. The deep throat is grass green. A very beautiful flower.

THORNKILL (169) Leopoldi, Type A. This is a medium size flower, but of the finest form. The wide, rounded petals open full and perfect with their outer edges rolled back, forming an almost perfect and unbroken circle. The color is a good, soft, medium dark red, clean to the center, which is darker. In addition to the form, the beauty is in the effect produced by narrow, darker bands extending lengthwise of the petals, not unlike a two toned corduroy.

Hybrid Amaryllis—Louise Hayward

Wyndham Hayward, *Florida*

The pure white hybrid amaryllis, *Louise Hayward,* illustrated in this number of Herbertia (Plate 180), is one of the most charming and perfect forms of the pure whites that the writer has seen in a dozen years of growing amaryllis in ordinary sandy loam beds. It bloomed in four years from seed (of the Ludwig Strain in Holland), and is snowy white except for a slight medium apple green shading at the base of the throat.

Hybrid Amaryllis—Mont Blanc

R. W. Kenny, Winnepeg, Canada

This clone was obtained in England three years ago. It bloomed the first year with one scape and four blooms. These were well shaped, medium in size but had a well marked green rib. The plant bloomed in February. Repotting was done when the bloom scape withered and it was kept in warmth and light without drying off.

The second year it bloomed in February with one scape and four blooms and did not vary from the first year. Again it was repotted and kept growing without drying off.

This season at the end of December the four large straps began to turn brown. The plant was set to one side out of direct light, and soon a large bloom scape appeared. This was very vigorous and was more robust than either of the preceding years. Only two blooms developed but they had wonderful texture and sheen and very little green mid rib. The illustration, Fig. 52, shows one flower.

Hybrid Daylily (Hemerocallis) Clones

Introduced by J. Marion Shull, 207 Raymond St., Chevy Chase, Md.

Anitra (Shull, A-4) Pale Lemon Yellow self, greenish at throat. Petals 1⅝ X 4¾ inches, sepals ⅞ X 4¾; spread 5 to 6 inches; heavy substance; fragrant. Scape 47 inches; late. Fine clump, mostly upright, deep green. Best in partial shade.

Gipsy Lass (Shull, C-3) Rich Orange self with faint reddish flashings, Old Gold deep in throat. Wide spreading full flower. Petals 1½ X 3½ inches, sepals 1 X 3½. Spread 4½ inches. All day bloomer, unaffected by sun. Robust, yellow-green, arching foliage. Scape 4 feet. Growth somewhat diffuse.

Gorgio (Shull, E-6) Brilliant Light Cadmium self with attractive nearly white midrib. Flower full, widely recurved, fine carriage. Petals 1½ X 4 inches, sepals ⅞ X 4. Spread 5 inches. Scape 3 feet. Robust, yellow-green, rather erect compact clump.

Musette (Shull, A-6) Empire Yellow self, greenish at throat. Very heavy substance. Petals 1⅝ X 4¾ inches, sepals ⅞ X 4¾. Spread 6

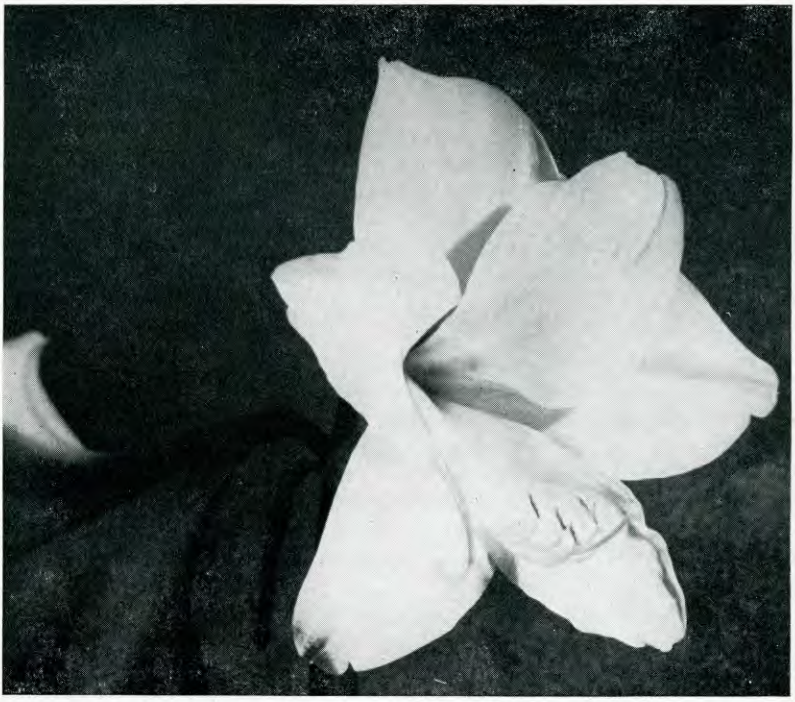

Fig. 52. Hybrid Amaryllis—Mont Blanc

to 8 inches. Fine blue-green, arching clump. Scape 43 inches. All day bloomer; stands sun well. Late.

Introduced by R. W. Wheeler, Winter Park, Fla.

Aristocrat (J-2) Semi Robust, very long and narrow sepals and petals of sufficient substance to hold a graceful form. The flower diameter is 9 inches. The chief color is Leghorn (T. C. C. A. No. S4115), with a green gold throat and cream lines through the center of the petals and a striking V shaped eye zone on the petals. The color of the eye zone is (M. & P. 3-G-12).

Bali (No. 48) Semi Robust, small cup shaped flower of fine form, multiflora habit, straight, strong stems, evergreen, continuous bloomer. The flower color is M. & P. Indian, 12-C-12, with a somewhat darker faint eye zone 10-G-12.

Cadmus (D 32-5) Semi Robust, large cup shaped flower with the tips of the sepals somewhat recurved and the petal tips recurved and sometimes twisted. Flower diameter 6 inches, petal width 1¾ inches, sepal width 1 inch. The throat and ground are deep yellow with a soft fulvous red on the petals and some of the same color dusted on the sepals. The faint eye zone is violet red, as also is the veining in the petals.

Reba Elgar (H 20-1) Robust in growth, a large, wide petaled flower of intermediate form. Flower diameter 5½ inches, petals 1-11/16 inches, sepals 1 inch. The petals are beautifully creped and have ruffled edges. The throat and ground are deep gold. The petal color is light amber on this gold ground, gold lines through the center of the petals. The sepals are lightly dusted with the amber. The distinctive eye zone is darker and on the soft red.

Lady Franklin (C-76-5) Robust, large flower, compact, sepals and petals decidedly recurved. The dominant color is mauve rose with rose red veining and rather wide eye zone of this same rose red, which shades into the petal color and gold throat.

Hindoo Girl (J70-5) Semi Robust, medium large flower of compact form as to throat, sepals very recurved, petals wide, ruffled and creped, tips recurved and twisted. The color is a handsome, soft, fulvous red with a deeper red eye zone which is not too pronounced and a green gold throat. A flower of distinction both as to color and form.

Indian Squaw (J-7) Robust, very long but narrow sepals and petals. Flower diameter 8¾ inches, petals 1¼ inches, sepals ¾ inch. The main color is Burnt Orange, 3 E 12, on a deep orange ground. The darker eye zone, 3 G 12, is in the form of an acute angle V.

Herkimer Johnson (J-9) Semi Robust, very large flower, compact form as to throat, sepals recurved, petals wide, creped, tips recurved and twisted. Flower diameter 6½ inches, petals 1⅝ inches, sepals 1 inch. The ground color is a deep golden yellow overlaid with a faint but wide cinnamon eye zone which extends deep into the throat and well up on the sepals and petals.

Quaker Lady (M-12) Semi Dwarf, medium size flowers, intermediate form, petals wide for size of flower, creped and twisted tips. Light, greenish gold throat and ground with light brown dusting on sepals. The petals are a solid pastel brown mahogany. Many blooming stems and a recurrent bloomer.

Ruby Supreme (E-57-5) Robust, very large flower, intermediate form, multiflora habit, strong grower. Flower diameter 7¼ inches, petals 1¾ inches, sepals 1-1/16 inches. Main color Antique Ruby, 6-L-6. This is a little lighter on the sepals. The throat is greenish gold and there is a narrow gold line through the center of the petals.

Shangri (F-3-1) Semi Robust, large flower, wide sepals and petals which are roundly recurved and the petals are ruffled. Flower diameter 5½ inches, petals 1⅝ inches, sepals 1⅛ inches. The color is a deep lemon yellow which stands full sun all day.

Shauri (G-70-4) Robust, very large flower, sepals and petals more recurved than Dauntless. Flower diameter 8¼ inches, petals 1½ inches,

sepals 1 inch. The coloring is pastel, mauve rose with a little darker eye zone extending in points up into the petals. The throat is greenish gold and there are cream lines through the center of the petals.

Titania (D-10) Semi Dwarf, small flower which opens out flat, sepal tips some twisted, petal edges ruffled. The throat and ground color is greenish lemon. There is light brown dusting on the sepals and the petals are colored a pastel brown. Many blooming stems.

Caroline Vernon (E-30-4) Semi Robust, large flower with wide petals, cup shape throat, opens fairly flat face with sepal and petal tips recurved. The sepals and petals are entirely different in texture, the sepals being heavy and stiff while the petals are almost transparent, crepy and ruffled. The throat and sepals are bright orange, the petals mauve orange with soft red eye zone and dark orange veins.

Elizabeth Wheeler (B-2-5) Robust, medium size, cup shape flower. Throat and ground are gold yellow, the petals are rose red, while the sepals have more of the gold with rose red veins and lines.

Yellow Tulip (C-35-1) Semi Robust, large flower, opens like a tulip, faces up. The color is a deep canary yellow. Many stems, a recurrent bloomer from April into September.

Introduced by Hamilton P. Traub, Mira Flores, Orlando, Fla.

Helen Wheeler (No. 459); semi-dwarf; pastel pink (Etruscan), eye-zone slightly deeper; middle of May.

Rouge Vermilion (No. 466); semi-dwarf; Scarlet (Rouge Vermilion) RHS 19; sepals lighter; orange throat; late May.

Theodore Mead (No. 407); semi-dwarf; petals and sepals much twisted; flower about 7 inches across face, of excellent substance, Saffron Yellow (RHS 7/1), gold glistening; early April.

Fire Red (No. 524); semi-robust; Fire Red (RHS 15), sepals lighter; orange throat; early June.

Emberglow (No. 424); robust; pale yellow shot Emberglow (3-G-10), eye-zone slightly darker; yellow throat, sepals lighter Emberglow; multiflora flowering habit; middle of May.

George Kelso (No. 501); robust; flower large, 5½″ across face; petals ruffled, 1½″ wide, sepals 1″ wide; bi-color, light orange suffused bronze; sepals lighter; early April. Named in honor of the late George DeWitt Kelso.

Queen Wilhelmina (No. 353); robust, Carmium Orange (RHS 8/1) with near white mid-rib; middle of May.

Victory Montevideo (No. 401); robust, near Chianti (6-L-6), throat golden yellow. This is the first introduction of an early red variety using Queen of May as one of the parents for the early flowering character. In central Florida it has flowered in early March while under trial. Named in commemoration of the British victory off Montevideo in 1939.

Victory Suomussalmi (No. 460); robust; orange self suffused rufous; multiflora flowering habit; middle of May. Named in commemoration of the brilliant victory of the Finns.

Hybrids Nerines

Hybrid Nerine—Chameleon

W. M. James, California

The hybrid, *Nerine, Chameleon*, is the result of a cross between *N. filifolia* (See page 135, Vol. 3, 1936 Herbertia) and *N. corusca major*

W. M. James, Santa Barbara, Calif.

Fig. 53. Hybrid Nerine—Chameleon

(See page 239, Vol. 4, 1937 Herbertia) made by the writer at Las Positas Nursery. Its foliage is evergreen, one-fourth to three-eighths inch wide, six to eight inches long and gray-green in color. Bulbs mul-

tiply much faster than do those of the paternal parent, *N. corusca major*, but not as fast as do those of the maternal parent, and sometimes produce more than one flower stem in a season.

The flower is attractive in appearance and comparatively large (Fig. 53). The petals are generally rose red in color, lightly edged with soft gray purple on the lower half and are covered throughout with a golden sheen. A small percentage of the flowers are rose red all over. Even though there is a slight variation in color when the flowers first open, as a rule they hold the first color for several days after being cut and taken into the house. A few slowly change to a light grayish purple as they age. Those which open indoors are usually less red, sometimes being a rosy lilac and sometimes a soft rose pink. The interesting and pleasing variation in color of this hybrid is what suggested the name, *Chameleon*.

The flowers are approximately two and one-half inches across, broadly funnel-shaped, and there are twelve to fifteen per umbel. The petals are three-sixteenths to one-fourth inch broad, about one and one-half inches long, gracefully recurved above the center and sometimes undulating. The stamens are usually as long as the petals.

The strong slender stems are twelve to fifteen inches long, some being erect and some slightly curved. If a stem is cut when the first bud is opening, the rest will open and last from seven to ten days.

Should propagation continue at the present rate, it will not be long before there are sufficient bulbs for distribution. So far hybrid Nerine, *Chameleon* gives promise of adding some desirable characteristics to a noteworthy group.

Improved Eucharis

New Eucharis grandiflora clone—Julius Thomas

Karl J. Easton, Florida

A new and improved clone of the well known Amaryllid, *Eucharis grandiflora,* has been observed in recent years in the plant collection of a florist at Lake Worth, Florida, Mr. Julius J. Thomas of the Thomas Flower Conservatory.

Mr. Thomas, a local grower and plant authority, has some hundreds of the improved clone of *Eucharis* growing in his lath-house at Lake Worth, which is near the winter society resort of Palm Beach. The writer has studied these plants in bloom at Mr. Thomas' establishment during the season of 1938-39, and found them to be among the most beautiful displays of flowers he has ever seen. Because of the interest which the new *Eucharis* has aroused, the following statement was obtained from Mr. Thomas as to their origin and how they came into his possession.

"While a resident of New Jersey, I became acquainted with a Californian who told me of a beautiful *Eucharis grandiflora* sport he had noticed growing in his greenhouse. The Californian claimed that the blooms were extra large and very fragrant, the bloom stalks sturdy and long, leaves large, broad and decorative in themselves and a good sized

bulb which was prolific in making off-sets. For the time I had forgotten all about them, when out from a clear sky I received a letter from my friend who stated that he was selling out and was going to Australia to make his home and wondered if I would be interested in the *Eucharis* sports. They soon became my property and when they arrived were a sickly lot and I was quite disappointed with my purchase. Today, however, as you can see, they are beautiful beyond words and of course priceless to me. Dealers and tradesmen from several sections of the United States have approached me about purchasing my entire stock. I prefer, however, to grow them on and have a ready market, and a profitable one too, for all of the blooms that I can grow."

Mr. Thomas states that in a few cases some of the plants made their way into private hands and it is from these sources that so much comment is being made about their superiority over prevailing stocks. Palm Beach and Miami trade especially, demand a large number of cut blooms, such as *Eucharis,* during the winter season and it is at this time that the flowers of the *Eucharis* clone, *Julius Thomas*, are at their very best.

THE ENIGMA OF CYRTANTHUS VITTATUS (?)

Hamilton P. Traub, *Maryland*

In 1939, Dr. Dyer gave reasons for questioning the authenticity of *Cyrtanthus vittatus* Desf. ex. Red. Lil. t. 182 (1807), a species based solely on a drawing (Herbertia 6: 65-103. 1939). While working with *Stenomesson* material, the writer noticed some similarities between the doubtful *Cyrtanthus* species and this South American Genus, and this may be a possible clue as to the original used by the artist, Mlle. Basseporte. It might be worth while to compare Fig. 4, Pl. 47, *Stenomesson coccineum;* Fig. 5, Pl. 47, *Coburghia incarnata* var.; Fig. 6, Pl. 47, *Coburghia splendens;* Fig. 1, Pl. 28, *Stenomesson flavum,* and Fig. 2, Pl. 28, *Stenomesson curvidentatum,* in Herbert's Amaryllidaceae, 1837; and also other plates figuring species of *Stenomesson* published subsequently. The description of *Stenomesson (incarnatum?)* by Dr. Goodspeed on page 28 of this issue of Herbertia is also worth considering.

WILHELMINA FREEMAN GREENE'S WATER COLOR DRAWINGS

We are indebted to the talented artist, Mrs. Wilhelmina Freeman Greene of Winter Park, Florida, for the Latin American Edition cover design featuring the Blue Amaryllis, *Amaryllis procera*. The design was made especially for this Edition and is intended to give an impressionistic picture of this rare and beautiful amaryllid. The artist has undoubtedly succeeded in achieving this objective to a remarkable degree.

Mrs. Greene's water color drawings of floral subjects are justly famous, and out of a long list, fourteen have been reproduced as color prints and are now available in the form of greeting cards. These color prints have but to be seen to be immediately appreciated—

Size of folder—4 1/4 by 5 1/2 inches:

Pitcher Plants—Sarracenia
Turk's Cap Hibiscus
Hybrid Red Hibiscus
Hybrid Hibiscus—pastel shades
Dwarf Poinciana
Ardisia and Brazilian Pepper
Shaving Brush Tree
Jacaranda
Crown of Thorns; Bitter Aloe & Bryophyllum
Parkinsonia and Bougainvillea
Frangipani
Shell Flower
Water Hyacinth
Flame Vine and Thunbergia
Dombeya

Size of folder—5 by 6 7/8 inches:

Magnolia grandiflora
New Hybrid Hibiscus

Size of folder—5 1/4 by 7 3/4 inches:

Royal Poinciana
Poinsettia

Size of folder—5 15/16 by 8 1/2 inches:

Florida Tree Orchids and Tillandsias
A Composite Bouquet of Florida Wild Flowers

Size of folder—7 by 9 1/2 inches:

A Bouquet of Florida Wild Flowers—74 species.

Mrs. Greene has the very laudable ambition of producing an illustrated book on subtropical flowers. Her aim is to interest children and the general public; in fact, all who want to learn visually rather than by studying technical works. She also hopes to find some one who will collaborate with her on a coloring and pasting book, "Around the World with Subtropical Flowers", for school children. Mrs. Greene writes—"I want to correlate it with the study of geography as Ditmars has done with the study of animals. I know that my children have some idea of the climate of Brazil for they know that the Flame Vine and Jacaranda both grow there. They have also begun to develop a knowledge of flower structure from drawing and painting them. Children learn by doing and seeing without realizing that they are learning. My children have also learned about birds from a bird game, and a stamp book of birds." Mrs. Greene's work is of such outstanding quality that publishers, garden clubs, parents' and teachers' associations, and other civic organizations interested in such patriotic undertakings should take advantage of this excellent opportunity. Mrs. Greene's address is Winter Park, Florida.

—*Hamilton P. Traub*

4. CYTOLOGY, GENETICS AND BREEDING

DAYLILY BREEDING AND TESTING ROUNDUP

As announced in 1939 HERBERTIA, brief articles, by some of those who entered the daylily breeding and testing field more recently, are presented. The information is put on record primarily so that those who grow daylilies may know more intimately the workers who produced some of the clones they grow, but also for the purpose of leaving authentic facts for the future historian of the daylily. In 1941 Herbertia, the roundup will be completed. All daylily breeders should send in brief articles about their experiences to the Editor. It is not necessary to wait for a formal request. Send in your article now. —*Ed.*

DAYLILY TESTING IN MINNESOTA

Robert Schreiner, *Minnesota*

There is a certain thrill in being one of the first to try a new plant, or member of a plant family in a region where this plant is comparatively unknown. This is especially true when the material with which you are experimenting gives promise of being of unquestionable merit. Minnesota is known throughout the country for its bracing climate. Real old fashioned winters and warm summers. The rainfall averages from 32 to 36 inches in a normal year with the summer months of July and August being our dry period. This is due to the fact that we are located at the edge of the Great Plains area where normal weather of dry summers is necessary to ripen the extensive grain crops grown there.

The two fold test on a hemerocallis in our section is, first, can it prove hardy in our climate of rigorous winters? Second, can it thrive during our "dry spell"? Our experience is that our warm sun, shining from a clear sky bleaches to nothing many of the varieties originated in the moister, softer climates of the Atlantic seaboard where a great majority of the varieties are being originated at the present time. So selection of durable color is essential with us.

The ability of hemerocallis to thrive and give a multitude of bloom during our hot and, more or less, dry summer months is certain to establish this splendid perennial as an indispensable unit to our flower gardens here in the Midwest. Public interest is awakening with genuine enthusiasm. Particular enthusiasm has been shown for the many-budded stems—some stems carrying as many as 115 buds!

Our hemerocallis season usually is ushered in by the more diminutive semi-dwarf species blooming about the season of the bearded iris. In our latitude this is about June 2nd to 15th. Two varieties that impress me among the more early flowering kinds are *Crown of Gold,* a soft yellow, airly fluted and the mellow tones of soft, orange *Judge Orr.* I should add to this a third variety, the true *Apricot* of Mr. Yeld. The variety sold in commerce is a nice hemerocallis and well appreciated but the true variety, practically unobtainable, is well worth uncovering.

Along with these very earlies, only a fortnight later, we have two creations of Mr. Betscher, originator of some very fine varieties. The two to blossom at this season are mellow *Earliana* and *Gaiety* with broad, open flowers, striking lemon yellow. It is very fragrant and I believe that this variety will merit the approbation some of his earlier, famous kinds have enjoyed.

Shortly after peony bloom season here, about June 22nd, we have another group of hemerocallis. Here we have varieties that come from the wizardy of several famous daylily hybridizers. One of the pioneers in Daylily development was Amos Perry of England. One of his earlier varieties which we value highly is *Iris Perry.* It is a rich shade of orange, cup shaped blooms held upright like an umbellatum lily. Its chief value is that it flowers for a long season. *Mikado,* by the dean of our hybridizers, Dr. Stout, does very well for us. It is another long season bloomer, often volunteering stems until October. Dr. Stout's *Serenade* is a dainty color. It may not be colored definitely enough for garden culture but its curly, twisted petals and delicate colors certainly make it a charming cut flower subject.

With the advent of July varied hues in hemerocallis greet us. Several of Mrs. Nesmith's striking creations flower. We particularly like the red tones of *Romany Lass.* Bicolored *Bold Courtier* is one of the outstanding new ones. A variation, more orange red, is dashing *Rajah* with its jewel-like center of embossed red. For a cheery color we like *Rosita,* quite rosy red, bright and very attractive. We have seen very few of the ambiguously called pink hemerocallis which did not leave us with a "let down". Using this year's bloom as a criterion, *Sweetbrier* was our choice. We would prefer to call some of the varieties described as pinks soft chamois-colored. Surely pink is a minor note in the color makeup. Two varieties having similarity in coloring are *Crystal Pink* and *Cleo.* Both are striking developments in this soft colored class and along with later blooming *Araby,* with its zone of brown in the center of the flower, represent one of the newest shades these plantsmen have given us.

We enjoy the variation in the form of hemerocallis and would dread seeing the form of this flower standardized as it is in the gladiolus. We enjoy for their variation in form and dainty coloration curly *Wau Bun,* embossed *Gloaming,* enticingly flecked; copious, full blooming *Mrs. A. H. Austin,* the broad star-like form of gilted *Golden Sceptre.* And who doesn't delight in the trim-cup shape of *Anna Betscher,* the huge, tubular, Easter-lily like trumpets of lovely *Sir Michael Foster.*

As our season progresses we come to late midseason kinds, August in Minnesota. Here we have a galaxy of stars that conjure up imaginations of Oriental splendor. Some of the striking developments have been in the red, rose and brown tones. High in merit rank *Dawn Play;* bright, festive, gay *Matador*—so brilliant it glitters. Much hybridizing has been done with the rose red form of *Hemerocallis fulva*—a varietal example is *Rosalind.* It is, in our estimation, finer than many of its children. It is a lovely color. Deep sonorous, brown-red *Wolof* has a

new tone, best planted near yellows as a foil for its slightly dull tone. Boldly patterned with touches of brown on yellow is deftly marked *Fulvalo.*

I have mentioned colors and tones of red mainly in this late blooming group. Of equal, or more, importance are the yellows and oranges. Indispensables at this season include *Hyperion,* a trumpet; *Sunny West,* fragrant and lovely. We consider *Golden Dream* one of the finest oranges and cannot understand why it is not more praised. Blooming for the first time *Nebraska* looks like one of the finest yellow varieties to come from Mr. Sass. Living in the heart of the Midwest, Mr. Sass has given us some striking creations embracing already mentioned *Sunny West. Nebraska* has long, tubular blooms. *Star of Gold* is the long spreading petalled type, very pleasing. *Golden West* is well liked down East. Here it does not seem as striking. Perhaps with *Nebraska* his other most unique development is *Hesperis,* a hemerocallis of rare form —creamy yellow, almost cream white.

To us one of the most important sections of hemerocallis are the extra late flowering kinds. After a long dry summer flowers are at a premium and the perennials are in need of flowers. Thus extra late blooming kinds, blooming for us from August 20th to as late as September 20th, are a class especially enjoyable. The few varieties are divided roughly into two classes, the very small flowered Multiflora hybrids, best examples are orange and brushed red-brown *Boutonnaire,* more pure orange *August Pioneer* and pure yellow *Buttercup.* Each is valuable for their season and their many budded stems. With us *Hankow* is late, a fulvous colored kind of the species *H. fulva.* It has bloomed very late for us twice. Our most striking late bloomer was the variety *Dorothy McDade.* It has larger flowers than others, is a pure yellow of nice trumpet shape. An origination of Hans Sass, all rights are owned by Mr. Clint McDade of Chattanooga, Tennessee who is specializing in the very late blooming hemerocallis. Some interesting new developments are promised from his work.

Let me conclude by saying this review does not attempt to cover the entire variety field. It rather embraces the varieties I have grown and observed myself. This year I added to my collection over 36 new kinds. So we await next years bloom with pleasant anticipation.

DAYLILY BREEDING EXPERIENCES

J. Marion Shull, *Maryland*

My interest in daylilies seems to have grown quite naturally and almost imperceptibly out of a long experience in Iris breeding, which I had been carrying on for more than a dozen years with a fair degree of success. A student of genetics, always keenly alive to manifestations of heredity, it implied no great diversion of interest when in 1927 I turned to the daylilies and made my first deliberate crosses.

Well aware of the seed sterility of *Hemerocallis fulva* I made no wasteful attempts to produce seed on this, but used its pollen instead,

on *H. Thunbergii (=H. serotina).* A number of plants resulted from this cross but only one differed materially from the seed parent. This one, however, fairly shouted its hybridity. It was so unlike either parent, not as large as *H. fulva* but with considerably wider segments, a good bright orange overlaid with a close flecking of red, a "fuller" flower than either parent, in fact so different that my interest was immediately engaged to use it further to see what might come out of succeeding generations.

I first pollinated this with a clone acquired under the name of *Florham,* probably one of the sisters issued carelessly under that appellation all of which are now shrouded with some uncertainty. Later other clones were used with this same hybrid. Only an occasional pollination proved successful, perhaps one in twenty, but the resulting progeny displayed the expected variability and so my interest in daylilies grew.

Then in 1933, by arrangement with Mrs. Nesmith I obtained from her Fairmount Gardens at Lowell, Mass., a number of the choicest things then available, the aim being to acquire, not a large collection but the best of varying types. These, combined with my hybrid "Thulva" are the basis of more recent work.

SELECTIVE BREEDING OF HEMEROCALLIS AT THE UNIVERSITY OF FLORIDA

John V. Watkins

Assistant Professor, Horticulture

University of Florida

For more than a decade the hybridizing of Daylilies has held the attention of the writer and thousands of pollinations have been made on plants growing in the Daylily Display Garden on the campus of the University of Florida. This collection, which comprises one hundred and thirty-four of the leading commercial varieties, has been assembled here for study and for demonstration. Pollinations have been made with a view to the origination of seedlings which would have, it was hoped, specific characters thought to be of value to southern gardens.

Two lines of attack, only, were followed. The aim of the first is toward the production of a seedling that will bear flowers of a clear, sprightly red with wide, heavy petalage that will not disintegrate in the Florida sun. Crosses were made with pollen from wildlings from China upon blossoms of a commercial variety of good form. After careful evaluation of the hundreds of seedlings that resulted from the crosses, all were discarded save one. This plant was retained, critically observed for four years under Florida gardening conditions, and, last spring was described in HORTICULTURE. This Brazil-red Daylily was named in honor of Mrs. John J. Tigert, the wife of the President of the University. Further hybridizing within this same strain of Hemerocallis is being carried on intensively, and additional selections will be made as the seedlings are of sufficient merit to warrant introduction.

The aim of the second line of selective breeding was toward the creation of a variety that would bear tiny, cherry-red blossoms on scapes that were but a foot in height. Hundreds of pollinations have been made in an attempt to breed a miniature Daylily of this description and a stock of parent plants has been built up after five years of intensive effort. None of these miniatures is sufficiently dwarf, none bears flowers that are tiny enough to fulfill the original ideal, although visitors have been unanimous in their praise of certain of the seedlings in this strain.

Every blossom that is produced by these liliputians will be self- or cross-pollinated in an attempt to create the Daylily that most nearly resembles a cherry-red Freesia.

In this program no work is being carried on with the plants that bear yellow or orange blossoms, no pollinations are being made which might result in the much-wanted white Daylily, nor are there lines of attack being pursued which might result in bi-colors or large flowers in the clear pink shades. The writer has observed many excellent seedlings in the gardens of other hybridizers which might well fill the needs in these categories.

THE NESMITH DAYLILIES

Mrs. Ethel P. Dewey, *New York*

Elizabeth Noble Nesmith, (Mrs. Thomas Nesmith) of Fairmount Gardens, Lowell, Massachusetts, has a garden full of beautiful daylilies *(Hemerocallis)* which she has spent years to collect and breed.

About 1926 she began the work of hybridizing with such available clones as *Apricot* and *Ophir* and the well known *H. flava, H. fulva,* and *H. citrina.* When a fairly large number of Betscher hybrids were introduced by the Bay State Nurseries in 1929, she obtained and used them to breed extensively as well as a considerable number of clones from Mr. Amos Perry of England which she imported in 1932 and 1933.

Being fortunate enough to receive divisions of *H. fulva rosea* (No. 1 and No. 2) in 1932 she was able to make crosses for pink-hued blossoms.

Through experience she found that *H. fulva rosea* had a tendency to break down the size of blossoms used as parent plants and later used only very large flowering clones for these crosses. *Imperator* because of its excellent branching habit and *Golden West* because of its substance, she found invaluable. *Cissy Giuseppe* has been extensively used for some shades of pink but especially for purple hues.

Mrs. Nesmith's selections of hybrids have been made from thousands of seedlings over a period of more than ten years and her first offer of daylilies was in her catalogue of 1931. At the present time she considers her breeding of Hemerocallis her most interesting work.

The following five varieties include both early and late flowering selections: *Crown of Gold*—clear deep orange, May and June; *May Morn*—orange yellow, May and June; *Golden Dawn*—large orange yellow, June and July for the rockery; *Springtime*—clear orange, mid-

rib lighter, May and June; *Romany Lass*—dark mahogany—red with purple zones and gold throat, August.

Many pink-hued daylilies are listed among her hybrids: *Pink Lustre* —large, flesh pink with creamy midrib and lustrous sheen, July and August; *Crystal Pink*—flush pink, deeper eye zone and pearly lustre; *Sweetbrier*—fresh pink of better form, and more branching than Rosalind; *Dolly Varden*—beautiful chinese coral pink with rosy lines and frosty sheen, July and August.

Deepening in color from rose-red to dark purplish red are: *Tartar Prince*—early, maroon purple extending deep into the throat, June and July; *Burning Star*—Nepal red like a ruby red lily, August; *Dawn Play*—velvety rose red with gold heart 50″, July and August; *Persian Princess*—very deep red, over flushed purple, with sepals a shade lighter, rich, golden throat; *Petra*—wide reflexed petals of glowing rose, sepals yellow heavily over-flushed rich rose, deep yellow throat, August. This last mentioned daylily is considered by Mrs. Nesmith as her finest introduction of the darker colored daylilies.

Outstanding in her garden in July was *Bold Courtier*—A very large flower with long petals of Pompeian rose with creamy midrib. The petals are very broad and full at the throat. The sepals of soft yellow are strongly recurved and very slightly flushed with rose near the throat. The effect is a very large and beautiful bi-color.

The nearest to white in color of any hemerocallis I have ever seen is Mrs. Nesmith's description of *Starlight*—a tall well-branched daylily with flowers of palest yellow, July and August. *Summer Eve* should not be omitted from the list of hybrids from Fairmount Gardens. It might well have been named "Cinderella" for it changes into new colors in the late afternoon. The morning finds the new flowers a pinkish hue of orange which do not deteriorate but change into a soft apricot of peach pink. Not all of the blossoms change at the same time so that the plant often appears to have two distinct sets of flowers. The blossoms are full and of good size.

A critical examination of the hybrids introduced at Fairmount Gardens shows that careful, intelligent thought has been the basis of the breeding program. The standards of evaluation have been raised year after year as they have with other hybridizers.

There is perhaps shown here more of what I choose to call the "human element" in the release of some of the earlier hybrids. The desire to share with others the best which we have at a particular time. The transformation from the old Lemon Lily to a perfect hybrid of some five generations or more of breeding is too great a feat for rapid accomplishment, and the plant amateurs are only too glad to have the best selections as each step in advance is made. To wait for ultimate perfection before making any introductions would deprive the gardener of much joy and happiness.

Mrs. Nesmith is one of the pioneer breeders of pink and red-hued daylilies and she has had the courage to name and introduce numerous daylily varieties. She has released and listed them for sale in her

catalogue year by year as they were gradually developed. There can be no doubt but that she has done much for the improvement of the daylily and for the advancement of popular appreciation of daylilies.

HYBRIDIZING DAYLILIES IN FLORIDA

WYNDHAM HAYWARD, *Florida*

A number of influences led to the writer's interest in the possibilities of breeding daylilies under the favorable conditions of a sub-tropical climate. Familiarity with the commonest kinds in the home garden in New England when a child, their close affinity to the Amaryllids, which becomes apparent to anyone who has worked with the latter flower, and the inevitable instinct to work with a promising decorative garden plant, were some of the inducements.

About ten years ago the writer saw a clipping from the New York Times describing some plants of rosy-pink daylilies that Dr. A. B. Stout was growing and hybridizing at the New York Botanical Garden. At the same time he received some plants of *Hemerocallis fulva* cl. *Kwanso,* the double clone, from the Henry Nehrling collection in Florida, and he enjoyed several discussions in the matter of breeding hemerocallis with the late Theodore L. Mead, of Oviedo, Fla., who had grown a number of early types and produced one named clone, *Chrome Orange,* which still has merit as a garden clone under proper conditions.

From the Farr Nursery Company about nine years ago were obtained plants of Dr. Stout's first group of named clones, *Mikado, Soudan, Vesta, Cinnabar,* and *Wau-Bun.* These proved all to be evergreen, and thrived under Florida conditions. About 1935 and 1936 a few hand-hybridized seedlings were grown, and other clones of the leading breeders of daylilies were added to the collection. Dr. A. B. Stout donated a number of plants of unusual and standard horticultural clones, and wild types to the University of Florida and the American Amaryllis Society trial collections in Florida and gradually these became available to growers over the state through exchanges and test distributions. Included in these were *H. fulva* var. *rosea (Rosalind)* and *Vulcan,* and in common with several other hybridizers, the writer undertook the breeding of the darker colored and rose-pink hemerocallis hybrids.

One of the best of the early seedlings that the writer bloomed after 1935 was the clone named *Araby,* which still seems attractive to many garden lovers. One of the most recent is *Emperor Jones,* a dark mahogany red which has been sensationally popular. Others of the writer's introductions which have met with some favor are *Cleo, Rosita, Minnie, E. W. Yandre, Old Rose, Florida, Osceola,* etc.

In breeding, it has been the intent to use only the best types and finest clones for color and shape combined, so that good form will be paramount in the results. The daylily world is cluttered with nice colored flowers of indifferent form. Only rarely in the seedlings does the happy combination of fine form and good color appear. Distinctive shape will make a daylily of inferior color outstanding and attractive.

Of course bad color as muddy, dirty tones and clashing, screaming hues are to be avoided.

Even using the best clones of Dr. Stout, Amos Perry, H. P. Sass, Carl Betscher and others it has proved to be a slow and tedious process to arrive at anything really new and distinctive. One or two seedlings out of each batch of several hundred or several thousand will prove worth keeping. The grower must be rigorous indeed in his discards. An outstanding new seedling hits the eye with a shock in a field of mediocre results. Not even one tenth of one per cent of the seedlings from the apparently most promising breeding material will be found top-notch.

Florida has peculiar advantages over northern climates for the breeding of daylilies, especially evergreen kinds, as are most of Dr. A. B. Stout's. Incidentally, the evergreen kinds are best for garden use in the lower South and warm climates generally because of the decorative value of the foliage in the winter months. In Florida evergreen daylilies will grow every month of the year, and seedlings may be pushed and flowered in one year from the date of planting in some cases. Sometimes, however the best types in a batch of seedlings will not flower for two or three years, so care should be taken not to throw away a batch of seedlings too soon.

DAYLILY NOTES FROM WEST VIRGINIA *

LEON H. LEONIAN, *West Virginia*

Growing daylilies from seed is rapidly becoming a fascinating pastime because ordinarily there are few duds among the ensuing seedlings. As it takes considerable will power to discard so many nice seedlings and keep only one or two superior plants, soon we will be facing the danger of too many named varieties and the subsequent chaotic condition in the classification and evaluation of daylilies. If things continue at the present rate, there will be hundreds of new varieties dumped onto the market within the next few years. For instance, this year thirty-six new varieties were introduced by one person alone. Many old and new breeders will undoubtedly follow suit in order not to be outdone, and some poor souls are going to have an awful headache trying to separate the grain from the chaff.

I must confess that I am not qualified to speak authoritatively about the numerous varieties of daylilies—in the first place, having devoted all my attention to fulvous sorts I know next to nothing concerning the yellow and orange colored varieties, and in the second place I have only a limited experience with the fulvous hemerocallis. I cannot expect to grow and even to see all worthwhile reds and pinks of other breeders because many of these are as yet unreleased, others are jealously guarded, still others have different periods of blooming so that one would be obliged to make several trips to the garden of a given breeder, and

* Being under contract, I am not at liberty to sell, exchange, or give away seeds or plants of daylilies developed by me.

finally some are mere wishful thinking, existing only in the bright imagination of some persons. Therefore what I have to say in this article should be considered the opinion of a daylily lover rather than that of an authority.

Many gardeners prefer yellow and orange hemerocallis to fulvous types not because they are prejudiced against reds, but because they realize that the quality of the yellow and orange tones in this flower is infinitely better than the quality of the reddish ones. The yellow of daylilies is not surpassed by other yellow flowers, but the red of fulvous varieties is surpassed by the quality of red of other flowers. Generally speaking, the red of hemerocallis carries too much of the brownish and mahogany tones, too much muddiness, and consequently is shallow and dull. The red of tulips, of roses, of dahlias, or of poppies is far better red than that of the reddest hemerocallis. As concerns the pinks, we seem to be much worse off. The pink of hemerocallis does not at all compare with the pink of carnation or of the rose; it is a shallow, dull pinkish tone; it has a long way to go to be a clear and sparkling pink. I realize that some breeders will have superior smiles on their faces when they read this, but I also realize that everyone imagines his duckling to be a swan. Witness some of the catalog descriptions; one would think that perfection was achieved already and there was nothing more to do.

My first acquaintance with "red" hemerocallis began with Cissy Giuseppe. It was described so poetically and with such bubbling enthusiasm that I could not resist, and purchased a plant at a ridiculously high price. What a rude awakening followed when the mean little flowers opened for me! Since then I have grown and watched a number of fulvous varieties; some proved to be bitter disappointments, others pleasant surprises. I have been particularly well impressed with four varieties that were developed in Florida: *Dr. Stout, Victory Taierhchwang, Emperor Jones,* and *E. W. Yandre.* The first two were introduced by Dr. Traub, and the latter two by Mr. Hayward. They stood our cold months well, and although last year we had a long and very severe winter, these Floridians came through with flying colors and flourished vigorously. The daylily *Dr. Stout* opens in the garden like a veritable sunburst, remaining bright and fresh all day. The flowers are large, well formed, well displayed, produced in abundance, and have a unique and pleasing coloring, sunburst infused with streaks of red. It should be seen in order to be appreciated. This variety is described as a recurrent bloomer in Florida, but with me it blooms but once.* Recurrent blooming habit may be very nice, but well established plants may continue to bloom for a long time. For instance, some of my own seedlings begin to bloom in June and continue well into September. *Victory Taierhchwang* is a showy, vigorous, and floriferous plant. The color of the flowers is described as Spanish Wine, but I would like to have it a bit clearer and possessing more sparkle. However this variety should have a place in the garden particularly in view of

* Clones that are recurrent bloomers in central Florida may not behave similarly in regions with shorter growing seasons. —Ed.

the fact that it retains its color fairly well throughout the day. Mr. Hayward's *Emperor Jones* is a very dark colored daylily, a deep mahogany red rather than "purple-black," and in common with other daylilies of the same coloring it does not stand the sun well. This is a large-flowered, showy plant and will perform well in cooler climates and in partial shade. *E. W. Yandre* is a very outstanding thing because of its flaring type flowers and wide petals. If instead of fulvous-bronze this variety possessed a clear ruby red coloring, it would be hard to surpass; but even so it is a distinctive daylily.

My own efforts have been centered on color quality rather than on any given form of flower. The development of clear, sparkling colors and the extension of color range are our greatest needs in daylily breeding. We should endeavor to eliminate brown from the red and substitute purple, then to intensify and eventually to segregate the purple from red. From then on a train of fascinating possibilities would be set in motion. I have made some progress, but much remains to be accomplished. Old rose, lavender, and magenta shades are now being evolved, but these have a long way to go before their tone quality can be considered as satisfactory. Clear ruby reds and scarlets, and very deep, blackish-maroons have progressed more than others, and deep rosy pinks in sparkling colors are beginning to show, but all of these are mere beginnings and the ideal color is still in the future.

In the not very distant future all of us will have our maroons, our reds, and our pinks, and one red will appear very much like another red, one maroon like another, and one pink like another pink. It is not going to be possible to control duplications because no sooner is some promising variety released than it is grabbed by every breeder and freely intercrossed with other varieties. As no one has a corner on breeding methods, many excellent varieties are certain to be developed and eventually released. As red, maroon and pink colors become common, the alert breeder will endeavor to turn out varieties so different from all others as to focus upon themselves the admiration of all daylily lovers. From now on it is going to be very difficult, if not impossible, for any one breeder to tower over all others in the development of exciting new varieties. The pioneers have cleared the way and have furnished the basic breeding material. No longer need we grow seedlings by tens of thousands in order to select a few promising things; judicious crosses made between some fine varieties will often yield a surprisingly large number of good reds.

I think that more attention should be devoted to the production of blends. I do not mean bicolors but such things as pastels where two or more colors are fused into an attractive whole. It is my prediction that good pastels are going to have more admirers than reds. Also the possibility of a great many combinations of pleasing shades is going to enable the breeder to extend himself as far as possible. Sometimes the blends become very intriguing; for instance, some of my own seedlings at first glance appear to have an odd shade of soft yellow, but upon closer examination one comes to the conclusion that there is a glow of salmon, and a hint of pink somewhere showing through the yellow.

Most people like bicolors, but unless the two shades are well matched, much of the attraction of this type of flower is lost. Often the basal spots of reds on a background of yellow appear like hastily applied patches. Instead of a sharp differentiation, I would prefer to have the red gradually diffuse into the yellow. One of my own seedlings that appeals to me very much has a combination of soft lavender and pale yellow, very nicely balanced on broad, flaring sepals and petals. Reddish purple and orange combinations in others offer the warmer aspects of bicolor daylilies.

The form of individual flowers has great weight with most breeders. The consensus of opinion seems to be that wide-petalled, flaring flowers are to be given preference over the narrower sorts. My plea is to break away from dogmas. Standardization may be all right in breakfast foods, in drug stores, and in tooth pastes, but why introduce it into the flowers? It is true that wide petals and flaring habits make the flowers appear larger and more showy, yet it is equally true that well formed, nicely curved back, and narrow-petalled flowers are more graceful. When several flowers of this type appear in clusters they seem like gigantic azalea blooms and are very attractive indeed. If well proportioned and well balanced, any floral type will have its followers.

WHY I AM INTERESTED IN DAYLILIES

ELMER A. CLAAR, *Illinois*

Gardening is a hobby of mine. I am not even a good gardener but I do have a lot of fun with it and I would like to have a maximum amount of fun with a minimum amount of work.

My garden is on a corner lot which in size is one hundred by two hundred feet. It has nine large trees on it, some of them with a diameter of between 2 and 3 feet. Being a corner lot, there are also a number of additional trees on the lawn area so there is considerable shade. I love the trees and I would not be without them. Among the plants that I am growing are iris, delphiniums, peonies, roses, mums, phlox, dahlias, tulips and daylilies.

I am very fond of iris but on account of the large amount of shade on my lot I have had to constantly pamper them and I have had an excessive amount of root-rot and borer. I do wish the hybridizers would develop a strain of iris that would grow in the shade. They are so beautiful that I shall always try to grow them.

Delphiniums are very beautiful but I lose a considerable number of my plants each year. I shall let somebody else raise them from seed. I shall buy the plants, enjoy their bloom and replace them when they die.

Peonies are wonderful flowers. Starting with the species, I have bloom for two months. It must not rain when the big doubles are in bloom or each flower must be staked. The sun must not get to some of those with the highest ratings or the lovely pinks and yellows will become

a faded white. The only way that you can see many of them at their best is to cut them and take them inside away from the sun. However, they require a minimum of care and are one of my enduring favorites. I shall always have peonies.

I am very fond of roses but they must be sprayed every ten days, fed often, never watered with an overhead watering system but have the water applied at the roots, cultivated regularly and not fed after August. They are beautiful and worth every effort necessary to maintain them. I shall always grow them.

For the life of me, I can't keep rust and mildew off of phlox and mums but I love them and my present attitude is that I shall always keep trying.

Dahlias are beautiful with a tremendous range in colorings but you must hitch them to a post which does not look well in any garden and you can raise them best under cloth. One should spray, feed and cultivate them regularly. I lose many tubers in storage in winter. I'll have a few big ones in my garden but I like the dwarfs best.

I tried to raise gladiolus but the thrips destroyed almost all of my flowers. Spray them once every ten days to overcome this and feed them regularly. They are so irregular in growth that I will not grow them in my garden but they can't be surpassed in a bouquet. I can hardly pass a florist shop without stopping when I see a bunch of *Picardy, Minuet, Maid of Orleans* or *Golden Chimes.*

I heard of daylilies *(Hemerocallis). Hemerocallis* means "beautiful for a day." This a very inappropriate name; it directs attention to the least desirable fact about the flower. It would be just as if we called glads "thrips" or Iris "root-rot". Daylilies will stand neglect, insect pests, lots of rain, lots of drought and you don't have to have sprays or any special cultural requirement. They will grow in any location, sun-baked or partly shaded; soil rich or poor, acid or alkaline, sand or clay. Plant them almost any time and they thrive. I actually received a shipment from Mr. Amos Perry in England in December that were outside with no special protection, except a few leaves, but the plants all lived. Daylilies "Can take it" but, like everything else they do best when you are kind to them. They are available at varying flowering seasons in a wide range of heights and colors; lovely colors like pink, rose, raspberry, red, maroon and ivory, bi-colors with vividly contrasting segments—alternating three petaloid segments of cherry red, maroon or brown and three sepaloid segments of ivory, yellow or orange. Many of the flowers have a number of different colors. Many have one color overlapping another color, like shot-silk. The flowers are as large and as fine as the finest lilies and are borne in greatest profusion, a single scape having as many as 20 flowers with large numbers of scapes to an established plant. One plant may have several hundred flowers during a season and at one time a great many flowers will be open.

However, what is most important to me is that they will grow in my garden under my trees and that I do not have to harness myself to a dust or squirt gun or a hoe or feed-bag to enjoy this flower. They are

at their best when the heat and drought of July and August have parched the lawn and when our other favorites are out of season. Buy a few of the new hybrids and you will soon be lustily singing their praises.

My daylily breeding work is in its infancy. I have over 1,000 seedlings but up to the present time have not introduced any clones.

DAYLILY BREEDING IN SUBTROPICAL FLORIDA

HAMILTON P. TRAUB, *Florida*

The writer was infected with the daylily fever by association with Mr. Wyndham Hayward. Although a valiant struggle was put up, bringing to bear all the old arguments about the lack of versatility in daylilies, and so on, resistance was entirely hopeless. Mr. Hayward made an extensive collection of species and clones, and soon he had a few enthusiastic converts, including the writer and Mr. R. W. Wheeler, in Orange County, Florida. The writer started active daylily breeding operations in 1933, and found that very rapid progress could be made under Florida conditions. Many seedlings under excellent growing conditions bloomed in 11 months, and practically all flowered at the end of the second season after sowing seeds.

The growing of daylily seedlings is fairly simple. The seeds are planted in flats as soon as harvested, beginning in May for the earliest flowering sorts. The flats, 20 inches long, 12 inches wide, and 5 inches deep, are filled to a height of 3½ inches with a very rich potting soil. A ¼ inch layer of coarse sand is spread on top of the soil, and the seeds are strewn thickly over the sand, and sand to a height of ¾ inches is added. The flats are covered with window-screens to keep off birds, mostly Blue Jays, Mocking Birds, and Thrushes, insects, snails, and rodents, and are set in the full sun.

The tropical rains that beat down on the small seedlings almost daily during the summer, water-log the soil and cause mechanical injury to tender seedlings. The purpose of the sandy layer is to provide a well-drained place for the crown, and to minimize any rain-caused mechanical injury.

From September to November, the seedlings are transplanted for testing in soil, enriched with well-rotted manure. They are spaced 3 inches in the rows that are 8 to 12 inches apart. Regular fertilization, every four months, with a mixture (at least 1 to 1½ tons per acre) of 4 per cent. nitrogen (half from organic sources), 8 per cent. phosphorus, and 6 per cent. potash, and small amounts of the micrometabolic elements zinc, copper and manganese, as sulphates, is advisable on the sandy soils of central Florida.

The seedlings are not molested by grasshoppers or other insects, except that when quite small they are relished above all other vegetation by a small sluggish leaf cutting ant that seems to exist in small colonies. The large Lubber grasshoppers that devour other amaryllids never touch daylilies. We may presume that the daylily contains a compound or compounds that are harmful to such insects, and attempts to isolate such

compounds for use in insect extermination may be worth while. It is also worth noting that comparative protection has been secured for insect susceptible amaryllids by planting them among daylilies. Apparently the grasshoppers are fooled by this method of camouflage. When the plants are fully grown and in flower, a green, katydid-like insect sometimes rasps open the seed capsules, and devours the seeds, but as a rule only a relatively few capsules are affected. The small pollen-gathering insects, *Halictus reticulatus,* regularly visit the daylily flowers and by noon have carried away most of the pollen. If crosses are made with pollen gathered early on the previous morning, these depredations are of no importance.

The daylily breeding program will be intimately bound up with local climatic conditions. In central Florida, the early flowering clones begin to bloom in the middle of February and continue on through March and April. These are followed in May by the "mid-season" clones, and most of the late ones bloom in June. Most clones are recurrent bloomers in Florida, and the season extends into September. However, after July, the amount of bloom is considerably reduced. At present we have no clones that flower in October through January, although the evergreen types will make root and leaf growth during these months. Occasionally some of the earliest clones—*Queen of May, Domestico,* etc.,—will bloom in January, but this is quite unusual. Some species, and clones developed in the North, are unsuited to the subtropics. Most species, and clones like *Cissy Giuseppe,* sulk and remain dwarfs. Clones like *Midas* refuse to live, and *Wau-bun, Soudan* must be watered during the flowering season (spring) for good results in a region with tropical rains in summer and semi-arid climate in winter and spring. Clones like *Mikado* and *George Kelso,* however, thrive under the utmost neglect.

The daylily breeding program for central Florida therefore will differ somewhat from that of more northerly regions. Such evergreen types as *Hemerocallis aurantiaca,* and *H. aurantiaca* var. *major* will be much used in crosses, and an attempt will be made to secure drought resistant, very early and late flowering clones. Recurrent blooming will also be sought since each new flowering period gives finer flowers than those produced toward the end of a single extended blooming period. The objection to daylilies in the past has been mainly that they were too definitely typed, and that in the color range there was too much yellow and orange and fulvous. The first consideration should therefore be *to extend the color range, and to secure more subtle coloring.* In shape too there is need for greater variety. In fact the objective to be sought is the greatest possible variation in all characters so as to make the daylily more generally useful in the garden, as a cut-flower, and in landscape design.

The breeding method adopted was based on the objectives in view. Dr. Stout had already made a study of inheritance in the daylily and his results will undoubtedly be given to the public sooner or later. It was therefore not necessary to duplicate this work, and the efforts could be concentrated on the task of securing in the shortest possible time the greatest variation in all characters. If pollen from one pollen parent is

Table 1. Hybrid Daylily Clones originated by H. P. Traub, 1933-1940, inclusive.

Stature, clone, and year of introduction	Numerical rating[1]	Dominant flower color[2]	Flowering date[3]	Foliage character[4]
DWARF—below 1 ft.				
None introduced.				
SEMI-DWARF—1 ft. to 2 ft.				
Cecil Houdyshel (1939)	T8.0	Doge Red (4-K-9)	May-I	E
Corinne Robinson (1939)	T9.0	Very light pastel pink (Etruscan, 4-G-11)	May-I	PE
Helen Wheeler (1940)	T8.5	Pastel pink (Etruscan)	May-II	E
Rouge Vermillion (1940)	T8.6	Rouge Vermillion RHS-19	May-III	PE
Theodore Mead (1940)	T9.8	Saffron Yellow RHS-7/1	Apr.-I	E
Wekiwa (1938)	T9.5	Rich velvety red	Apr.-III	D
SEMI-ROBUST—2 ft. to 3 ft.				
Carnival (1939)	T9.6	Moro Red (7-L-10) Aureolin throat	May-II	E
Charlotte Traub (1938)	T8.5	Emberglow (3-G-10)	Apr.-II	PE
Dr. Hughes (1938)	T9.0	Orange, suffused vinaceous rufous	May-I	E
Duchess of Windsor (1937)[5]	T9.8	Refined light orange with polychrome sheen	May-II	E
Estelle Friend (1939)	T8.0	Burmese Gold (3-C-11)	Apr.-I	D
Fire Red (1940)	T8.8	Fire Red RHS-15	Jun.-I	PE
Fred Howard (1939)	T9.5	Clear Ember (5-K-10)	Apr.-III	PE
Gloriosa (1938)	T7.6	Algerian Red (5-L-10)	Apr.-I	E
Golden Glow (1938)	T8.6	Rich Golden Glow (9-L-6)	Apr.-III	E
Granada (1938)	T9.0	Monterry Red (5-J-12)	Apr.-I	E
Happiness (1938)	T8.5	Bright coppery-rose	Apr.-I	E
John Blaser (1939)	T8-8	Clear apricot (9-K-5)	Apr.-I	D
La Tulipe (1939)	T9.6	Dark Cardinal (6-L-8) sulphur throat	Apr.-II	E
Lena Hughes (1938)	T8.0	Salmon rose	Apr.-I	E
Mauve Rose (1938)	T7.5	Mauve Rose (7-E-5)	Apr.-II	E
Mayor Starzynski (1939)	T9.5	Glistening bronzy-rose	Apr.-II	E
Mildred Orpet (1939)	T9.8	Peach Blush (5-C-11)	May-I	E
Peony Red (1939)	T9.0	Peony Red (6-J-6)	May-I	E
Reba Cooper (1939)	T8.5	Sunrise (10-C-7)	Apr.-I	E
Victory Taierhchwang (1938)	T8.7	Spanish Wine (7-J-6)	Jun.-I	E
ROBUST—3 ft. to 5 ft.				
Audrey Blaser (1939)	T7.8	Sunkiss (9-K-9) suffused rufous	Apr.-II	E
Dr. Stout (1938)	T9.8	Sunburst, suffused Moroccan red (5-K-11)	May-III	E
Elaine (1938)	T9.0	Delicate light salmon rose	Apr.-III	PE
Emberglow (1940)	T9.0	Pale yellow shot Emberglow	May-II	E
George Kelso (1940)	T9.6	Orange, suffused bronze	Apr.-I	E
Indian Chief (1938)	T9.6	Totem Red (4-J-12)	May-I	E
Queen Wilhelmina (1940)	T8.6	Cadmium Orange RHS-8/1	May-II	E
Russell Wolfe (1939)	T8.5	Near Spanish Wine (7-J-6)	May-II	E
San Juan (1938)	T9.1	Very deep Spanish Wine	May-I	PE
St. Joan (1939)	T9.0	Moroccan Red, golden halo	Apr.-I	E
Victory Montevideo (1940)	T8.5	Chianti (6-L-6)	Mar.-I	E
Victory Suomussalmi (1940)	T8.8	Orange, suffused rufous	May-II	E
GIANT—Above 5 ft.				
None introduced.				

[1] The "T" before the rating indicates that this is the breeder's own rating under the conditions of High Hammock Orlando Fine Sand in Central Florida, and is not to be confused with any symposium ratings that may be given later. All of these clones were selected for the subtropical southeast, particularly central Florida.

[2] Color descriptions are based either on Maerz & Paul, **Dictionary of Color**, (initials not indicated), or on **Royal Horticultural Society Colour Chart** (initials "RHS" indicated).

[3] The approximate flowering dates are for central Florida; figures after months indicate: I = first 10 days (1 to 10); II = second 10 days (11 to 20); III = third 10 days, more or less, (21 to end of month).

[4] E = evergreen; PE = partly evergreen. D = deciduous.

[5] Originated by H. P. Traub, and donated to Mr. Wyndham Hayward. Mr. Hayward named it in honor of the Duchess of Windsor by permission of the Duke of Windsor. Mr. Hayward introduced it in 1937

used in making a cross on a seed parent, the number of combinations secured in one generation is reduced to a minimum, but if more kinds of pollen are mechanically mixed and applied to many seed parents then the number of possible combinations will be correspondingly increased. Although a limited number of crosses of the first mentioned type were made and duly recorded, the great majority of crosses were of the second type, and the results were quite up to expectations.

Between 6 and 7 a. m. in the morning during the flowering season, pollen was gathered from 20 or more clones and species, spread out in paper trays and allowed to dry indoors until the next morning when the dried anthers with pollen were put into a small gelatine capsule and the mixture was thoroughly shaken. Using this mixture, crosses were made early in the morning, except in the case of night blooming clones, in which case the pollinations were made in the late evening. From these crosses the writer secured a bewildering array of progeny that defied classification. Once the great variety of combinations had been produced, the next step was to single out the most desirable ones for further breeding work. This was a very difficult task for all the progeny were quite beautiful. It was not a question of the beautiful and more beautiful but rather that of the most beautiful. In most cases much attention was also given to constitutional vigor and floriferousness. Obvious colors were discarded in favor of more subtle, orchidaceous combinations.

Out of the first 10,000 seedlings only 0.8 per cent were selected for further study, and only 38 were named and introduced. The 38 clones are listed and very briefly characterized in Table 1. In the table, numerical ratings have been used to evaluate the clones as they grew in the writers garden at Mira Flores, Orlando, in central Florida, on Orlando fine sand, high hammock phase. An attempt was made to be as severe as possible. Only 16 of the 38 clones rate 9.0 or above; 16 rate 8.0 to 8.9, and 5 from 7.5 to 7.9. No clones rating below 7.5 have been retained. These ratings are entirely personal and should not be confused with any numerical ratings that may later be given by the Daylily Committee. Only 8 clones—*Mildred Orpet, Duchess of Windsor, Carnival, George Kelso, La Tulipe, Indian Chief, Theodore Mead* and *Dr. Stout*—rating above 9.5, are considered as approaching perfection. Many of the other clones are quite outstanding in some particulars, but may be lacking in others.

At the present stage in daylily breeding, it is important to retain certain clones for particular characters such as time of flowering, new colors, new flower shapes, etc. By making these available to other breeders, the improvement of the daylily will be speeded up very much. We need but to mention Hayward's clone *E. W. Yandre* that is being used by a number of breeders. From the standpoint of the advancement of the daylily, Mr. Hayward has done a great service in unselfishly sharing with others this new break in flower shape. The writer attempted for some years to secure very early flowering reds, but progress was slow for there was little to work with. By utilizing *Queen of May*

as a pollen and seed parent,, a clone with this habit and Chianti color was finally produced, and introduced as *Victory Montevideo.* This blooms in March and February and gives much needed variety during the early season in Florida. It is being used as the basis for additional breeding for very early reds and pinks.

In considering the whole group of 38 clones introduced, the writer is often asked to indicate the most outstanding. In the following brief appraisal, only a few clones will be mentioned as typical. From the standpoint of delicate and subtle coloring, *Mildred Orpet* is worthy of note. The color is beautiful in the early morning but improves as the sun beats down upon it, and in the evening the delicate peach-blush of the segments always lures one to the garden for one last look before nightfall. For real garden value, as regards vigor and floriferousness and richness in color, *Dr. Stout* is at the head of the list. It can stand the full sun. Among outstanding colors are *Fred Howard,* a clear ember without trace of fulvous coloring; *Mayor Starzynski,* a delicate bronzy-rose; *Peony Red*; *Rouge Vermillion; Corinne Robinson,* light Etruscan, a pastel shade; *Wekiwa,* a velvety red with the habit of *Wau-bun.*

From the standpoint of flower shape, *La Tulipe,* is noteworthy. Although it does not look exactly like a cottage tulip, it is reminiscent of this shape, and at first glance does not remind one of the daylily. The flower is almost upright, somewhat vase-shaped, and the throat is lighted up with clear orange, contrasting with the relatively small portions of the petals that are colored Dark Cardinal. The color is not particularly brilliant, but as in good design, the whole effect is, to say the least, quite pleasing and artistic. The other extreme is represented by such clones as *Theodore Mead* and *Carnival.* In *Theodore Mead,* all the segments are extra long, deep in color, of very excellent spangled texture, curled back and much twisted. In *Carnival,* the segments are recurved with edges slightly ruffled, the very large star-like throat is lighted up with orange-yellow that radiates as conspicuous stripes of the same color through the middle of the petals, contrasting with the small upper portions of the petals that are Moro Red. Here again, the color is not outstanding for brilliancy, but the total effect is that of happy abandon—hence the name. *Indian Chief,* a clear Totem Red, is outstanding for large size of flowers. *John Blaser,* clear apricot, with very narrow segments, and multiflora flowering habit, is a fine cut flower clone.

With reference to future work it should be said that the best is yet to come. After selection of the varied breeding material from the earlier progeny, it is important to utilize it to the fullest extent in breeding still finer clones. In the season 1939, over 25,000 seedlings were produced, and some of these bloomed at 11 months. In 1940, many additional crosses have been made. The clones to be selected from these vast numbers of excellent progeny should approach the ideal that the writer has had before him.

Finally, it should be stated that the writer is an amateur flower grower and breeder and has never sold any plant. All clones introduced have been donated to others, but in some cases plants have been received

Upper, Photo on Nov. 28. An F_1 hybrid of **H. exaltata (dormant habit)** x **H. aurantiaca Major** (evergreen). This hybrid is evergreen with lush foliage and continuous growth. Lower, Photo on April 12. Foliage entirely dead; plant fully dormant during winter. New growth, shown for one plant, appearing above ground from buds submerged during winter. Characteristic for **H. multiflora, H. minor, H. Dumortierii, H. Middendorffii,** and **H. Thunbergii.**

Plate 181

in return, but not on the basis of monetary value. The clones described above can be purchased from plantsmen who advertise in this issue of Herbertia.

Mira Flores,
Orlando, Florida,
July 4, 1940

FOLIAGE HABITS OF DAYLILIES

A. B. Stout,
New York Botanical Garden

The extremes in the habits of growth in the foliage of daylilies, especially as they grow and appear in autumn and winter at New York, may be described and classed as *dormant* and *evergreen.* But there is an intermediate and rather diverse class, some members of which are to be classed as *semi-evergreen* in winter.

The Dormant Habit

The daylilies which have no green leaves for a time during late autumn and winter may be called dormant in habit of growth. For these the period of most vigorous vegetable growth is in spring and early summer when there is the somewhat continuous appearance of new leaves. Then for the late summer and autumn the growth of the buds ceases (is *discontinuous)* or is much decreased (somewhat *sustained).*

In the fully discontinuous growth the last leaves of the season grow to full size or nearly so while much of the foliage still remains green. For some of the daylilies with discontinuous habit (especially *Hemerocallis Middendorffii, H. minor,* and *H. exaltata)* the foliage dies early in late summer or early autumn even before there are freezing temperatures. For others (especially *H. Dumortierii, H. citrina, H. Thunbergii* and *H. multiflora)* much of the foliage may remain green until frosts occur. Usually the youngest leaves are the last to die and some of these may not be of full stature, but the plants of these species are to be classed as dormant in winter and the growth during late summer and autumn is discontinuous or nearly so.

In a more sustained growth, at least some new leaves continue to appear after the spring season of most vigorous growth. But as winter ensues the foliage very fully dies back to the basal buds and then the plants are to be considered dormant. Growth is somewhat sustained for plants of *H. flava* but when late autumn arrives the live buds are almost enclosed by the bases of the dead and dying leaves with the tips of the larger buds protruding slightly above the level of the soil. For *H. Forrestii* the summer foliage dies back into the crown during late autumn and the new growth of the next year comes late in spring from the buds that are rather submerged.

The members of the species *H. fulva* are noticeably diverse in the degree of sustained growth and dormancy. For plants of the clone

Europa the older foliage turns yellow-green and then dies quickly in the period when frosts usually occur, and by November 15th, at New York, the foliage is dead and lax and is lying nearly flat on the ground and the live leaf-buds are short and compact and somewhat enclosed in the base of the dead leaves with the tips almost at the level of the ground. In winter when the dead leaves shrivel and disintegrate the buds become more or less exposed. In the late winter and early spring the buds enlarge noticeably and growth starts early even before the ground is fully thawed. Yet plants of the *Europa* clone are hardy far to the northward. The clones *Maculata, Cypriana* and *Rosalind* are quite similar to *Europa* as described above and so are various other plants of *H. fulva*. But the double flowered clones *(Kwanso* and *Flore-Pleno)* and some wild plants of *H. fulva* obtained in China and Japan remain with their younger and partly developed leaves more or less green throughout autumn or even winter.

In addition to the distinct and specific differences in the time when the foliage dies and in the precise character of the dormancy (abruptly discontinuous or sustained), there are marked differences in the texture, color and appearance of the foliage. The dead foliage may become lax and fall flat or it may remain rather erect in a mound; it may shrivel and decay quickly or it may remain tough and wiry; it may become loose and easily separated from the crown or it may remain rather firmly attached throughout the winter. In some daylilies the old leaves break irregularly leaving tufts of fibres which combine to form a somewhat conspicuous mat in the crown. In others the base of the dead leaves becomes thin, papery and brittle.

There are also differences characteristic of species in the position, size and shape of the live buds. During winter the buds may be rather deep in the ground (submerged), or they may be visible at the surface, or they may extend somewhat above the surface. In shape they may be short and compact or quite slender and elongated. When growth starts in spring the young leaves may be spreading or upstanding. Also the old dead leaves may soon spread and fall away leaving the buds exposed or the buds may remain for some time more or less enclosed in the bases of the dead leaves. Various of these characters are common to two or more species. For example, plants of *H. multiflora* and *H. Thunbergii* are very similar in having in autumn tough, wiry, reddish-brown and rather upstanding dead foliage.

Early spring is the time of vigorous vegetative growth in the foliage of daylilies. But there are noticeable differences in the growth of the various species and vigorous early growth and maturity of foliage are not always correlated with early flowering. Of the early-flowering species, *H. Middendorffii* makes vigorous early growth of foliage, *H. Dumortierii* is somewhat slower in the development of foliage and *H. flava (Lemon Daylily)* is still later in starting to grow. Also the development of foliage is somewhat similar for the early-flowering *H. Dumortierii,* the summer-flowering *H. Thunbergii* and the autumn-flowering *H. multiflora.*

The Evergreen Habit in Daylilies

Of the older types of the daylilies (those already known in 1895) as they grow in New York, the clones which were named *H. aurantiaca* and *H. aurantiaca major* have foliage that is continuously evergreen. In these the development of the younger leaves of various sizes continues (see Plate 181) until checked by severe winter weather and although the foliage is more or less frozen and desiccated when spring arrives there is considerable green foliage in sight. It appears that these daylilies have an almost continuous growth combined with the evergreen habit when they are grown in tropical and semi-tropical areas. Numerous of the named horticultural clones now in existence have inherited the evergreen habit from one or both of the two daylilies, *H. aurantiaca* and *H. aurantiaca major.*

The Semi-evergreen Habit

There are wide differences among the large number of hybrid seedlings and named clones in regard to the proportion of leaves that remains green during autumn and winter. Some which have relatively few green leaves in mid-winter may be classed as *semi-evergreen* or *semi-dormant.* It is possible that in semi-tropical areas some of these may have a short period of complete dormancy.

For certain members of the species *H. fulva* a considerable portion of the foliage remains quite green until much frozen during winter. Of these, the *Chengtu Daylily* appears to be almost evergreen, or at least semi-evergreen, at New York. But Mr. John Watkins has reported by letter to the writer that at Gainesville, Florida, this particular daylily is dormant with all its foliage dead for a "very short rest" while plants of the *Europa* clone have a "long rest." Thus the members of the species *H. fulva* are somewhat diverse in respect to the period of dormancy. In the North some are fully dormant in winter while others are somewhat evergreen.

Growth of Seedlings in a Greenhouse

The seeds for the daylilies grown at the New York Botanical Garden have usually been planted during late summer or early autumn and the seedlings have been kept in a greenhouse during the following winter. As a rule, the seeds of most species and hybrid progenies have germinated promptly; but there have been cases of delayed germination or even of seed-rotting without germination, some of which have been corrected by subjecting seeds to cold temperatures.

In the growth of seedlings kept in the greenhouse during the entire winter there are the same main types of growth (evergreen, semi-evergreen and dormant) seen in garden cultivation. But for seedlings with the dormant and discontinuous habit there are marked specific differences in the length and nature of the first period of growth, in the length of the period of dormancy that ensues, and in the character of the second period of growth that follows. In the resumption of growth in late

winter or early spring the seedlings which have certain species in their ancestry exhibit a somewhat abnormal type of growth which may be termed *repressed.* This and certain other features of the growth of seedlings may be modified or even entirely changed if seedlings are transferred for a time to a refrigerator or to a cold frame.

The evergreen habit. For seedlings which have the evergreen habit the development of new leaves is somewhat continuous as is the dying of the oldest leaves. There are, however, especially in hybrids of evergreen x dormant combinations, differences according to parentage in the rapidity with which new leaves appear and in the vigor, robustness, and character of the foliage. Usually seedlings with the evergreen habit are so robust that they are placed in the experimental plots during the spring. It has been noted that the continuous growth of seedlings which have the evergreen habit may be somewhat checked by repotting or by transfer during the winter to a cold frame and also to some extent by fluctuations of temperature and perhaps sunlight in a greenhouse. When this occurs there will be some leaves that are shorter than are the leaves at either side in the same fan.

Dormancy in seedlings. In the abruptly discontinuous growth of seedlings in a greenhouse the dormancy of the buds is a conspicuous feature (Fig. 53). Frequently only a few leaves are formed before the growth of the bud becomes discontinuous. In respect to the death of the first crop of leaves two main types of behavior were noted. (a) The leaves may die and the entire plant then has a period of at least several weeks of complete dormancy as far as green foliage is concerned or (b) the last of the first crop of leaves may remain green until the bud resumes growth (Plate 181).

In the resumption of growth during late winter after a period of dormancy, for seedlings growing in a greenhouse, the leaves may become upright and normal or they may become short, usually dark green in color, and rather spreading to form a low flattened fan *(repressed* growth) (Plate 182) which is noticeably different from the growth of the first period. The buds usually become dormant or nearly so. Seedlings of certain species (especially *H. exaltata, H. Middendorffii, H. Dumortierii,* and a wild type now believed to be *H. esculenta)* very generally have the repressed habit for the second period of their growth when kept in a greenhouse during the entire winter. But if seedlings which have this habit are placed in a refrigerator after they have become fully dormant and left in a temperature slightly above freezing for 30 days the new growth which they then make in the greenhouse is normal. Also the resumed growth is normal if the dormant seedlings are placed in a cold frame during late winter (about March 1st). But with the advance of spring during May and early June, seedlings which have been in the condition of repressed growth and have remained in the greenhouse may change to normal growth, as shown in Plate 182. But various groups of seedlings with repressed growth remained in this condition and some died during the summer while others grew feebly and only made good normal growth after a winter in a cold frame.

F_1 seedlings of **H. Middendorffii x H. esculenta. Seeds** were planted early in August. Photo taken May 28th. Germination was prompt but seedlings made few leaves before buds became discontinuous in September. The leaves remained green until January when they died and the plants were fully dormant for about 5 weeks. For plants kept in the greenhouse there was then repressed growth for the few new leaves that appeared. Then the buds became discontinuous, but the plants remained green and resumed normal growth late in May when this photo was taken. The two seedlings in pots were taken, while fully dormant (Feb. 26), to a cold frame; they remained fully dormant until late in April when they made the normal growth here shown.

The seedlings which were left in the pan had a short period of normal vegetative growth, a period of dormancy, a period of repressed growth, and then the resumption of normal growth here shown for the more precocious individuals. The seedlings taken to the cold frame (or to an ice box for a few weeks) resumed normal growth without a period of repressed growth.

Plate 182

It is to be noted that a reduced development, especially in the length of the leaves, is the rule for the very first leaves that appear above ground from any bud, be it the first shoot of a seedling or of a new lateral branch or a bud that resumes growth in an old fan. These first leaves have somewhat the character of bud-scales. But in the repressed growth above described the largest leaves which appear during this particular period of growth are noticeably reduced in development.

Seedlings of species which have somewhat sustained growth in the garden were somewhat irregular in habits of growth in the greenhouse and in some cases such seedlings have been quite fully evergreen. The hybrid progenies of numerous parental combinations of discontinuous x sustained have exhibited considerable diversity in the precise character of the growth.

It is to be noted that the habits of evergreen growth and dormancy and the normal and the repressed habits of growth after dormancy all developed in seedlings that grew side by side during winter in a greenhouse in which the conditions of temperature and moisture favored continuous vegetative growth. Also the changing length of daylight was the same for all the seedlings. The differences in growth are evidently inherent and hereditary.

Behavior of Plants Transferred to a Greenhouse

For the evergreen habit. Plants of most of the species and also of various horticultural clones have been dug in the experimental garden at various dates during autumn and winter, planted in pots and placed in a greenhouse. Those daylilies which have evergreen habit and continuous growth grew lustily and more or less continuously. In nearly all cases such plants flowered much earlier than did divisions of the same individual which were grown in the garden. For example, ramets of the *Mikado Daylily* have flowered in March instead of in late June and early July.

For the dormant habit. In November 1939, after the first frosts had occurred but before the ground had frozen, divisions of *H. minor, H. Middendorffii, H. Dumortierii, H. exaltata, H. Thunbergii, H. citrina, H. multiflora, H. flava, H. Forrestii, H. fulva* and of several horticultural clones were transferred to a greenhouse. In every plant of these there was within a few days a resumption of vigorous growth in the formation of new leaves but in respect to flowering and to the later growth there was diverse behavior. In most cases plants of *H. exaltata, H. Forrestii* and *H. multiflora* did not flower, and the buds soon became discontinuous and in some cases the plants became almost dormant during spring. *H. minor, H. Dumortierii* and *H. flava* bloomed rather soon and although the foliage remained green for a time the buds became discontinuous. Plants of *H. nana* and *H. Forrestii* obtained in autumn from Europe made a limited growth of leaves and flowered, after which they became fully dormant.

Plants of the *Europa Daylily* and most members of the species *H. fulva* made vigorous growth and flowered well during March and

April, after which there was somewhat continuous growth almost as for plants of evergreen habit.

For daylilies with dormant habits (with the exception of *H. fulva),* the plants which were kept in a greenhouse for an entire winter and following spring were in the following May discontinuous in growth and in poor condition in comparison with plants that had remained out of doors in the garden. In May and early June the plants of *H. flava* were almost dormant with the old foliage dead. Plants of *H. Middendorffii* were dormant for a time and the new growth which they made in late May, in the greenhouse, was noticeably repressed. Plants of *H. Dumortierii* remained rather green during May and June but the buds were discontinuous, quite as in late summer for plants grown in the garden. As a rule plants which were dormant grew poorly for some time after they were transferred, about June 1st, to the experimental garden. Some of them died; but others made fair or even good growth of new foliage.

Methods of intensive propagation of daylilies* are most effective at the beginning of periods of vigorous vegetative growth. The daylilies with dormant habits may be divided in early autumn for greenhouse culture but the propagations should be moved to a cold frame during winter as soon as their growth becomes discontinuous.

The Inheritance of Habit of Growth

In daylilies the different characteristics of foliage and the various habits in the growth of the buds are hereditary.

The evergreen habit is decidedly dominant over the dormant habit (Plate 181). The data indicate, however, that the clone grown from the type plant which was named *H. aurantiaca* is heterozygous for the evergreen character and is probably itself of hybrid origin. When either *H. minor, H. Middendorffii, H. multiflora* or *H. Thunbergii* is the other parent in crosses with plants of evergreen habit the F_1 hybrids which are evergreen are less robust and lush than are the hybrids which have either *H. fulva, H. flava* or *H. exaltata* as a parent. Also in some of these hybrids and in certain selections of further breeding many seedlings have relatively few green leaves during winter.

The hybrids obtained, both of F_1 and F_2, between species which have an abruptly discontinuous growth and complete dormancy in winter have all had this same type of growth. Selective breeding for doubleness in flowers, in which the more nearly evergreen plants of the *H. fulva* group were parents, have given some offspring decidedly evergreen in character.

The firm wiry texture and rich brown coloring of the dead foliage, as seen in *H. multiflora* and *T. Thunbergii,* is noticeably dominant in hybridization with plants which have other types of foliage.

That various characteristics in the growth of young seedlings in a greenhouse during winter and spring are hereditary is evident. Definite

* Vegetative propagation of daylilies, by A. B. Stout. Jour. N. Y. Bot. Garden 38: 13-17. 1937.

Fig. 54. Photo taken early in February of seedlings three months old from germination. At left, seedling with evergreen and continuous growth; in middle, sister seedling, bud discontinuous, and two of the few leaves still green. These show segregation in sister seedlings. At right, a fully dormant seedling of H. MIDDENDORFII *parentage. Soil was removed to show dormant bud.*

and very contrasted segregation for evergreen and for dormant habits is frequently seen among sister seedlings (figure 54). Normal growth and repressed growth are in sharp contrast. In the more precise features of growth and especially for dormancy, the several species of *Hemerocallis* are all somewhat differentiated, and also many somewhat different minor features of growth develop in the hybrids of the numerous combinations in parentage.

HARDINESS IN DAYLILIES

Several types and degrees of winter injury are to be recognized in daylilies. Foliage that is both evergreen and lush may be killed together with the buds in the crown and then decay with a soft rot in spring. Thus an entire plant may be killed; or some of the growing points, especially on the more submerged branches, may survive but the plant may make a poor showing during the summer. When relatively few fans and buds are killed the plant may recover and even produce a good crop of flowers.

For various plants with dormant habit (both of discontinuous and of sustained growth) the growth in spring of new fans is slow and the leaves and scapes are stunted and poorly developed. Often the largest of the buds are severely injured but the smaller and more undeveloped buds in the crown make quite normal growth later in spring. In many such cases the mixture of injured and normal fans in a plant is in conspicuous contrast during May and early June.

Of the two old clones with evergreen foliage, the *H. aurantiaca* is reasonably hardy through most winters at New York but plants of the true *H. aurantiaca* clone *major* are tender and are often killed during winter unless protected. A considerable number of the hybrids grown at The New York Botanical Garden which are evergreen suffer severely from winter-injury; others are sufficiently hardy to make a good bloom in the summer; others are quite hardy. Numerous seedlings and various horticultural clones have an evergreen or a semi-evergreen habit but when their foliage is tough and rather wiry and the older leaves die without rotting the buds suffer little or no injury during the winter.

There is winter-injury to various of the daylilies which have sustained growth until dormancy ensues or is enforced. Some members of the species *H. fulva*, especially the clones most widely grown *(Europa* and *Maculata)*, are fully hardy but others are not. Seedlings grown from selfed-seed of the widely grown *Lemon Daylily* (a clone of *H. flava)* have all been weak in growth and decidedly non-flowering but it is not certain that this is due merely to winter injury.

Plants of *H. nana*, and *H. Forrestii* (which appear to be dormant in growth) have not thrived and some members of these species have failed to live through the winters at New York.

But there are various daylilies, especially among hybrids of certain parentage, which have no green foliage in winter and which are discontinuous in growth that are more or less injured by winter conditions. Of the seedlings that have been eliminated by death during their first winter in the experimental garden, many had an evergreen habit but some had the discontinuous habit. It appears, therefore, that hardiness in the daylilies is not completely correlated with dormancy in growth, nor is tenderness limited to plants with the evergreen habit. Also severe winter injury to the leaf buds is not merely a matter of their exposure, for some of the hardiest of daylilies, as the *Europa Daylily* and *Apricot*, have their live and green buds quite exposed during freezing weather, yet without injury or desiccation.

Under the winter conditions in northern United States hardiness seems to be very general for the daylilies which have discontinuous growth; many hybrids which have semi-evergreen and even evergreen habits are sufficiently hardy for successful culture, especially if their foliage is tough and wiry. Most daylilies with fully evergreen habit and lush foliage are so severely injured that they are of no value for culture in the northern states.

CHROMOSOMES OF CLIVIA CYRTANTHIFLORA

EDITH HENDRIX WITTLAKE, *Ohio*

Clivia cyrtanthiflora is a hybrid between *Clivia nobilis* and *Clivia miniata*. The foliage and flower appear to be quite similar to *Clivia nobilis*. Its flowering time, however, is different from either parent as it blooms during the latter part of July and the first part of August. It sets seed to its own pollen and about fifty percent of these seeds germinate. Although the seedlings appear healthy at first, they gradually decline and die on my hands. I have never raised one more than three

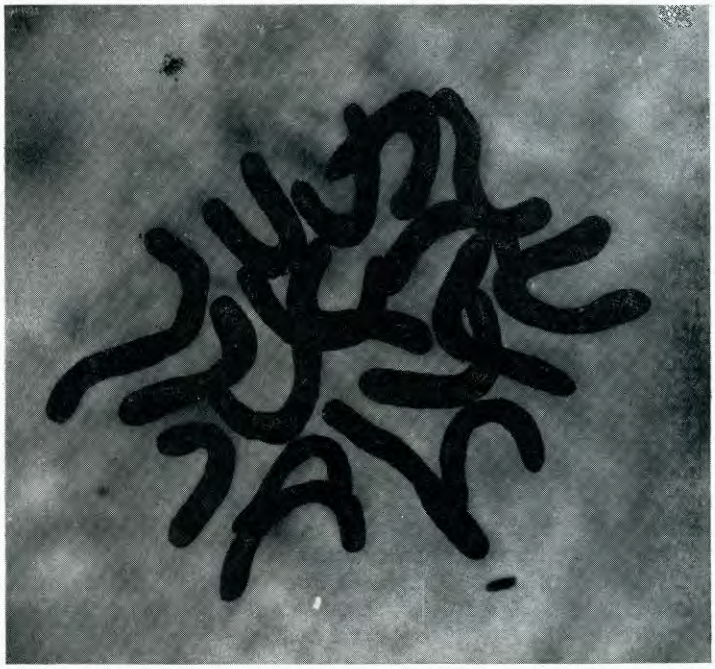

Fig. 55. Photomicrograph showing nine pairs of somatic chromosomes, greatly enlarged, in Clivia cyrtanthiflora. Photo by Eugene B. Wittlake.

months. While this may very well be due to horticultural practices, the lack of success led me to make some slides to determine if possible any chromosome irregularity which might be a factor.

In the autumn of 1939 some root-tips of *Clivia cyrtanthiflora* were taken into the labarotory for this chromosome count. The root-tips were killed in Nawaschin's Solution and run up through a graded alcohol and toluol series into paraffin. They were then sectioned 12 microns thick and stained. In the staining both Haidenhain's Iron Alum-Haematoxylin and Johansen's Safranin and Fast Green were used.

When viewed through a microscope, the cells of the various root-tips showed chromosomes in all stages of development. There were nine pairs or 18 somatic chromosomes in the cells. They all appear quite normal. It seemed necessary to photograph the chromosomes although there was no regular photomicrography equipment available. So an Eastman Kodak Recomar 18 with an F. 4.5 anistigmat lens and a ground-glass back was used to take the pictures through an oil-immersion lens. In photographing the slides, it was found that those stained with Safranin and Fast Green made the best pictures. The accompanying picture (Fig. 55), made from a Safranin and Fast Green slide, shows the nine pairs of somatic chromosomes in the metaphase stage. The chromosomes vary in length from seven to ten microns. Upon making the enlargement, it was discovered that the ends of some of the chromosomes were out of focus due to the fact that they do not lie in the same plane. These ends were retouched on the print with India ink.

The interesting fact about these chromosomes is that they lie well within the range of *Clivia miniata* which varies from 18 to 22 somatic chromosomes, according to the articles in the 1937 *Herbertia* by W. S. Flory and S. H. Yarnell[1]. This knowledge ought to interest plant breeders. So far the chromosome count in itself has not answered the question regarding the failure with its seed in the study of *Clivia cyrtanthiflora*, but there is a great deal more cytological work to be done on this plant and with better equipment, now available, this work will be continued.

HABRANTHUS BRACHYANDRUS AND BREEDING POSSIBILITIES

Hamilton P. Traub, *Maryland*

Ever since the brilliant researches of Sealy reinstated the Genus *Habranthus* in 1937, there has been renewed interest in this group of amaryllids. *Habranthus brachyandrus,* (Baker) Sealy, with outstanding flowers of clear pink and deep wine colored throat, has given a very excellent account of itself in Florida over a period of years. The beautiful light pink *Habranthus robustus,* Herb., more widely distributed at present, produces from one to three flower scapes per bulb in early summer, but the flowering season is not long. In contrast, *H. brachyandrus* has a relatively longer flowering season, and a thrifty bulb may produce as many as four to five flower scapes in one season. Bulbs that had flowered in Florida in early summer (1940) were dug in July and replanted outdoors in Maryland in August. Soon after planting these bulbs flowered again profusely. This suggests that this species may lend itself to forcing. It can be very easily propagated from seeds and from offsets that are produced in great numbers.

Crosses made by the writer between *H. brachyandrus* (seed parent) and *H. robustus* (pollen parent) have given progeny mainly similar to the seed parent. This seems to corroborate the results obtained by Dr. Flory and others, but a very small percentage seem to be true crosses

[1] Flory, W. S. and Yarnell, S. H., "A Review of Chromosome Numbers in the Hemerocallideae, Alstroemeriales, and Amaryllidales," **Herbertia.** 4: 163-181, 1937.

since they are intermediate between the two parents. Further attempts should be made, and for this purpose other species of *Habranthus* should also be used in order to secure a wide range of colors, flowering seasons, and growth habits.

Additional species that may be worth considering as breeding material include the following:

H. Andersonii, Herb. ex Lindl., (Bright or coppery yellow); Uruguay; Argentine; and Brazil?
H. texanus Herb., (Coppery yellow); Texas
H. gracilifolius, Herb., (Pale purplish pink); Uruguay
H. longipes, (Baker) Sealy; Uruguay
H. mendocensis, Herb., (color not recorded); Argentine
H. pedunculosis, Herb., (Light red?); Argentine; Uruguay?
H. sylvaticus, (Mart. ex Schultes) Herb., (Bright red); Brazil
H. versicolor, (Mart. ex Schultes) Herb., (White, flushed outside with red and green); Uruguay; Brazil?
Amaryllis (Habranthus) caerulea, Griesb., (Pale blue); Brazil; Uruguay

We are dependent on our Latin American friends in Argentine, Uruguay and Brazil for help in the task of collecting these species for breeding purposes. Any such help would be greatly appreciated by all who are interested in the amaryllids.

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Flory, W. S. Cytotaxonomic Notes on the Genus *Habranthus.* Herbertia 5:151-153. 1938.

PROF. HOOVER ON BRODIAEA AND DICHELOSTEMMA

The members of the Society will be interested to know that Prof. Robert F. Hoover, 165 Santa Rita Ave., Modesto, Calif., has made a scholarly revision of the Genera *Brodiaea* and *Dichelostemma.* His work is so thorough and sound that it will surely find general acceptance Prof. Hoover is now working on the revision of the Genus *Triteleia.* This important work on the western American Allieae was published in the American Midland Naturalist, Notre Dame, Ind., and the Bulletin of the Torrey Botanical Club.

—*Hamilton P. Traub.*

5. PHYSIOLOGY OF REPRODUCTION

GROWING ALSTROEMERIAS FROM SEEDS

W. M. JAMES, *California*

Propagation of most kinds of *Alstroemeria* any other way than by seeds is not very satisfactory. Well developed clumps do not divide without considerable waste and some difficulty, whereas young seedling plants do not need to be divided and can be handled with practically no loss at all.

Most seeds of various kinds of *Alstroemeria* germinate readily under proper conditions. All kinds which I have grown apparently require comparatively low temperature for germination. There are two distinct types of *Alstroemeria* seeds—those that have to be treated before they will germinate and those that do not. *A. aurantiaca* and its forms are the only ones I have had which needed preliminary treatment. The other kinds—*A. chilensis, ligtu, ligtu* var. *angustifolia, pelegrina, pelegrina alba,* and *pulchella**—germinate almost one hundred per cent in about thirty days in the open ground in Santa Barbara if they are planted in the fall after night temperatures are 50 degrees F. or below.

Alstroemeria aurantiaca seeds very seldom germinate before two years, and even then only a small percentage, no matter when they are planted. Dr. William Crocker of the Boyce Thompson Institute For Plant Research very kindly consented to run a series of tests to determine whether a treatment could be found which would hasten and improve the germination of the seeds of this type of *Alstroemeria.*

In the fall of 1938 a quantity of seeds were forwarded to Dr. Crocker and in February 1939 I received the following information from Dr. Lela V. Barton; "The seeds of *Alstroemeria aurantiaca* which you sent us have been tested under a number of different conditions. We have obtained 94 to 100 per cent germination after two months at 77 degrees F. followed by one month at 50 degrees F. The germinations occurred at the low temperature. We also obtained 64 per cent germination in a greenhouse at 55 degrees F. after a pre-treatment in moist granulated peat moss of two months at 77 degrees F. plus one month at 50 degrees F. No germinations have been obtained in a greenhouse with a temperature as high as 68 degrees F. You will note that these seeds then require low temperature for germination, but the advantage of a preceding period at high temperatures indicates the presence of a hard seed coat.

From our experiments I would say, then, that if the seeds are planted in a warm greenhouse and left there for two months and then transferred to a cool greenhouse the seedlings will be produced within three or four months after planting the seeds."

* For some time Mr. Harry L. Stinson of Seattle, Washington, has been collecting and translating early writings on **Alstroemeria.** He has found several discrepancies in the nomenclature of those under cultivation. After comparing my plants with the descriptions given in the translations, I agree with him but, will use the present names until his investigations are completed.

A preliminary trial in the fall of 1939 indicated clearly that the method suggested by Dr. Barton can be used to advantage, but some difficulties were encountered. In the first place I have no greenhouse and the only substitute available where a relatively constant temperature of 77 degrees F. could be maintained was a small space near a water heater and storage tank. Not nearly enough room was available to treat the number of seeds desired if they were planted.

Seeds were placed in three loosely covered containers; one with granulated peat moss; another with sand and the other containing nothing but seeds. All were kept slightly moist during the treatment. After thirty days most of the seeds were useless because of fungi and bacteria, even though several methods of disinfection were tried. I am satisfied a way can be found to treat the seeds as suggested by Dr. Barton and will make another attempt in the fall of 1940. Small plants of *Alstroemeria aurantiaca* are needed in large enough quantities to warrant considerable effort in finding a method of controlling pathogens and saprophytes while the seeds are being treated.

NOTE TO THE EDITOR CONCERNING GROWING ALSTROEMERIAS FROM SEED

A planting of seeds of *Alstroemeria aurantiaca* made in soil in a flat placed in a cold frame in August 1938 gave 96 per cent seedling production in May 1939 after a winter in the cold frame protected by a board cover so that the temperature was approximately 35° F. This treatment gave the seed a period of warm weather preceding the cold of winter and may offer a more practical method of producing seedlings in a climate similar to Yonkers, N. Y.

No trouble was experienced with mold in either soil or granulated peat moss plantings of the highly viable seed lot used at Boyce Thompson Institute.

Lela V. Barton.

SHIPMENT OF BULBS IN MOIST CONDITION

L. S. Hannibal, *California*

The writer has received shipments on several occasions from the East Coast, especially Florida, of bulbs during their growing state where conditions have made it desirable that the roots be untrimmed. This has applied essentially to evergreen crinums and native Florida species of *Hymenocallis.*

In no case has serious setback in growth been experienced when moist sphagnum moss or damp newspapers were wrapped about the roots—provided that the bulbs were planted at once upon arrival in a suitable planting medium and kept in a cool moist location for several weeks until the roots have reestablished themselves.

This procedure is probably not advisable during the heat of the summer since fungi may grow and the roots may decay thus checking their growth, but during the fall and winter bulbs which have been in

transit up to 7 days have arrived in good shape with foliage in perfect condition, showing no evidence of serious root injury.

The writer's attention was called to an item* recently concerning a shipment of narcissus bulbs that had been sent from coast to coast in a moist condition. In this case the sphagnum moss had been moistened with a glycerine-water solution. The glycerine was said to have prevented evaporation of the moisture and checked fungus growths. This procedure may be of interest to those who occasionally handle such shipments of evergreen bulbs and wish to insure the arrival of their material in the best condition possible.

ATTEMPTS TO GROW LYCORIS FROM SEEDS

C. W. Culpepper, *Virginia*

The first experience with *Lycoris* was in 1938 when a few recently acquired bulbs of *L. squamigera* and *L. radiata* flowered. After the flowers faded the writer waited anxiously for the seeds to develop. However, the ovary developed only slightly, that is to less than the size of a garden pea, and then ceased to develop, shriveled and died.

It was thought that natural pollination did not occur and that hand pollination would be necessary. In 1939 all the flowers upon six flowering stalks of *L. squamigera* were carefully pollinated with its own pollen. Pollen from *L. squamigera* was stored in a dessicator for the purpose of using it in pollinating *L. radiata* which flowered a few weeks later. All the flowers on about thirty flowering stalks of *L. radiata* grown in the open were pollinated by hand, twelve of which were pollinated with the pollen of *L. squamigera*. The flowers of six stalks that had been grown in pots were pollinated with their own pollen, and the flowers of five other plants also in pots, in the cold frame, were pollinated with the pollen of *L. squamigera*. All the flowers behaved exactly as the ones in 1938 that had not been hand pollinated. No seeds were obtained and the ovary developed only slightly before shriveling.

In 1940 Dr. Traub suggested that there would be a better chance to obtain seeds if the flowering stalks were cut from the bulb at the time of flowering and allowed to develop with their basal ends in water.* Seven stalks of *L. squamigera* and about thirty of *L. radiata* were pollinated and the basal ends of the stalks placed in water. The flowers of several stalks of *L. radiata* were pollinated with pollen of *L. squamigera*. The material was kept in a warm, well lighted room but not in direct sunlight. In about ten days it was evident that the ovaries were developed to an extent beyond those that were allowed to remain attached to the bulbs. Many of the carpels finally reached one half of an inch or more in diameter. As the basal end of the stalks began to decay they were cut off to healthy tissue and again placed in fresh water. This was

* **Scientific American,** April 1940, p. 223.

* Artificial Reversal of Growth Dominance in Amaryllids. Hamilton P. Traub. Year Book American Amaryllis Society [Herbertia] 2: 109-110. 1935.

continued until only an inch or two of the stalk remained. The carpels with the remaining portion of the attached stalks were then placed in a moderately moist atmosphere and allowed to continue development. However, an examination indicated that the ovules were developing extremely slowly. The carpels were kept alive for approximately three months, yet the seeds after the carpels were finally dry appeared much shriveled and so immature that their viability seemed very doubtful. The seeds were planted but none germinated. It was noted, however, that the ovaries of *L. radiata* pollinated with pollen of *L. squamigera* developed to about the same extent as those pollinated with their own pollen. These experiments indicate that seeds of *Lycoris* are rather hard to obtain in the region of Northern Virginia.

The writer would appreciate obtaining any information about methods of inducing seed development in *Lycoris*. Perhaps someone has been successful in obtaining seeds or has had some experience that may be helpful.

The writer expects to continue the efforts to get seeds and make crosses with different species and it is hoped that others will try to secure viable seeds.

It is hoped that next year the flowering stems can be grown in a nutrient solution perhaps with the addition of hormones. It is also thought that keeping the flowering stems in direct sunlight in a moist atmosphere may be advantageous. The seeds develop so slowly that resort to growing or germinating them in sterile agar may be necessary.

4435 North Pershing Drive,
Arlington, Virginia.

W. M. James, Santa Barbara, Calif. See page 175.

Amaryllis candida

Plate 183a

W. M. James, Santa Barbara, Calif.

See page 176

Hymenocallis speciosa

Plate 183b

6. AMARYLLID CULTURE

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

AMARYLLIS CANDIDA, HYMENOCALLIS SPECIOSA, ISMENE AMANCAES, PHAEDRANASSA CARMIOLI AND BOMAREA ACUTIFOLIA

W. M. JAMES, *California*

Each season we are pleasantly surprised when various amaryllids under trial come into flower. This season the five briefly described below are outstanding.

AMARYLLIS CANDIDA

Nowadays, even though we receive many unfamiliar plants, inquiry soon reveals that most of them were discovered and named many years ago. So, when a plant which was discovered and named very recently is received, it bears additional interest. Several bulbs of *Amaryllis candida* were received from Argentina by the Las Positas Nursery late in the summer of 1939. These were not planted until late the following winter, which would be the normal time for them to start growth in their native habitat. One plant bloomed in May.

It is a really striking flower. (Complete description in Herbertia Vol. 5 1938, page 123.) A stem about three feet tall had five pure white flowers, larger, but shaped very much like *Lilium formosanum* (Pl. 183a) and with the distinctive fragrance of *Lilium sulphureum*. On the single plant which flowered, the leaves started soon after the flowering stalk, but did not reach full development until after the blooming period. Apparently we were especially fortunate in having this plant bloom, as *Amaryllis candida* generally does not do so for two years after being dug, even when the natives move it directly into their yards from its natural habitat.

The leaves are very different from those of the other *Amaryllis* species. There are seven to eleven growing almost upright and they have a peculiar, gray-green color. The shape also is different from those of the large-flowered hybrids we are so familiar with.

Amaryllis candida is found in Tucuman Province and grows in a sandy soil where there is a dry atmosphere and scanty rainfall. It is not very hardy and suffers occasionally from ten degrees of frost in its native habitat. Most of the bulbs were growing nicely when this was written in June. Presumably they should be kept dry during the winter, and that will present difficulties out of doors in Southern California, especially when they do not bloom for two years after being moved. Needless to say, some time will be needed to determine the full cultural requirements, methods of propagation and uses of this splendid plant.

HYMENOCALLIS SPECIOSA

One seed of *Hymenocallis speciosa,* which I had received from Mr. Wyndham Hayward a few days before, was planted on September 29th, 1936. The first flower opened October 13th, 1940 and the plant was photographed on the same day (Plate 183b). Six days later eight of the nine buds were open and the first flower was still good. The cluster of bright, pure white flowers make a really beautiful sight.

Because *Hymenocallis speciosa* is a West Indian species, I inveigled a friend, Mr. Percy Ellings, to grow this one seed under "glass" in his care. We hope to get seeds from these flowers and if we do will feel like trying it out of doors.

ISMENE AMANCAES

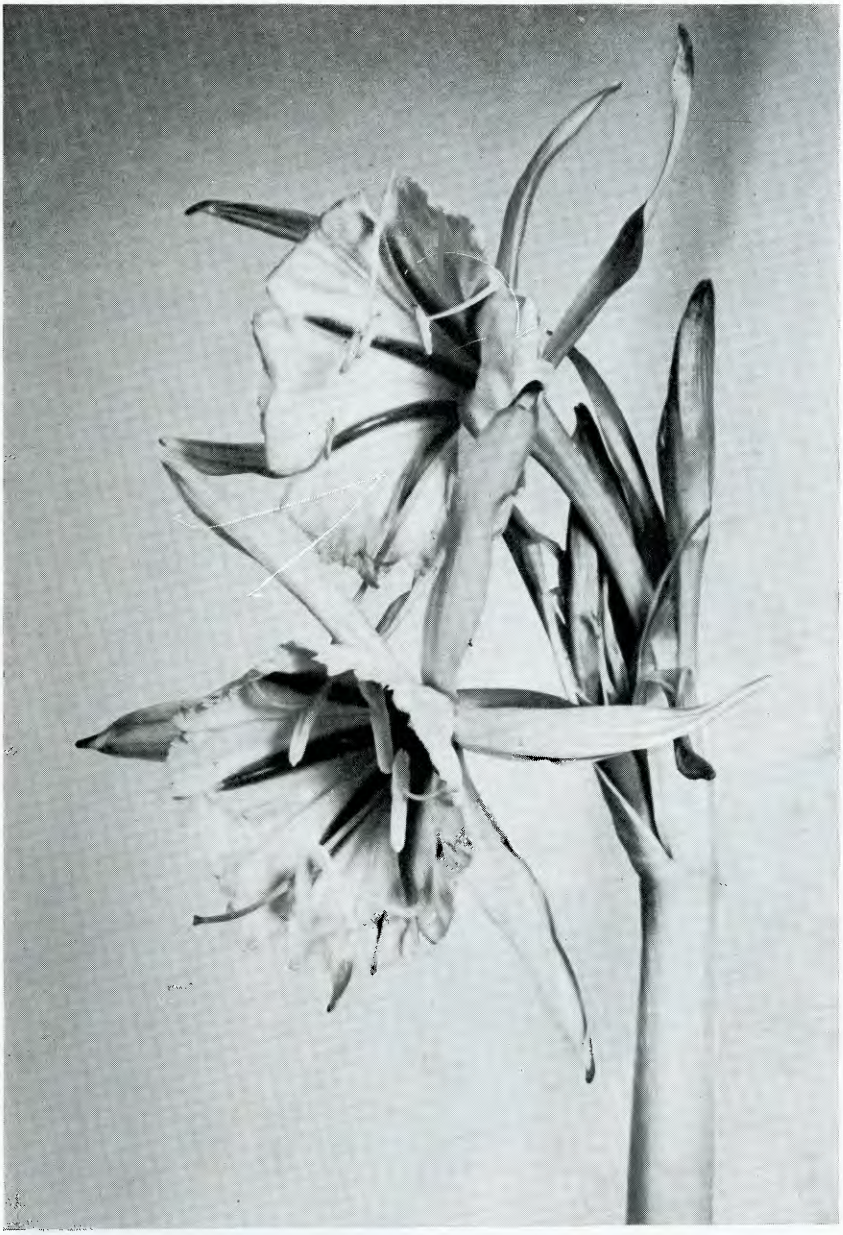
This is a beautiful plant from the Hill of Amancaes near Lima, Peru. There are four or five green, partially erect leaves one and one-half to two inches broad and eighteen inches long. The green flower stem is slightly flattened (ancipitous) and about eighteen inches tall. Baker says that the umbel is three to six flowered, but the one pictured had seven. The flowers (Plate 184) are mostly horizontal, nearly sessile and have a greenish perianth tube three inches long; segments one-fourth to three-eighths inch wide and two to two and one-half inches long; the bright yellow staminal cup is obconical, two inches in diameter at the throat and has six green vertical strips. It blooms in Santa Barbara in June, and apparently it prefers a well-drained sandy loam. It will not stand much cold and should be kept dry while dormant. (In the coastal districts of Peru it hardly ever rains very much. The moisture is mostly from drizzles, heavy dews and mists.) It does not seem to mind being dug in the fall and kept in storage until time for growth to start in late winter.

Even though it was flowered at Kew in 1878, it is still very scarce. My short experience indicates that it will thrive if the cultural precautions outlined are observed.

PHAEDRANASSA CARMIOLI

Bulbs of *Phaedranassa Carmioli* were received from Zarcero, Costa Rica in the early summer of 1939. They were planted at once and started leaf growth which lasted until late fall. The first flower appeared in late winter (Plate 185) and, as the bulbs did not all bloom at the same time, there was a succession of bloom until early summer. The new foliage did not start until late spring. Apparently it likes partial shade and plenty of moisture during the growing season. Probably it can be grown out of doors in the mildest climate only. Like any new plant, it will take observation for several seasons to learn its habits and uses.

The flowers are bright red tipped with green and are borne in an umbel of ten to twelve on an eighteen inch stem. They are attractive and last about a week when cut. The leaves are lance-shaped and bright green in color; about three inches broad in the middle and twelve to



W. M. James, Santa Barbara, Calif.

See page 176

Ismene amancaes

Plate 184

W. M. James, Santa Barbara, Calif.

See page 176

Phaedranassa Carmioli

Plate 185

W. M. James, Santa Barbara, Calif. See page 180

Bomarea acutifolia

Plate 186

fourteen inches long; and grow mostly after the flowering season. *Phaedranassa Carmioli* gives promise of being a useful member of a little known group.

W. M. James, Santa Barbara, Calif.

Fig. 56. Fruit of Bomarea acutifolia

BOMAREA ACUTIFOLIA

Dormant plants of *Bomarea acutifolia* were received from Zarcero, Costa Rica in the early summer of 1939. They were planted at once and remained dormant until late fall, flowering the following spring. Probably several seasons will be necessary to learn the habits and to determine the full cultural requirements of this plant, especially as there are few bomareas in cultivation and little is known about their culture. Apparently it likes best to twine upwards and outwards so that the flowers can be produced in more or less direct sunlight. It is doubtful if it can be grown out of doors except in the milder climate.

The blossoms (Plate 186) are tubular with a slight flare at the top and are borne in an umbel of six to eight. The color is bright scarlet outside and deep golden yellow inside. The general appearance becomes more yellow as the flowers age. There are six stamens with bright blue anthers borne inside the flower. The green leaves are borne throughout the length of the stem. The stems are tough and wiry and twine tightly around each other or any support available. The flowers are long-lived, either on the plant or when cut. The fruit is illustrated in Fig. 56. One season's observation indicates that *Bomarea acutifolia* will be a colorful and useful new addition to our group of bulbous plants.

CRINUMS AND OTHER AMARYLLIDS IN NORTH CAROLINA

ELIZABETH LAWRENCE, *North Carolina*

I think that last winter was the final test of the crinums in my garden. While the thermometer did not drop below six degrees above (it went to zero in 1917), the month of January was the coldest on record, and two late freezes were more damaging than the severe weather earlier in the year.

Since I began collecting crinums, nearly ten years ago, I have had fifteen kinds, nine of which are perfectly hardy and bloom without fail. One, *C. americanum,* seems to be hardy but has never bloomed. I wonder if this is because the buds are formed too early, and are nipped by the frost. This is what happened to *Cyrtanthus parviflorus* this year. The rest of the fifteen may live through the winter, but they do not recover sufficiently to bloom the following season. They gradually disappear. *C. Kirkii* and *C. Kunthianum,* the last to be added to the nine hardy ones, not only survived the rigors of last winter, but are already pushing up their stout flower buds.

Among the species that have proved garden worthy are four of the Milk-and-Wine Lily type, *C. Kirkii, C. Kunthianum, C. erubescens,* and one that is unidentified. The flowers of the first two species are large, and in many-flowered umbels on stout, short scapes a little over two feet in length. They bloom in June and July, and may repeat in the fall. The flowers of *C. erubescens* are smaller and drooping and not so wide open. The scapes are nearly three feet. It blooms late in June and early in July. The unidentified Milk-and-Wine Lily blooms from early August almost continuously until frost. I have had flowers from it in November. This makes the crinum season, beginning with *C. longifolium* in April, a long one. The Milk-and-Wine Lily is the only fall-blooming crinum that I know. It is also one of the most beautiful, with five or six red-keeled, milk-white flowers opening very wide on long tapering scapes. The leaves are a peculiar yellow-green which distinguishes them from the foliage of any other species. This crinum is found in old gardens, and is in the trade as *C. fimbriatulum* (which Mr. Hayward says it is not). At Mr. Hayward's suggestion I sent one of the enormous bulbs to Mr. Sealy at Kew, and he has promised to identify it when it blooms.

C. longifolium is the hardiest crinum, and the least attractive. I have a white form and a pink one. Both are very homely. The only reason for having the white is that it is the first crinum to bloom. There is no reason for having the pink, except that it is an undertaking to dig it up.

C. Moorei is very different from any of the crinums that I have had except *C. giganteum.* I have reluctantly given up *C. giganteum* as unfit for gardens in North Carolina. I think it is almost the loveliest flower I ever saw. The flat dark foliage rosettes are decorative in themselves. I have had this species twice, but it bloomed only when it was not put into the ground until warm weather. It is pure white. The

very similar, but pale rose flowers of *C. Moorei* have the same vanilla fragrance. There are six of them to the short slender scape. This species blooms only once with me, usually in August. It requires shade.

In addition to these species, two hybrids, *Powellii* and *Cecil Houdyshel* (both results from crosses between *C. longifolium* and *C. Moorei)* are satisfactory in the garden. There are white and pink forms of *Powellii.* The white form has improved every year until there were so many scapes on it last spring that I lost count after the tenth. I am sure that there were at least fifteen during the month of June. Five of them were in bloom at once. The pink form, the best pink that I have had, did not persist. The clone *Cecil Houdyshel* turned out to be rather pale in my soil, but a very good bloomer, producing scapes in June, July and August.

Another unidentified crinum is one of the loveliest. It came to Miss Isabel Busbee from the Royal Palm Nurseries by mistake for *C. erubescens.* I sent a flower scape to the Royal Palm Nurseries and it was pronounced *C. longifolium.* If it is a form of that very variable species, it is by far the best I have ever seen. It is on a different scale from other crinums, being smaller and more delicately made as to leaf and flower. There are four or five flowers on the slender tapering scape. They are faintly flushed with pink, and delightfully fragrant. This is one of the best bloomers, producing flowers every month from June through September.

The crinums that have not been successful with me are *C. giganteum, C. scabrum, C. amabile,* a species from Burma, and the clone *Empress of India.* All except the one from Burma bloomed the first season after being set out late in the spring. All came back the following spring, but did not bloom. This is the third year, and none of them are showing above the ground yet. After last winter I doubt if they will. I have also had a crinum that came from the five and ten, and that I took to be *C. asiaticum.* It bloomed the first year, but did not persist.

Crinums are said to be heavy eaters and drinkers. However, they could not do better than in my garden where they are seldom watered or fertilized. They seem to thrive in heavy clay, and do not object to afternoon shade. *C. longifolium* blooms cheerfully in full shade, and *Powellii* blooms well but not so well as in the open. Crinums increase rapidly, but it is a shame to divide them for the bloom is so much better if they are left undisturbed.

I have been much interested to see how well the Amaryllids that make winter foliage have gone through this last severe winter. The bright green leaves of *Callicore rosea,* usually cut back early in the fall, have scarcely been marred, and have been more numerous than ever before. I wonder if this beautiful Amaryllid, perfectly hardy here but accustomed to sulking, will surprise me by blooming this summer. *Amaryllis advena* kept its green and glossy leaves until spring. The pale green tender looking foliage of *Lycoris squamigera* remained as fresh as usual. The leaves of *Lycoris aurea* (which never blooms) and those of *Nerine undulata* (the only nerine that has ever bloomed for me) have also gone throughout the cold unharmed.

W. E. Rice, Downey, Calif. See page 185

Sprekelia formosissima

Plate 187

W. E. Rice, Downey, Calif.

See page 185

Chlidanthus fragrans

Plate 188

SPREKELIA AND CHLIDANTHUS

W. E. Rice, *California*

Two of the most beautiful members of our Family of amaryllids, to me are *Sprekelia formosissima* and *Chlidanthus fragrans,* and both are native to our own hemisphere. *Sprekelia formosissima* with its native habitat south of Mexico City, looks like a big blood red orchid (Plate 187). We find when this bulb is planted fairly deep, six inches or more, though not much more, and in sandy silt or light loam with good drainage, it is not at all hard to grow, if given an abundance of water all the time the foliage is good and green. In a very mild climate it will stay green all the time. If left undisturbed for a few years you will find very satisfactory increase and *Sprekelia* also grows very readily from seeds, but to secure a good heavy crop of seeds the flowers should be hand pollinated. For an old timer and indeed an old favorite, it is quite remarkable that *Sprekelia* is not more freely grown. It should be in everybodys collection, sometimes it is spoken of as Aztec Lily, St. James Lily, or Jacobean Lily. Like most amaryllids *Sprekelia* and *Chlidanthus fragrans* both like ground that is very rich for they are gross feeders.

Chlidanthus fragrans comes from South America, somewhere in the Andes. The writer has a very fine collection of this species and we get more joy from them than the others. With him they do exceedingly well. The bulbs do not grow so very large and a ten centimeter bulb will give very good bloom—such flowers (Plate 188); beautiful clear Canary Yellow with long tubes, in umbels anywhere from three to six on a stem and with a very pleasing fragrance makes them most desirable.

Without doubt *Chlidanthus fragrans* is one of the jewels of the Family that have not yet been generally discovered. When it does come into its own, the writer predicts it will in a year or two, then it will be everybody's sweetheart. They also grow easily from seed which is freely produced and they are not at all stingy about multiplying by offsets. It makes a splendid pot plant, but when soil is not allowed to dry out.

HYMENOCALLIS FLORIDANA IN THE GREENHOUSE

Edith Hendrix Wittlake, *Ohio*

In 1934 Dr. Glenn Blaydes of the Botany Department at Ohio State University collected a small clump of *Hymenocallis Floridana* while on a trip to Florida. Upon their arrival in Ohio the bulbs were potted in rich heavy soil and the large 12-inch pot was partially submerged in one of the tanks of the Tropical Room in the Botany Greenhouse. Since 1934 the bulbs have not been repotted or disturbed in any way.

This clump of *Hymenocallis* has bloomed regularly three times a year until this year when an experiment was made. *Hymenocallis floridana* sets seed freely when hand-pollinated, but often sets seed without this aid. The large, green seeds are very slow to germinate. If the seeds are kept continually moist, germination may occur in five or six

months. They are easily germinated in a jar of water and then transferred to muck. The scum which may collect around the sides of the jar does not seem to hurt the seeds. These seeds may also be kept in a dry condition for a month or so and then put into water or muck. The seeds shrivel slightly under this latter treatment but will recover if not stored too long. Seeds stored longer than two months probably will not germinate. Seedlings require the same conditions as the mature plants and apparently will not flower until several years old. Two-year old seedlings show no signs of flowering as yet.

The flowers of *Hymenocallis Floridana* are quite large and very fragrant. They make good cut-flowers and last almost a week if not pollinated. A pot of these bulbs in flower never fails to attract the attention of all who enter the greenhouse.

Until the autumn of 1939 the bulbs of *Hymenocallis Floridana* had two flowers to a single scape. In August of 1939, since the bulbs had never been repotted, I stirred in among them about a potful (2-inch pot) of "Vigoro". The bulbs were nearly dormant when this fertilizing was done and the foliage had all died down. In November the bulbs bloomed again, and the flowers were magnificent. All of the scapes had three or four flowers. Not a single scape had only two. Of the scape shown in the photograph (Plate 189) two flowers were hand-pollinated. Three large and two small seeds were harvested from each one as well as many abortive seeds.

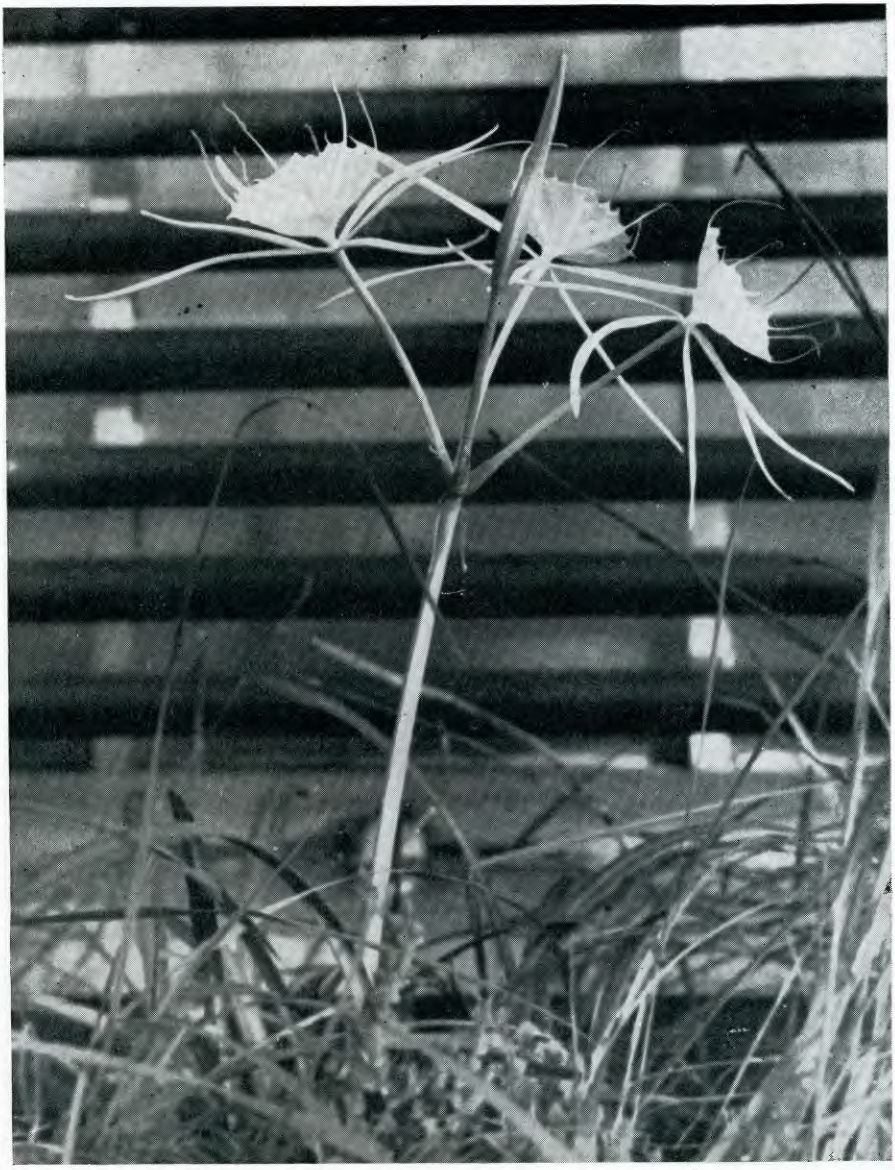
Ordinarily these bulbs would have bloomed again in March of this year. This blooming season produced no flowers, but a large number of new shoots. Now in June one bulb has sent up a flower scape, but it is still too small to determine the size and number of flowers.

THE BLUE-FLOWERING AMARYLLIS, AMARYLLIS PROCERA

HARRY BLOSSFELD, *Sao Paulo, Brazil*

[I am enclosing herewith an article about *Amaryllis procera,* a plant that I collected in 1938 and 1939 in Brazil. When visiting my friend, Sr. Joao Dierberger of Sao Paulo, he gave me a copy of the review, Herbertia, in which I found an article about *Amaryllis procera,* and was astonished to find there many incorrect statements about its native locality and growing conditions, that apparently were written by those who never in their lives collected a single *Amaryllis procera* in person.

The statement, for instance, that the soil in which these plants grow is about two feet deep on the rock base, is rather exaggerated. I found many plants growing in a soil layer of about one inch, and never collected a plant from a place where the soil layer on the rock base was deeper than ten inches. Also the statement about the effect of charcoal on the acidity of the soil is ridiculous because in Brazil it is a custom to burn the grasslands every year but on the area where these plants grow there is no grass to burn. The only additional vegetation consists of mosses, algae, lichens, and here and there plants of *Vellozia* and



Eugene B. Wittlake, Columbus, Ohio.

See page 186

Hymenocallis Floridana

Plate 189

Bromeliaceae. The humidity of the air is high in the morning and evening, and much dew can be observed on the leaves of *Amaryllis procera.* The statement that the dew will drop from the trees in the morning at the spot is also exaggerated for any dew that might drop can have no influence on the *Amaryllis* plants for there are no trees. But the presence of thick fog mornings and evenings is important for this fog produces the numerous springs on the upper part of the rock that supply the *Amaryllis* with an abundance of water even during the dryest season of the year, and on the hottest days. —*Excerpts from a letter written by Sr. Harry Blossfeld at Piura, Perú, Nov. 11, 1940 and sent from Casilla 2640, Lima, Perú. Sr. Blossfeld further informs us that he is on a plant collecting trip in northern Perú, and Ecuador. Next year he will continue his plant collecting in Colombia.*]

When studying botanical literature several years ago, I discovered a note on *Amaryllis procera,* which was reported to have blue flowers. This short scientific remark interested me so much, that I traced the matter and made a record of all material found in literature in my notebook, where since finishing my practical horticultural activities I am accustomed to collect all available data on rare plants of horticultural value.

The country of origin of this curious plant was said to be central Brazil, where it was reported to grow in full sun; making very large and bottle-shaped bulbs with long necks and the leaves curved like scimitars. The plants had been introduced into France some thirty years ago, but they have disappeared from culture.

Several years passed after I recorded these data and I experienced many adventures in the mean time, when I traveled twelve thousand miles through South America as a plant collector. It was not until 1937 when I remembered this interesting plant and made inquiries on it during a collecting trip through the Organ Mountains in Central Brazil. I got some hints as to where this *Amaryllis* might be found, but I could not get any good material at that time. Half a dozen small bulbs were brought to me by one of my orchid collectors, who however had received them himself from another source but he knew more or less where the plants were growing.

When on a collecting trip in the Organ Mountains again this past year, I made new inquiries and finally succeeded in finding the exact spot where the plant was reported to grow. Many people warned me not to make the trip to collect them, as the rewards would be very low and the expensive costs of the trip would be wasted money. The plants were reported to grow on abrupt rock slopes, and only where men can not reach them they were said to grow in some quantity. But I had failed at that time to get certain orchid plants, the collection of which had been the main purpose of my trip, so I had already wasted the money for the expedition and not being willing to return with a complete failure, I decided to risk some more money in order to bring home some fine material.

With one companion I started from a small village by truck, with only a small suitcase, containing some food, clothes and a few bags

which we hoped to fill with the *Amaryllis* bulbs or with any other valuable plant material, should we fail to discover the first. When the road ended at a "fazenda" (large farm), we walked on for a few hours in a beautiful valley on a narrow, rocky road, which was a painful matter owing to the tropical heat and the lack of water. Climbing up the mountains at last we found a clear brook where we rested, and nearby we found some people of whom we inquired about the *Amaryllis* plant. We were so happy to get exact information, and they showed us a large, bell-shaped rock, nearly bare of any vegetation, and some thousand feet high, on the flanks of which we discovered with the field-glass greenish specks, which we were assured were clusters of our blue flowering *Amaryllis*. We were so hopeful at that view, that we arose immediately from our rest, and contracted the two men we had met to help us. We had noticed, that the rock would be difficult to climb, and we realized that we needed help to bring down the collected material.

We felt some misgivings when contracting these two men who looked like tramps. But there was no choice, we needed the help badly and trusted on our good luck and last but not least on our pistols. We had these loaded with shot, as this is the best protection against poisonous snakes, which are abundant in this rocky region, but when the night came, I changed the third and fourth shot cartridge of my pistol magazine for bullet cartridges to be prepared for all eventualities.

Before it became dark, we arrived at the foot of the rock and after selecting a good resting place with water nearby, we climbed the mountain to explore, only taking with us our Cine-Kodak and a photographic camera. The rock became abrupt only in its upper parts, where its form was, as mentioned above, like a bell and nearly bare of vegetation except for some low alpine plants and dwarf shrubs. The lower parts were heavily inclined but not directly abrupt, and there was also dense vegetation of shrubs. We found there some terrestrial *Oncidium* and *Laelia* orchids; higher up on the rocks, very decorative large *Bromelia* specimens, in the water-filled center of which a beautiful blue-flowering *Utricularia* was abundant. The latter is interesting because it traps microbes in the water with its roots. There were also two fine species of *Vellozia* with blue flowers, born in quantity around the globular crown of these dwarf shrubs. These are similar in shape to Japanese dwarf trees and are undoubtedly of decorative value.

When climbing upwards, we arrived at the rocky top part of the mountain and there we found on the bare stone crowded in large clusters the *Amaryllis procera* we sought. Their two to three feet high necks all pointed northwards, right into the sun at noon. The rocks on which they grow, are all inclined in the same direction. The strangely curved leaves were swinging in the hot wind of the evening and each had a fine purple line on the margin. They were of a greyish green and leathery, and quite succulent. We stood a while around the first cluster which we found before we considered the best way to gather them, and how to carry them down. This was by no means easy, because the clusters of bulbs generally grow on bare, heavily inclined, rounded rocks, which were difficult to reach and harder to climb. Should

the collector slip on his way to reach them, there would be little chance to stop the fall. Slipping was difficult to avoid, as all these rocks were moistened by dropping water and overgrown by algae and lichens. The black soil of leaf mould in which the *Amaryllis* bulbs grow was quite swampy, but not "sour,"* as water continually washed through it. Although it was near sunset when we set out on our return, the wind blew hot and the rocks were quite warm. That gave us an idea of how this spot would be the next day at noon, when the full tropical sun would burn on the slopes.

We arrived at our camp without accident, prepared our meals and whilst our two men laid down to sleep, we had still to discuss the best way of collecting our bulbs in as short time as possible. We had brought with us food only for two days, but there were now four hungry men instead of two, so that we had to finish the job in one day. When we had discussed everything and prepared our plan for the next day, it was midnight and we laid down on our bed of grass, which we had cut before it became dark.

But we could not sleep, perhaps because of the excitement of our success or due to our weariness after five hours of walking and climbing in tropical heat. Besides, there was another obstacle. There were ticks round us in the grass and on the shrubs in such quantities, that we felt them stinging all over the body. We got up and tried picking them off but half an hour later we again had as many as before. We did not sleep a single minute during that night and at three o'clock we went to the fire and prepared ourselves some coffee and drank many cups, hot, black and bitter. After eating some "rusk" we lighted our pipes and awaited the dawn.

Our two men had slept well all the night over, they apparently were accustomed to ticks and did not suffer from their bites. When still grey fog flew through the valley and the first faint glow of the morning appeared, we climbed up to the *Amaryllis* bulbs and when the sun raised over the mountains on the opposite side of the valley, our men had already brought down to the road several bags of these plants. My companion and I selected the best bulbs from the clusters, collected and cleaned them carefully and put them into the bags. Our men carried these down when they were filled.

In the cool morning we wore light shoes with felt soles, such as alpinists wear when climbing in the rocks. They allowed us to go quickly and safely over the most dangerous spots, but when the sun raised higher and it became warmer, we feared the poisonous snakes, which are always dangerous on hot days and we changed our shoes for high hunting boots of thick leather. Had the collecting work been difficult before, it became now dangerous as we constantly slipped. The final result was, that we had to use our bare hands when climbing over the slopes. I doubt whether we would have been able to kill a poisonous snake during most of the time without slipping down the rocks, for the heavy boots proved to be most unpractical. Fortunately no accident

* The exact meaning of the word "sour" is not clear. Sr. Blossfeld will undoubtedly explain its meaning in a further communication. —Ed.

happened, although several times we observed snakes taking their sun bath on the bare, hot stones.

At three in the afternoon we had already gathered most of the quantity of bulbs we needed, but the heat had become so oppressive at that hour, that we had to take a rest. Each of us loaded a bag containing 10 to 15 bulbs on his shoulders and we climbed down. We arrived at our resting place completely exhausted, which can be explained only by the heat, the lack of sleep during the past night, the abruptness of the mountain and the heavy weight of the load we carried, for each bulb weighs from 2 to 5 lbs.

After an hour's rest and a good meal, we climbed up again, carrying once more with us our photographic material. We wished to take some pictures and also a hundred feet of film from our spot before the daylight disappeared. On the way we discovered that on the most difficult places, where it was nearly impossible to find access, the *Amaryllis* bulbs were growing in quite large quantities, whilst on easier spots the clusters were scattered only sparsely. When we arrived at a place, where we could stay firmly and rest a moment, we inspected the flanks of the surrounding mountains with the field-glass. We could not discover one single *Amaryllis procera* anywhere else and I believe, that this plant grows only on the northern slopes of the Organ Mountains and even there occurs only sporadically at places which are distant one from the other, or it may even be, that it grows only on the place where we collected it. This also explains, why this fine plant has been so rarely cultivated.

We had the intention of reaching the very top of the mountain in order to have a glance on the other side of it. Climbing upwards, I arrived under a rock table and when raising my head over its top, I had such a surprising view, that I nearly lost my balance and fell back on my companion's shoulders, who was nearby below my feet. I had discovered a large cluster of *Amaryllis procera* bulbs and in the center of it one bulb bore a stem with four beautiful blue flowers! The sun was shining just from one side through the large and decorative blooms, thus showing every fine detail of the nerves and veins of the petals. Each blossom was three to five inches in diameter, the color being a bright heaven-blue with darker veins. The borders of the petals were undulated and rippled, and their tops pointed slightly backwards. The bunch of flowers was on a 15 to 20 inches tall stem. Some time later, we also discovered a few seeds inside a rounded pod, which had three chambers, each of which contained two rows of black, flat seeds. A few seeds had already fallen out of the pod on the swampy wet soil between the bulbs, and a few of them had just germinated.

After taking a good many pictures it had become late, and we climbed to the top of the mountain, which proved not to be as easy as we thought it would be. A 20 feet high vertical rock wall, crowning the mountain top, proved to be very difficult to climb and as its top showed dense jungle vegetation, we did not expect to find any interesting plant material there. We therefore explored this small top part of the mountain. We returned and quickly collected the remaining bulbs

to complete the lot we needed and just when the sun disappeared below the mountain's top we had the work finished. All of the output was brought to our camp, where a mule caravan had arrived which carried the bulbs to the road, where our truck was waiting. It was already midnight, when we had loaded the bulbs on the car and could start back to civilization.

I have now a good many of these bulbs planted in my nursery in the open at Sao Paulo, Caixo Postal 2189. I did not lose a single plant of the lot I collected and all of them are in splendid condition and growing vigorously, in spite of the very different climatic conditions of Sao Paulo, which has a sub-tropical climate, whilst the habitat is in the tropics though in altitudes of 3000 feet above sea level and higher. This proves, that blue-flowering *Amaryllis* is not so difficult in culture as reported in the literature. The plants need full sun, intermediate house temperature and must be planted in a rich leaf-mould which should be mixed with some loam to avoid drying out. The soil must be continually moist and in summer, when the plants are in full growth, it can be kept quite swampy, but the soil must not be "sour" as this causes rotting of the bulbs. On the other side, a basic condition of the soil, in consequence of existence of too much lime is harmful to the bulbs also.

Propagation of *Amaryllis procera* can be effected by offsets, which are regularly produced under suitable conditions, and propagation by seeds is another suitable way, especially in warm climates, where the seedlings can be kept in the open all the year round.

The blue colour of the flower makes this plant specially valuable for hybridizing purposes and I can imagine, that crossings with large flowered *Amaryllis* hybrids of white colour would give results of fantastic beauty and outstanding shape and form of flowers. But the true species itself is very useful because of its novelty colour and because of its excellent keeping qualities, both on the plant and as a cut flower.

THE BLUE AMARYLLIS, AMARYLLIS PROCERA, IN FLORIDA

E. J. Anderson, *Palm Beach, Florida*

My experience in the culture of Amaryllis has been relatively short and I feel that I was indeed fortunate in having one of my *Amaryllis procera* bulbs bloom this past spring (Plate 190). Before importing my bulbs I read many interesting articles on the suggested culture in issues of Herbertia. I then felt that I would like to do a little experimenting and therefore imported a dozen bulbs. These were not as large as those described in Herbertia. However, they were healthy stock and soon developed long sickle-shaped leaves; and in many instances made active root growth.

In planting I considered all of the suggested methods of culture and arrived at the conclusion that I would plant each bulb differently. The growing medium ranged from good, sandy loam to osmunda fiber. The differences in the soil consisted of additions of leaf mold, muck and sandy loam in various proportions. From my observations they enjoy

Amaryllis procera: photo by E. J. Anderson

Plate 190

semi-terrestrial culture as those bulbs planted in approximately one-half fiber and one-half soil seemed to develop the best root systems.

In making the experiments I have subjected the bulbs to about every condition possible in this locality and believe that water control is necessary. I also found that partial shade was beneficial. Several of my bulbs, though small, seem to be growing nicely and I have every hope of securing flowers this spring.

I have recently been advised by a South American exporter that *Amaryllis procera* is kept growing throughout the year in Brazil—never allowing a rest period. I find this true as the foliage is green this 18th day of October and shows no sign of resting.

I intend to experiment with different amounts of shading—that is, shading the base of the bulb and allowing various degrees of sunshine on the foliage. My reason for this experiment is based on the fact that in its native habitat it grows in tall weeds or bushes and the tops only are exposed to the elements.

ALSTROEMERIAS: A NEGLECTED OPPORTUNITY

J. C. Th. Uphof, *Orlando, Florida*

Alstroemerias deserve more attention than they have received in the past. The plants are far too attractive to be ignored. The various species have very ornamental flowers and are of great promise to the plant breeder. Occasionally we encounter a very few in a garden or park; some species are always present in a botanical garden. Many years ago their beauty was much more appreciated than at the present. Later their improvement had to give way to that of a number of other species like gladiolus, dahlias, amaryllis, begonias, sweet peas, petunias and others from which an endless chain of fine hybrids and varieties originated. This should also have been done with *Alstroemeria*. The flowers are easy to handle during the process of hybridization and there is much variety among the many species available. Combined with our knowledge of plant breeding and of genetics, we are more or less able to predict the beautiful hybrids we may be able to obtain after some years of effort. As stated above only a few species are found in gardens but when we consider the large number of species for example in the Herbarium of the Royal Botanical Gardens at Kew and of Berlin-Dahlem which I had the privilege to examine, then we conclude that there is something in this plant genus for the horticulturist to develop. In this connection I wish to give a short botanical and horticultural account of this group.

Nearly 60 species of *Alstroemeria* have come to light thus far. They are all native to South America. More than half of them are found in Chile and surrounding countries.

This genus was founded in 1762 by the great Swedish botanist Carolus Linnaeus (Karl von Linné). It is of interest that there are some species that have been described in 1763 by Adanson under the name of *Ligtu* and there are others that were named in 1836 by Rafinesque as *Lilovia* and later on as *Priopetalon*.

According to Pax and Hoffmann,[1] the place of *Alstroemeria* with reference to the other genera of the *Amaryllidaceae,* is as follows: They form part of the subfamily *Hypoxidoideae* to which also belong the genera *Bomarea* Mirb., *Lentichis* Phil., and *Schickendantzia* Pax. Among these only a few species of *Bomarea* are known to the horticultural world. In fact there are some species of this genus that were once described as *Alstroemeria,* especially by Ruiz and Pavon[2] but later on transferred to *Bomarea.* Hutchinson in 1934 elevated this group into a family, *Alstroemeriaceae.*

Our genus was named by Carolus Linnaeus[3] in honor to his friend M. Alstroemer whose father was at that time the well known Counselor of the Swedish Chamber of Commerce. Linnaeus received seeds from Père Feuillée in Peru through Alstroemer via Cadiz. Père Feuillée ranked the plants among *Hemerocallis.* The first species, and therefore the leading one with which other species have to be compared, was named *Alstroemeria peregrina.* Linneaus shows an excellent illustration in Plate III of his work. Then follows the descriptions of *A. ligtu,* from Chile, and the third species, *A. salsilla.* This one was later transferred by Mirbel[4] in 1804 to the Genus *Bomarea.*

In one of the most outstanding works on the flora of Peru and Chile, namely that of Ruiz and Pavon,[5] we find a number of the earliest descriptions of *Alstroemeria* species. These pioneer botanists describe a total of 22 species. They all are illustrated on large folio plates. We notice here, for example, original descriptions of *A. haemantha, A. revoluta* and *A. versicolor,* all from Chile. There we find also *A. lineatifolia,* (See Plate 191), *A. distichiflora, A. anceps, A. rosea, A. bracteata, A. denticulata, A. macrocarpa, A. cordifolia* and *A. latifolia* from the Peruvian Andes. No doubt *A. denticulata, A. macrocarpa,* and *A. latifolia* (See Plate 191), are of horticultural value.

Of interest is another work of later date, namely that of Herbert.[6] Several of his 29 species of *Alstroemeria* are well illustrated on a number of plates in black and white. He had also acquired much experience in raising various species, more than any other grower of that or our time. He noticed considerable variation among the seedlings that were considered as species. He states that *A. psittacina* Lehm. (syn. *A. pulchella* L.), *A. haemantha* Ruiz et Pav., and *A. aurantiaca D. Don.,* "flower well in the open ground if well covered with straw or a thick coat of leaves in the winter. The soil should be light, and the tubers set pretty deep; and any heading that would throw the wet off in the winter will be found advantageous." He also discovered that the flowers are proterandric namely "that the stigma does not come to perfection until after the decay of the anthers." He also noticed that the

[1] **F. Pax und K. Hoffman.** Amaryllidaceae in **Engler und Prantl.** Die Natürlichen Pflanzenfamilien. Vol. 15-a. Leipzig, 1930.

[2] **Hippolyto Ruiz et Josepho Pavon,** Flora Peruviana et Chilensis. Tom. III Madrid, 1802.

[3] **Carolus Linnaeus.** Plantae Alstroemeria in Amoenitates Academicae. Tom. VI 247-262, Upsaliae, 1762.

[4] **Charles Mirbel.** Histoire Nat.. des Plantes Tom. IX: 71. Paris, 1804.

[5] **Hippolyti Ruiz et Josepho Pavon.** Flora Peruviana et Chilensis. Tom. III: 58-64, Plates CCLXXXVIII-CCXCVI, Madrid 1802.

[6] **William Herbert.** Amaryllidaceae 88-101, London 1837.

late development of the stigma should make the genus very liable to spontaneous intermixture of various species. This condition has been studied in more detail in recent years by Urban[7] in Chile. Herbert described in his interesting and well known work a number of new species, for example, *A. inodora,* known from the crevices of rocks near Solta, southern Brazil; *A. macraera,* originally found near Valparaiso, Chile; *A. pygmaea* from the neighborhood of Pasco, Peru. He describes this species as a curious little plant unlike *Alstroemeria* in many respects. However it is still considered as a member of this genus (see also Index Kewensis). *A. pygmaea* grows only in the highest evaluations of the Cordillera in rich black soil, reaching a height of not more than two inches. Among his other new species is *A. Isabellana* which was received by Sir W. Hooker from Mr. Tweedie who stated that it is one of the most beautiful species of Rio Grande. It grows in the mountain marshes and rough pastures of that region and was very abundant near Portalegro, Brazil. Its flowers are orange tipped with green. The last of the species described by Herbert in his Amaryllidaceae is *A. subrosulacea* from Chile. The flower stalk has but few leaves, the flowers are 1¼ inches long, with evanescent color. He also described some interesting species in Botanical Register[8] among which *A. magnifica,* allied to *A. ligtu L.,* is native of Chile. He also mentions *A. chorillensis,* native o the mountains of Peru.

It is interesting to read what more recent botanists have written about the occurrence of Alstroemerias in the region of the Andes and along the Pacific Ocean, on the basis of observations made in modern times. Among these we have Reiche[9] who states that *A. violacea* Phil., occurs in the coastal section of the northern part of Chile, being one of the most beautiful species of that region, whereas *A. haemantha* Ruiz et Pav., *A. versicolor* Ruiz et Pav., and *A. ligtu L.,* are most numerous in the central part of that country. Other species are found in the Cordillera at elevations of 2500 meters. Further he mentions how *A. peregrina* Ruiz et Pav., (and *Hippeatrum bicolor* Bak.) occurs in large numbers in the southern part of the province of Coquimbo, which is phytogeographically one of the most interesting parts of Chile. These *Amaryllidaceae* are usually found between the xerophytic shrubbery, where there is in spring a rich vegetation, especially of flowering herbaceous plants. He states that in the southern provinces, mainly near Amorgos not far from Corral, *Alstroemeria aurantiaca* D. Don., occurs with many other interesting species along the margins of virgin forests and here and there in open places. Weberbauer[10] tells us that among the species of *Alstroemeria* in the Andes of Peru *A. peregrina* Ruiz et Pav., is most widely known of any. It is an ornament among the hills around Lima. He found *A. pygmaea* Herb., growing on the prairies of the Central-Pe-

[7] **Otto Urban.** Estudios sobre la biologia de algunas plantas endemicas. Revista Chileana. Hist. Nat. Vol. 31: 46-49, 1928.

[8] **William Herbert.** Miscellaneous Matter in Botanical Register. Vol. 29: 64, 1843.

[9] **Karl Reiche.** Grundzüge der Pflanzenverbreitung in Chile. Vol. VIII of Engler und Drude. Die Vegetation der Erde. Leipzig 1907.

[10] **A. Weberbauer.** Die Pflanzenwelt der peruvianischen Anden Vol. XII of Engler und Drude. Die Vegetation der Erde, Leipzig, 1911.

Upper, Alstroemeria latifolia, and lower, A. lineatifolia; from Ruiz et Pavon, Flora Peruviana et Chilensis, 1802.

Plate 191

ruvian Sierra-zone at an elevation of 2900 meters where there is a great wealth of herbaceous plants but a scarcity of trees and shrubs.

Let us now consider the Alstroemerias growing on the other side of the Andes, namely in Brazil. Good descriptions of plants from that country are found in the famous and expensive Flora Brasiliensis.[11] The chief author is Schenck. Later on Baker[12] gave a more complete enumeration of the species. He admits 19 species, of which 5 are new, namely *A. scaberula,* from Goyaz growing in bushy places near the Mission of Douro; *A. platyphylla,* from Chapoda at Nostra Senhora d'Abadia; *A. Gardneri,* from moist places near the same locality; *A. Burchellii,* from the hills near the city of Goyaz, and *A. zamioides* from dry, shady places on the Sierra de Natividade near Goyaz. At the present time about 40 species of *Alstroemeria* are known from the Republic of Brazil. One of the last to be described from that country is *A. buhantanensis* Hoehne,[13] from the vicinity of Sao Paulo.

The history, botany and geography of the genus *Alstroemeria* have been reviewed in order to show the reader something of the enormous wealth of species in this interesting genus of which there is so very little under cultivation, but which promises so much for the future of our gardeners. Horticulturally the best known species is *A. aurantiaca* D. Don., followed by *A. chilensis,* sometimes called Chilean Lily. These are not only of value as garden subjects, but also are outstanding as cut flowers. Species occasionally found in collections are *A. pulchella* L., *A. pelegrina* L., *A. violacea* Phill., and *A. revoluta* Ruiz et Pavon.

From my own observations made in Holland, Germany and England I know that the plants are frequently propagated from seeds. They are planted in February, sometimes as early as January, in pots or deep seed pans filled with a sandy soil. They are left to germinate in a temperate greenhouse, sometimes in a hotbed or frame. With fresh, well kept seeds, one should not have any difficulties in obtaining healthy plants. Sometimes the seeds are planted out of doors in May, where they should be sown in a protected place. When the seedlings are about 1 inch high they are transplanted. Those planted in February in the hothouse are later transferred to small pots. Those originally sown out of doors are usually planted out in beds about 8 inches apart in a light, sandy, but fertile soil. During the rest of the summer the beds are kept free of weeds, and the soil is cultivated once in a while in order that air may easily penetrate into the soil for the benefit of the roots.

Shortly before approaching frost, the surface of the soil is either covered with a layer of straw or leaves, or a layer of soil to a thickness of about 6 or 7 inches is placed over the bed. Some nurserymen observed in the latter instance that plants will pass through the winter

[11] **A. Schenck.** Alstroemeria in **Martius.** Flora Brasiliensis. Vol. 3, pt. 1. Monachii et Lipsiae, 1871.

[12] **J. G. Baker.** On the Brazilian species of Alstroemeria. Journ. of Bot. Vol. 15: 259-262, 1877. See also:

J. G. Baker. Handbook of the Amaryllidaceae 133-142, London, 1888. (In this work B. mentions 44 species of Alstroemeria.)

[13] **F. C. Hoehne.** Uma Alstroemeria nova dos arredores de Sao Paulo. Revista Museo Paulista. Vol. 15: 481-489, 1919.

in good condition and that they will flower more profusely during the following summer.

Sometimes Alstroemerias are grown in 8 to 10 inch pots. These pots are filled with a mixture of sand and loam derived from decayed leaves and compost. They are planted in pots in October; are kept in a frost free place, and in a slightly moist condition. When the first shoots show above the soil, the pots are placed in the greenhouse close to the glass. After the middle of May they are planted out of doors in a semi-shady, well protected place. Treated in this manner, they will flower earlier in the summer than plants kept out of doors throughout the entire winter. A number of species can not be handled in this way because the roots are too fleshy for pot culture.

Little is known or has been recorded about *Alstroemeria* growing in such subtropical regions as Florida where there is no frost hazard. However, they survive as far north as Washington, D. C., or even farther north if covered with mulch in winter.

Alstroemerias are also propagated by division of the mature plants. This is usually done in the spring when the plants are at the end of their resting period. Sometimes they are propagated in this way in the fall. Due to the peculiar fleshy condition of the roots they should be handled carefully to cut down losses due to the decay following injury to the roots.

Although *Alstroemerias* are easily propagated from seeds, reproduction by division will probably prove to be the only safe method when hybrids and varieties are concerned because they do not come true from seeds.

BOMAREA OVATA AND OTHER CENTRAL AMERICAN BOMAREAS

J. C. Th. Uphof, *Orlando, Florida*

When I was collecting species of epyphytic orchids in July 1938 with the help of native Indians in the tropical mountain jungles near Los Chorras, a small hamlet not very far from San Salvador, the capital of El Salvador, I found to my surprise a very attractive tall vine which I recognized at once as a species of *Bomarea*. A few vines of this species were hanging down from some high rocks, that were covered with *Achimenes longiflora* and other *Gesneriaceae*, a number of creeping aroids and some shrubs belonging to various families. Further up I found additional plants of this species that I identified as *Bomarea ovata* (Cav.) Mirb. This species has a wider range of distribution in tropical and subtropical America than any other *Bomarea*. It is worth while to draw here more attention to this interesting vine and to the entire Genus in general.

Bomarea ovata (Cav.) Mirb. is a herbacous vine (Plate 192). A few stems arise at the base of the plant, about 2 to 5, in some instances more stems originate from the thick tuber. They are 3 to 5 mm. in diameter and reach a length of 2 to 6 meters. Not seldom they creep into the crowns of small trees, covering branch after branch. The leaves

are alternate, glabrous and lanceolate, rather long pointed, 4 to 10 cm. long, and 12 to 28 mm. wide. There are usually 7, somewhat parallel running veins, they are clearly visible on both sides of the leaf. The flowers occur on compound umbel-like inflorescences. The small umbels, umbellules, are usually two-flowered—one flower is more advanced than the other. At the base of the compound umbels occur 3 to 4 bracts. They are lanceolate to somewhat spatulate, 12 to 15 mm. long. At the base of the usually two-flowered small umbels there is one smaller lanceolate bract, 4 to 6 mm. long. Sometimes there is a small bract at the middle of the pedicel of the smaller flower of each umbellule.

The plants were flowering in July and August. The flowers were slightly bell-shaped, 2 to 2½ cm. long and 10 to 12 mm. in width. The inferior ovary is 2 to 4 mm. long, dark green and somewhat ribbed. The three outside members of the perigone are lanceolate, salmon colored, except that the part toward the tip is slightly greenish. The inside is lighter salmon colored. The halves of the sepals are folded inward. The three alternating members of the perigone are of the same length but are curved toward the middle in the lower half, and therefore appear to be spatulate. The outside is yellowish toward the midrib. The margin of the petals is deep green, the rest is light green. The inside of the petals is green to light green with three dotted, longitudinally running, dark purple stripes. There are 6 stamens that are formed in two cycles, 5 to 17 mm. long. The filaments are green to almost whitish. The anthers are deep violet. The ovary is inferior. The style is light green, 5 to 7 mm. long; the stigma is slightly three-cleft. Fruits and seeds are unknown to me.

According to Standley and Calderón *Bomarea ovata* (Cav.) Mirb., is thus far the only species that has been found in El Salvador.[1] Accordingly to the Index Kewensis[2] about 140 different species are thus far known. They have been cited as follows:

Index Kewensis (Main work)	73 species
Supplement 1896-1900	0 species
Supplement 1901-1905	1 species
Supplement 1906-1910	42 species
Supplement 1911-1915	20 species
Supplement 1916-1920	1 species
Supplement 1921-1925	2 species
Supplement 1926-1930	1 species
Total	140 species

The majority of the species of *Bomarea* are found in Columbia, Ecuador, Peru and Bolivia. The most are distributed in the region of the Andes where many grow from an elevation of 1500 meters up to the timberline. Many are not high climbing vines for some reach a height of only a few feet. About a dozen species are known from

[1] **Paul C. Standley** y **Salvador Calderon.** Lista Preliminar de las Plantas de El Salvador 52. San Salvador, 1922.

[2] **B. D. Jackson** et **Jos. D. Hooker.** Index Kewensis. Londini 1893-1895 and Supplements 1896-1930.

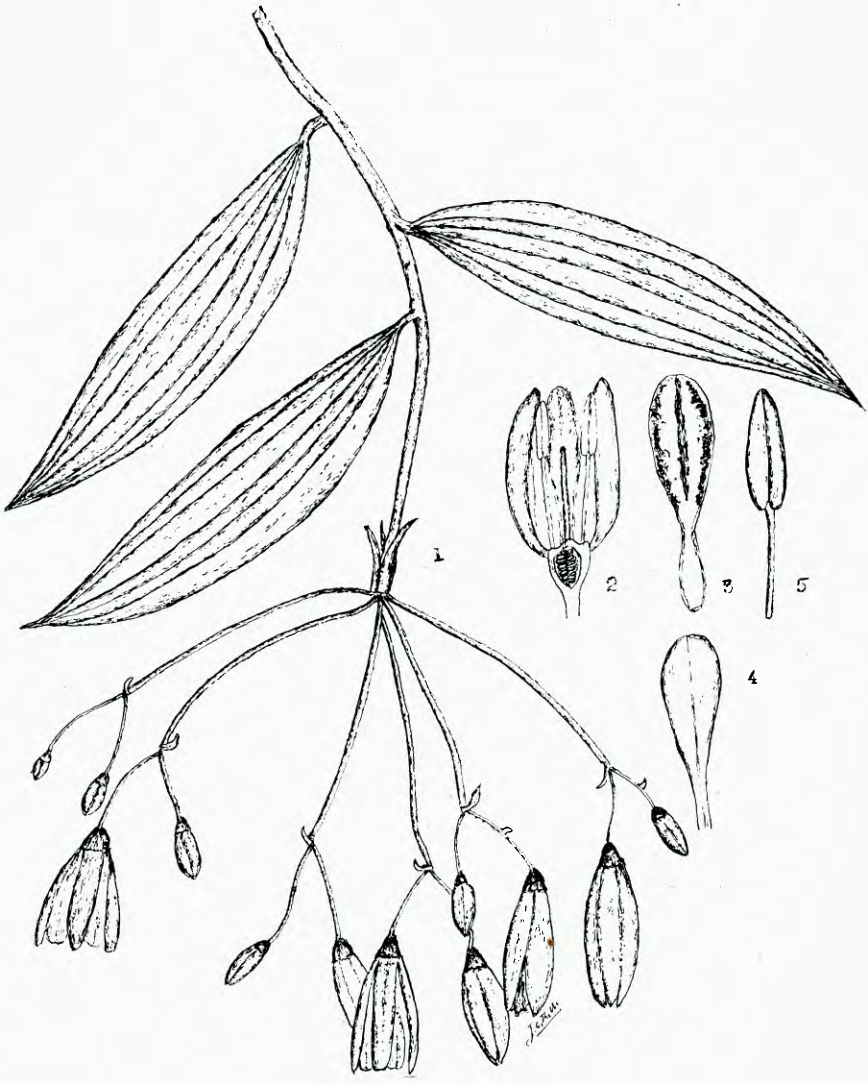
Brazil, but they are rarer as one goes southward. Only one species has been reported from Chile. Some *Bomareas* are known from the West Indies, but there are only a few species in southern Mexico.

The number of known species of *Bomarea* has been rapidly increased in recent years. Herbert[3] admitted 44 species, and Baker[4] included 75. The founder of this genus was Mirbel[5] who segregated it from *Alstroemeria* which was founded by Linnaeus.[6] The reason for this segregation I quote in Mirbel's own words: "Ce genre diffère du precédent (namely *Alstroemeria*) par les divisions du périanthe dont les exterieures ne sont pas reversées en arrière, pas les etamines qui sont droites et par la capsule qui est arrondie et aplatie de haut en bas."

As far as the first description of *B. ovata* is concerned, we find this plant first mentioned by Cavanilles[7] under the name of *Alstroemeria ovata*. He describes the plant in Latin and gives a very extensive and thorough acount of its morphological characteristics. He also gives a very accurate illustration of this species on Plate 76, leaving no doubt as to what plant he had in mind. I easily recognized from this drawing the plant I collected in El Salvador. He gives an illustration of the twig with flowers that form the compound umbel. He shows also two illustrations of the capsule. Cavanilles states that his plant came from Peru and mentions no other countries. Quite naturally Willdenow[8] describes the plant under the same name. He refers to this species in German as "eijformige Alstroemerie."

The most northern distribution of this species is recorded from Mexico by Urbina.[9] He reports it from Sierra de S. Felipe growing at a height of from 7000 to 8000 feet. He recognized also another species from that country namely *B. edulis* Herb. Lundell[10] found *B. ovata* (Cav.) Mirb., somewhat southward near La Libertad Guatemala. Smith,[11] who has studied the flora of Guatemala over a much larger area, mentions *B. ovata* (Cav.) Mirb., from Santiago, Dept. Zacatepequez at 6500 feet elevation; from the volcano Acatenango in the same Department at 10,000 feet, and from Santa Rosa in the Dept. of Santa Rosa at 3000 feet. He also found *B. hirtella* Herb. from the neighborhood of the volcano Agua in the Department of Zacatepequez at 9000 feet; and *B. acutifolia* Herb., from the volcano Agua, and from San Miguel in the Department Quiche at 9000 feet elevation.

[3] **William Herbert.** Amaryllidaceae. London 1837.
[4] **J. G. Baker.** Handbook of the Amaryllideae. London, 1888.
[5] **C. F. Brisseau Mirbel.** Histoire Naturelle Génerale et Particulière des Plantes. Tom. 9: 71-72, Paris, 1804.
[6] **Carolus Linnaeus.** Amoenit. Acad. Tom. 6. See also:
Carolus Linnaeus. Species Plant arum. Ed. Sec. Tom. I, 461. Holmiae, 1762.
[7] **Ant. Iosephi Cavanilles.** Icones et Descriptiones Plantarum quae aut sponte in Hispania crescent aut in Hortis Hospitantur. Tom. I: 54-55, Plate 76. Matriti, 1791.
[8] **C. L. Willdenow** in **Carolus Linnaeus.** Species Plantarum Ed. Quart. Tom. II: 196, Berolini, 1799.
[9] **Manuel Urbina.** Catalogo de Plantas Mexicanas. 348 Mexico, 1897.
[10] **Cyrus L. Lundell.** The Vegetation of Petén. 163. Washington, 1937.
[11] **John Donell Smith.** Enumeratio Plantarum Guatemalensium necnon Salvadorensium Hondurensium Nicaraguensium Costaricensium. Oquakae, 1889-1907.



Bomarea ovata (Cav.) Mirb.

Plate 192

Standley and Calderón[12] mention *B. ovata* (Cav.) Mirb., as the only species from El Salvador, growing near San Salvador (the Capital) and Ahuachapan. A good illustration of this species is given by Chouse[13] together with a short description.

I could find no mention of this plant genus with reference to the flora of Honduras. Goyena[14] mentions *B. chontalensis* Seem., from Nicaragua. Standley[15] enumerates a number of species from Costa Rica. *B. acutifolia* (Link et Otto) Herb. is common in forests of the higher mountains at elevations of 2000 to 3000 meters. He states that the root-tubers of this species as well as the others, are edible but have little flavor. *B. chontalensis* Seem., is reported from wet forests in the mountains. *B. costaricensis* Kränzlin was found in Cerro de Buena Vista and along the slopes of Irazú and Poá at 2000 to 3000 meters. The flowers of this endemic species are exceptionally large, about 5 cm. long. *P. edulis* (Tuss.) Herb., is mentioned from Papa de Venado, and seems to be common along the edges of forests, especially in the higher mountains at an elevation of 1400 to 3000 meters. *B. Porschiana* Cufidontis., is endemic on the volcano Turrialba at a height of 2500 feet.

Mirbel called this genus in honor of Bomare stating: "Bomarea, du nom du respectable Valmont du Bomare dont la vie laborieuse est consacrée a l'étude et à l'enseignement des sciences naturelles."

San Salvador, Republica de El Salvador,
September 1938.

NOTES ON ALSTROEMERIA ACTIVITY ON THE WEST COAST

L. S. Hannabal, *California*

Considerable interest in the culture and hybridizing of Alstroemeria is in evidence on the West Coast and this is due apparently to the fact that a number of species, with great color and growth variations, are available and provide a wide range of material to work with. It is natural therefore that no two breeders are attempting to duplicate or obtain the same results. The ultimate results therefore should yield some interesting hybrids for many of the alstroemerias hybridize very readily.

The University of California Botanical Garden probably has one of the best collections of material. This was obtained in their recent Andes expeditions. At present they are working toward the production of a plant type having a medium weight stalk carrying a large flower umbel. Some success has been obtained using *A. chilensis, A. Ligtu* and others.

Victor Reiter, Jr., of San Francisco is having considerable success in the development of an open flower umbel similar to that exhibited in the better forms of *A. pelegrina* var. *rosea*. Other growers are attempting to obtain new color ranges using both European hybrids and natural color variants of species as parents.

[12] **Paul S. Standley y Salvador Calderón.** Lista Preliminar de las Plantas de El Salvador. 52 San Salvador 1924.
[13] **Felix Choussy.** Flora Salvadorena. Tom. III, 5 San Salvador, 1932.
[14] **Miguel Ramirez Goyena.** Flora Nicaraguense. 797, Managua, 1909.
[15] **Paul C. Stanley.** Flora of Costa Rica. Part I, 175, Chicago, 1937.

In fact so many variations are available that considerable question has come up regarding the earlier classifications of the species of *alstroemeria* and at present several workers, including Mr. H. L. Stinson of Seattle, Washington, and Mr. W. M. James of Las Positas Nursery, Santa Barbara, Calif., are attempting to re-check the earlier Latin descriptions and untangle the supposed natural Hybrids from the true species.

We look forward to preliminary reports from these workers in the near future with considerable interest.

NOTES ON ALSTROEMERIAS *

P. H. Brydon, *California*

Two outstanding species of *Alstroemeria*, among a considerable number which were sent back by the recent Botanical Garden Expedition to the Andes, have bloomed this summer. The first, *Alstroemeria violacea*, promises to be one of the most outstanding contributions of the Expedition, since this is probably its first introduction into cultivation. Mature plants of this species attain a height of five feet and are found growing on the edge of the Atacama desert in Chile at an altitude of from 500 to 1,500 feet. The leaves on the sterile stems are ovate-oblong, two inches long, one inch wide, and shine as though lacquered. The flowering stems eventually reach a height of five feet and produce a compound umbel, six- to eight-rayed with as many as sixteen blossoms to the inflorescence. The flowers are a pleasing shade of Mauve (R. H. S. Color Chart 633/2), two and a quarter inches wide at the mouth, each segment being one and a half inches long. The lower half of the upper segments are white with scattered carmine spots. This species has responded to the same cultural treatment as other alstroemerias and, according to Baker in his Amaryllideae, 1888, it is related to *A. Ligtu*. The blossoms first appeared in June, approximately five months after germination, and continued to appear until late August.

The second interesting species is as yet unnamed and is referred to as "*Alstroemeria species* No. 39. 1220." It closely resembles *A. Ligtu* in growth, habit, and floral characters. The umbel is compound, six-rayed with six flowers to each ray. The individual blossoms are slightly smaller than the largest of the "Ligtu-angustifolia hybrids," and are a striking shade of Salmon Red. The lower segments are slightly longer than the upper, and tipped yellow with maroon stripes. A peculiar situation exists in the stamens, the anthers of which dehisce or abort about the time when the flower is opening although, in some instances, one stamen elongates to produce a large normal anther close to the exserted stigma. Our cytologists report that this species appears to have sixteen pairs of chromosomes as opposed to eight pairs in other species examined. Its flowering period is later than other species, commencing in June and continuing through August.

* Reprinted by permission from **Journal of the Calif. Hort. Soc.**, Vol. I No. 4, Oct. 1940.

Both of the above species are apparently much later in their blooming period than other species of hybrids now grown. It is conceivable that a race of hybrids may be produced which will extend the flowering period of alstroemerias until the middle of August. So far, we have been unable to cross the two above-mentioned species with either the "Ligtu-angustifolia hybrids" or *A. aurantiaca,* but hope that this may be possible in the future.

LEUCOCORYNE AS A POT PLANT

WYNDHAM HAYWARD, *Florida*

The novelty bulb from the uplands of Chile, *Leucocoryne ixioides* var. *odorata,* which has been growing more popular in the American horticultural trade in recent years, has a decided value as an ornamental pot plant for spring decoration purposes in the greenhouse and outside in warm climates.

The purpose of this note is to cite an example of the remarkable longevity of these bulbs and their power to retain their blooming power more than a year as dry bulbs out of the ground.

The facts are as follows: in the Fall of 1938, Mr. W. M. James, valued cooperator of the American Amaryllis Society in Santa Barbara, sent the writer some bulbs of *Leococoryne,* the beautiful "Glory of the Sun" as it is more commonly known. Some of these bulbs were given away and some were planted within a few weeks. About two dozen were left dry packed in peat in a small cardboard box on a shelf in the house.

The *Leucocoryne* bulbs planted in the fall of 1938 bloomed only indifferently in pots. Apparently this subject must be thoroughly ripened off before replanting. Some remained dormant in the ground and in pots, making only a little foliage. Other bulbs bloomed well. The writer did not save any of these bulbs of the previous planting, but in Fall of 1939 found the box with the balance of the bulbs which had been stored dry since the year before. There were about three dozen bulbs. They were dry and somewhat shrunken, but sound, and some showed signs of sprouting and of root growth, indicating that they were past their time of planting.

These three dozen bulbs, which had passed more than a year out of the ground in dry storage in a box, were planted one dozen in the open garden at Winter Park, Florida, and two dozen in a six inch pot. All grew quickly and thriftily, making luxuriant foliage and bloomed profusely in the spring of 1940. The illustration (Plate 193) accompanying this note shows a pot of the two dozen bulbs at the height of their beauty, about four months after planting.

DAYLILIES IN AN ILLINOIS GARDEN

MRS. ROLAND S. READ, *Illinois*

In Grandmother's garden, one of her most cherished plants was the Lemon Day Lily with its tall, grass-like foliage and spikes of fragrant, yellow lily-like flowers in May and today we still give it one of the

Wyndham Hayward, Winter Park, Fla. See page 205

Leucocoryne ixioides var. odorata as a pot plant.

Plate 193

honored places in the garden for its beauty, its fragrance and for the lovely pictures which can be made by growing it in our perennial borders, especially near the bearded Iris. I have found that yellow and white are truly the accent colors for any mixed perennial border. These two colors, along with the gray foliaged plants, give light and contrast to many plantings and beautify many flowers which in themselves are rather dull by creating flattering background values. Of the three, yellow is our happy, bright color and it is impossible to have too much of it. No yellow tone is so sparkling as that of the old fashioned daylily, *Hemerocallis flava*, no plant more rugged than the new hybrids of this great and lovely family, which bring to our gardens larger blossoms as well as flowers in which there are subtle shadings of red, apricot, pink, salmon, orange, yellow, buff and citron. A selected group of varieties will give bloom from early May throughout the summer until mid-September. The quality of "picture-making" so marked in *Hemerocallis flava* and even in *Hemerocallis fulva*, which has escaped from many old gardens to lift its tawny head in beautiful drifts along the roadway, is to be found in every variety.

A few named hybrids purchased this fall, planted carefully and slightly covered this winter, will reward you with a bloom or two next spring and the clump will increase rapidly in size and beauty.

Hemerocallis is truly one of the best plants for our fickle Illinois climate. They grow well in any garden soil which can support other perennials and they thrive equally as well in southern Illinois as in the northern part of the state. They withstand drouth and an excess of rain does them no harm. However during long, continued hot, dry weather, many of the tiny buds drop off while some buds are blooming but the plant lives and continues to increase in spite of the weather. I have planted Hemerocallis at all seasons of the year but I have found spring and fall planting best, in fact, early fall planting is the best of all.

It is worth while to take a little trouble with the planting. Plant in either full sun or partial shade, deciduous shade rather than the shade close to a northern wall. Dig a hole big enough and deep enough so the funny-looking, fleshy tubers and rootlets can be spread out. Place the plant so the brown, fiber-like coating of the green shoots is just under the surface soil. Add a little soil and then pour in a lot of water. Add a little more soil and then gently move the plant up and down. This method of planting is called muddling and it firms the roots into the soil. Add more soil around the plant and press down well. Add blood meal on top, then in a few days when the ground is dry, a shallow cultivation turns the blood meal under without any danger of burning the roots or rotting the stalk.

I use blood meal on all Hemerocallis for its quick results in growth and for the fine color it gives the leaves and blossoms. In two or three years the plant may be lifted, cleaned with a hose and cut so that each piece will have a few sprouts with some of the tuberous roots attached. Cut down through the plant, following the natural grouping of the stalk clusters. If the pieces are too small, it may be a year or two before the plant blossoms, however, the plant increase is often worth the sacrifice.

If the plants are set out in the fall, a light covering of straw or leaves put on after freezing weather is advisable. Most perennials benefit by such winter protection in the widely fluctuating temperature of Illinois. Hemerocallis foliage, if left alone, will act as a natural crown protection. However if the foliage is cut off in the fall cleanup, then do not fail to cover to prevent heaving.

The only pests I have ever found on Hemerocallis are grasshoppers and the Iris borer. A spray of arsenate of lead is fine for both. Locating the borer is the same in Hemerocallis foliage as in the Iris foliage.

The varieties of Hemerocallis are many and varied. There are many lovely new ones. Unless one has a very large garden, it will not pay to buy without seeing the varieties in bloom as there are many varieties that are quite similar in size and color with differences so slight that only specialists can detect them. I will list a few of my favorite varieties here and urge you to visit a grower's garden next spring and summer for there are a great many varieties available and your garden should be made up of your own favorites:

Hyperion (Mead); One of the best, it has huge, soft, canary-yellow flowers of excellent form and height. It blooms in July and August and it is not unusual for each stalk to carry 20 or more buds. *Ophir* (Farr); The flower is large and with the petals gently recurved; is a rich yellow, overlaid with gold. It is truly a lovely color. There are often more than 25 buds on a stalk. It is quite tall and blooms in July. *Cinnabar* (Stout); The recurving petals of deep yellow have a large area midway in the center of rose brown. The throat is pure yellow. *George Yeld* is similar. Both are lovely. *Mikado* (Stout); a variety of very great beauty. *Mikado* always stands out in a garden planting. The flower is a fine, clear, deep yellow. On the three upper petals there is a large deep orange-red spot. The center petal is much deeper in tone than the others. The throat is red-gold. It is very tall and blooms in July and August. *Anna Betscher* (Betscher); This is a lovely deep orange-yellow shade with reddish-bronze—July and August. *Aureole;* This is a fine, early variety, always blooming with the Iris. It is a lovely deep yellow-orange with a soft overlay of brown on the petals. This variety does very well in part shade. *Dr. Regel;* A fragrant orange-yellow of a clear, soft color. It blooms early and is excellent for cutting. The color is perfect in a border planting. *H. minor;* A tiny, clear yellow flower for edgings or the rock garden. The foliage is neat and grasslike, the stalks about 12″ high are loaded with buds. Bloom in June. *Sungold;* Early June-flowering, large, deep gold flowers with very broad petals. Many buds on the tall stalks and the whole plant is very effective. *Golden Dream, Bay State, Goldeni* are very similar in color but are not nearly so large. *Golden West;* A lovely large orange-yellow flower of great substance, it is quite tall and blooms from July until September. *Golden Empress;* Another lovely soft orange-yellow, a late variety. *Sonny* (Stout); One of the pale yellow, tall varieties for midsummer blooming. It withstands the hot summer days without fading. *Dover, Gipsy, Sir Michael Foster,* and *The Gem* are also very excellent. These few have proved their value in my garden and as time

goes on others will move in beside them. Deeper, richer colors are available as well as pinks but they are still quite high-priced but we are having something to look forward to. I am only commenting on the ones that have already bloomed for me in my garden.

FLOWERING PERIODS FOR CLONAL VARIETIES OF DAYLILIES[1]

SELMA C. KOJAN
New York Botanical Garden

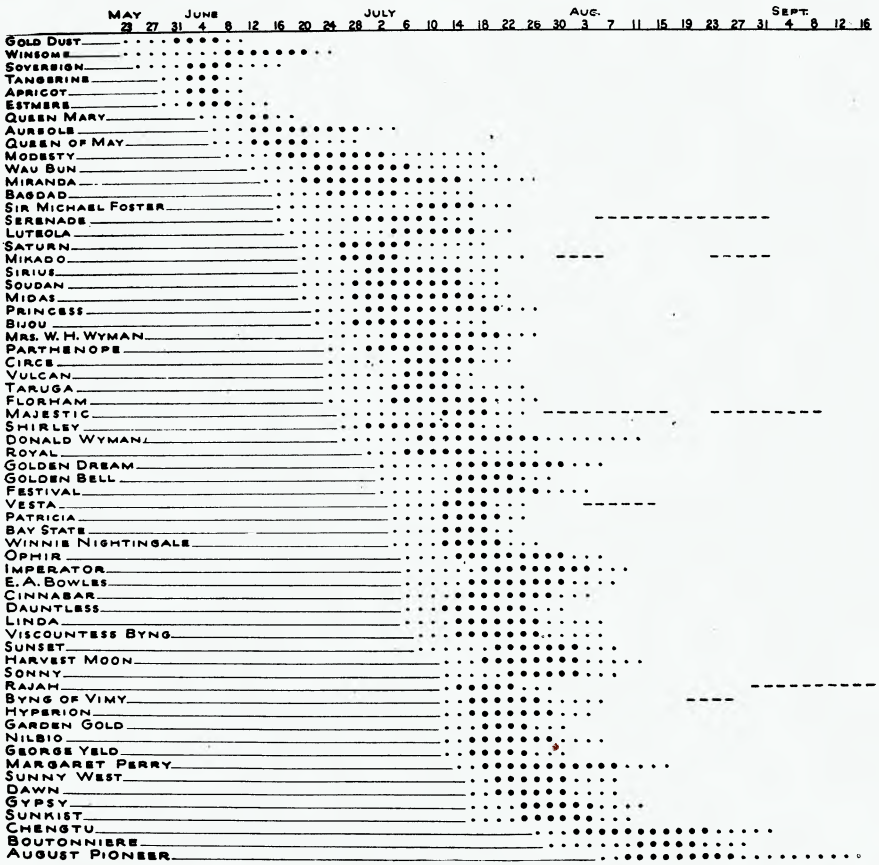


Fig. 57. Chart showing blooming periods of 64 daylily clones in the display collection at the New York Botanical Garden in 1939.

The accompanying chart, Fig. 57, indicates the periods of blooming during 1939 for 64 clonal varieties of daylilies which are growing in the display collection at the New York Botanical Garden. The names are

[1] The observations here reported were made by Miss Selma C. Kojan in connection with a scholarship grant from The New York Botanical Garden. A. B. Stout.

arranged in sequence according to the earliest date of bloom for each clone[2]. The large dots indicate the period of maximum bloom for the ramets (members of a clone) which were under observation. The first series of small dots indicates the period during which there was increase in the amount of bloom; the last series indicates decreasing bloom. Second and third periods of flowering are indicated on the chart by dashes.

The clones selected for this list include the earliest and the latest to flower during 1939 of all the named horticultural clones grown at the New York Botanical Garden. For nearly every one of these there were three well-developed plants or ramets in excellent condition of growth. Thus, it was possible to obtain adequate data during the same season on the normal period of flowering for these daylilies.

There were in the display collection numerous other clones of which there was only one ramet each or of which all the plants were not yet well-developed. But in 1939 none of these flowered earlier or later than the dates given in the chart.

The *Gold Dust Daylily,* which flowered from the 23rd of May to the 10th of June, was the first of all the named clones to bloom in 1939. However, in 1937 the same ramets of *Gold Dust* started blooming on the 12th of May, but in that year blooming was very generally earlier. The *August Pioneer Daylily,* which bloomed in 1939 from August 5th., to September 14th., was the very latest of all named clones to bloom at the Garden. A glance at the chart will show that there was a continuous succession of clones in flower between these two extremes. Of the several clones in bloom at any one date, some were in increasing bloom; some were in maximum bloom; and others were decreasing in bloom.

In 1939 the two daylilies *Tangerine* and *Apricot* began flowering on May 28th and finished flowering on the 10th of June, a period of 14 days. It may be noted that these two early-blooming clones had the shortest periods of bloom of all of the named clones growing at the Garden. In 1937 the same three ramets of *Apricot* bloomed for 21 days, a week longer than they did in 1939. Observations made over a period of years indicate that a short duration of bloom is normal and characteristic of these two daylilies. In contrast, as shown in the chart, the daylilies *Modesty, Miranda, Donald Wyman,* and *August Pioneer* had in 1939, very long periods of flowering, in one case as long as 48 days.

It has been observed that two clones may have periods of bloom which coincide closely, and yet the time and extent of maximum blooming and the number of blooming periods may not be the same for both. Pairs of clones which in 1939 exhibited this condition are: *Bagdad* and *Serenade, Sirius* and *Soudan, Parthenope* and *Circe, Mrs. W. H. Wyman* and *Florham, Vesta* and *Patricia, Ophir* and *Linda, Byng of Vimy* and *Nilbio, Dawn* and *Sunny West.*

In 1939, *Vesta,* an evergreen daylily, had a second period of flowering as is indicated on the chart by dashes. In some years the daylilies *Mikado* and *Majestic,* also evergreen, suffer from severe winter injury, and their late-blooming scapes arise in buds which are of small size in

[2] A group of plants, all of which have arisen from a single individual by repeated vegetative propagation.

early summer but which grow rapidly and produce scapes later in summer. These two clonal varieties had second and also third periods of flowering in 1939. A number of evergreen daylilies had in this same year only one period of flowering. *Luteola, Soudan, Princess, Vulcan,* and *Sonny* are a few of the named clones belonging to this group. Second periods of flowering, however, are not limited to clones of evergreen habit, but may be induced in ramets of discontinuous growth by winter injury or abnormal conditions of weather or culture. In 1939 the clonal varieties *Serenade, Rajah* and *Byng of Vimy,* which are discontinuous in growth, had also second periods of flowering. In this year from two to thirty days elapsed between the first and second periods of bloom for all the daylilies mentioned. In no case has a second period of blooming been equal to the first period in the number of flowers open during any one day.

There are several clonal varieties which were in bloom at the same time that are quite similar in stature, habit, and character of flower. *Gold Dust* and *Sovereign,* two of the early-blooming clones, were in bloom at the same time. They have much the same habit of growth and stature, but the flowers of *Sovereign* are somewhat paler than those of *Gold Dust.* Therefore, the gardener may wish to have both of these growing in the garden. *Queen Mary, Aureole,* and *Queen of May,* which flowered together, are very similar in flower, foliage, and habit of growth. Hence, the gardener may want to make a critical selection from this group. The same is true for *Miranda* and *Golden Bell.* The daylilies *Luteola, Florham,* and *Shirley,* which bloom during June and July, also bear quite a marked resemblance to each other.

The observations made at the New York Botanical Garden over a period of several years do not fully agree with some of the statements made in reference to the flowering of certain daylilies. It was reported in 1939 that the clone *Earlianna* began flowering on May 13th, two weeks earlier than did the *Dr. Regal Daylily.* In 1939 at the New York Botanical Garden the *Dr. Regal Daylily* began flowering on May 24th, but in former years the same ramets of this clone have started to bloom as early as May 11th and have never flowered later than June 8th. In the display collection at the New York Botanical Garden there is one ramet of *Earlianna* which was planted in the early spring of 1938. That year its first flower opened on May 26th; in 1939 its first flower opened on June 1st. In the collection there are a number of other daylilies including six clonal varieties and some unnamed types which flowered in 1939 at an earlier date than did the *Earlianna Daylily.*

Another case may be mentioned. It has been claimed that the clone *Mrs. W. H. Wyman* is "extremely late flowering," but at the New York Botanical Garden over a period of 9 years, the earliest date of bloom for plants of this clone was on June 24th, and none of them has flowered later than July 30th. Of those listed in the chart, there are 35 clonal varieties that have bloomed later in 1939 than the clone *Mrs. W. H. Wyman.*

Frequently ramets of daylilies bloom out of their normal season or are irregular and erratic in blooming. Severe winter injury, unusual

conditions of weather, recent planting, a crowded condition, and need for transplanting all affect the amount of bloom and the extent of the period of flowering. In his book entitled *Daylilies*, Dr. A. B. Stout reports that there is often considerable fluctuation from year to year for the same ramets with as many as 10 to 15 days difference in the dates of opening of the first and last flower. There are also differences from year to year in the dates for climax of bloom and for the extent of the period of bloom. The dates of flowering will also differ in countries according to climate and latitude, and much difference can be expected in different parts of the United States. However, the relative season for flowering is the same from year to year for each of the various clonal varieties. In no case has a daylily normally bloomed early in spring in one year and late in summer in another year.

In the display collection at the Garden there were three ramets for nearly every clone listed, each growing in the same position three years or longer, and each in a lusty and robust condition. Thus the data for 1939 which is presented in the chart are quite adequate for indicating the relative periods of normal flowering which are characteristic of the clones listed. In every case the ramets observed are, it is believed, true to the name first definitely applied. But it is known that for several clones here listed, certain plants which are in garden cultivation under the same names are incorrectly named.

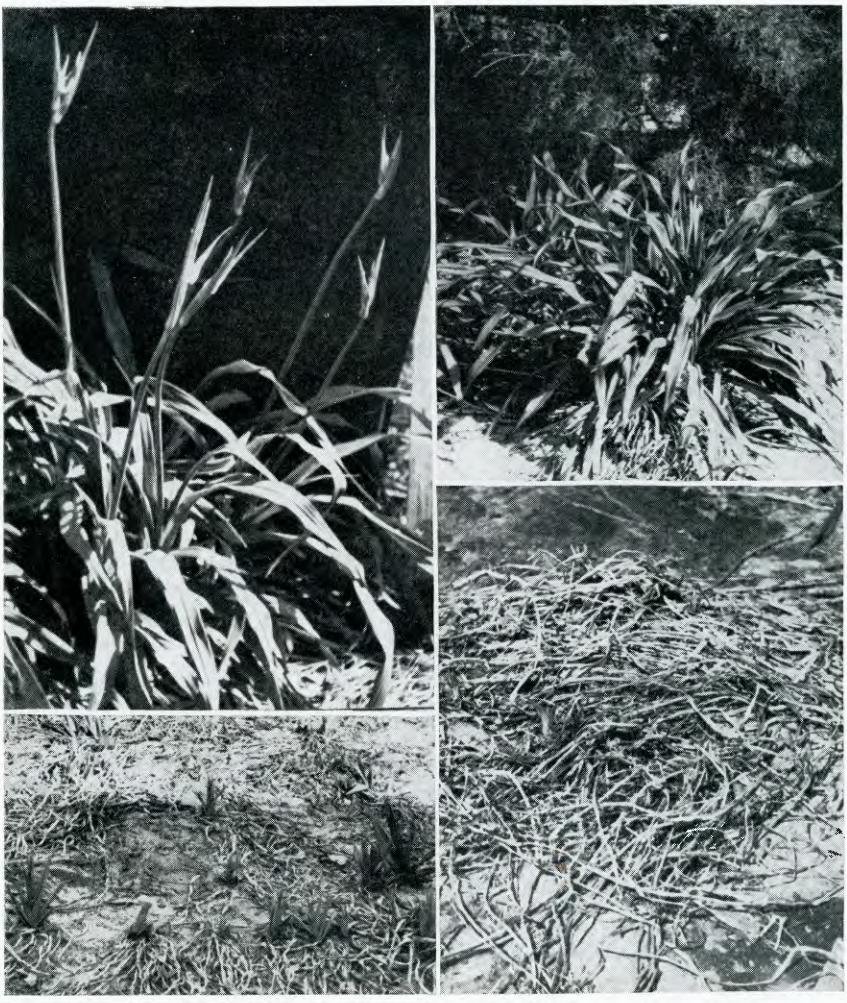
Flowering behavior is a feature of importance in considering the relative merits of the daylilies. At the New York Botanical Garden numerous clonal varieties are grown for public display, and gardeners are cordially invited to observe the daylilies in this large collection. It is hoped that the blooming data presented here will assist the gardener in making evaluations of the merits of the various daylilies for use in garden culture.

DAYLILY FOLIAGE AS AN ELEMENT IN THE GARDEN DESIGN

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

The owners of southern gardens have come to appreciate the extreme usefulness of daylilies for strong garden color that comes into its greatest show just as the cool-weather annuals are beginning to wane in April and May. This excellent group of garden herbs is rather diverse in foliage behavior as well as in flower form and color and we gardeners of the Gulf Coast will do well to ponder upon the important factor of evergreen habit. Even when it is out of bloom, a well established clump of *Hemerocallis aurantiaca* will furnish a good green mass of attractive foliage as a part of the garden picture. One eminent garden authority remarked that he would grow daylilies, though they never bloomed, for the joy of seeing the dew glisten on the fresh leaves each morning.

This evergreen character (See Plate 194) has the attention of plant breeders and they are all making serious attempts to breed this highly desirable factor into their new seedlings. That they are being successful is attested by the fact that many of the older types can now be replaced



John V. Watkins, Gainesville, Fla.

See page 212

Upper left, clone Domestico in early March; upper right, clone The Gem in winter; lower left, Mikado is dormant until spring; lower right, Hyperion is completely dormant until rather late in spring in Florida.

Plate 194

by newer sorts of similar flower form and color, but with foliage evergreen instead of deciduous. The southern hybridizer who has the best interests of the genus *Hemerocallis* at heart will not rest until his seedlings show the ability to furnish good green masses of crisp foliage the year round.

Though we admire the evergreen clones as excellent components of the garden picture, we cannot overlook the surprise element, the attractive seasonal appearance and spring freshness of the deciduous varieties (See Plate 194). Many clones of this class are well known for their superlatively attractive leaves. *Hyperion* and *Ophir*, for example, are distinctly deciduous in character, pushing their leaves through the ground rather late in the southern spring, yet their leaves are beautifully dark green holding their pristine freshness long after some of the robust evergreen kinds have commenced to turn brown in the hot sun of late summer.

Perhaps a good method of planting the two types of daylilies might be worked out as follows. Set a large drift, consisting of 20 plants of the evergreen *Dauntless*, in front of a shrubbery border; just next to this arrange a group of deciduous *Linda*, then a bold mass of *Vulcan* may come next to furnish crisp green foliage all winter in front of the darker green of the evergreen shrubs.

In the Daylily Display Garden on the campus of the University of Florida, 134 named varieties are growing under garden conditions that are typical for most of Florida. Notes are being taken continuously on the behavior of these plants and many of the findings should be helpful to gardeners.

Following the extremely low temperatures of January, 1940, the plants were carefully scored for foliage effect, and the results are recorded on the next page. These 1940 records were checked against those for 1938 and 1939 and it was found that foliage behavior is consistent for each given variety. The unstarred clones can be depended upon to furnish foliage for garden effect during most of the winter. The leaves of the evergreen daylilies were badly yellowed by a temperature which was recorded officially as 17° F, although they are usually unharmed by frosts and temperatures in the high twenties.

Of the 134 clones listed in the accompanying table, it is seen that 22 are designated as "F". These daylilies are fully evergreen and are characterized by excellent foliage masses which are of great merit in our winter gardens. The 18 varieties classed as "G" make a good winter show but the leaf masses are not quite as heavy and robust perhaps as in those of the foregoing group.

The plants marked "H" and "I" are variable and these classifications should not be considered indisputable as there will be some overlapping. Some of these sorts have very short periods of dormancy while others recover and produce low, sparse leaf masses after several weeks. None of these furnishes winter-long mounds of evergreen foliage.

FOLIAGE BEHAVIOR OF THE DAYLILIES IN THE DISPLAY GARDEN AT THE FLORIDA AGRICULTURAL EXPERIMENT STATION, GAINESVILLE[1]

F Ajax
S Alba striata*
G Amaryllis
S Apricot*
F Aurantiaca
F Aurantiaca major
F Aureole
F Aurillo
S Austin, Mrs. A. H.*
S August Pioneer*
S Bardeley*
S Baroni*
S Bagdad*
S Bay State*
I Betscher, Anna
S Bijou*
S Boutonnierre*
S Bowles, E. A.*
S Brownie*
S Burbank*
S Burmah*
S Byng of Vimy*
S Calypso*
H Chengtu*
G Chisca
G Chrome Orange
G Cinnabar
S Citronella*
S Crawford, J. A.*
H Cressida
H Curlypate
F Dauntless
S Dawn*
S Dazzler*
F Domestico
H Dwarf Yellow
G Eldorado
F Erica
S Estmere*
S Europa*
S Festival*
S Flamid*
S Flavinia*
G Florham
S Fulva cypriana*
S Fulva maculata*
S Fulva rosea*
S Fulva wild type*
G Gem, The
I Gloriana
S Golconda*
S Gold Dust*
S Gold Imperial*
F Golden Bell
S Golden Dream*
F Golden Mantle
G Golden West
S Goldeni*
S Gracilis*
S Guiseppi, Cissy*
H Gypsy
I Hankow
G Harvest Moon
S Hend. Giant Orange*
S Hippeastrum*
F Hume, Emily
F Hy. Semperflorens
S Hyperion*
I Kwanso*
G Ladhams, B.
S Lady F. Hesketh*
S Lemon Queen*
S Lemona*
S Linda*
G Lovett's Lemon
G Lovett's Orange
F Luteola major
S Luteola palens*
S Mandarin*
G Mann, Mrs. J. R.
S May Morn*
I Midas*
I Mikado*
S Minor #3*
F Miranda
I Modesty
S Mulleri*
S Multiflora*
H Nocerensis
S Ochroleuca*
H Ophir*
S Orangeman*
S Pale Moon*
G Parthenope
G Patricia
S Perry, Gladys*
F Perry, Iris
S Perry, Marg.*
S Perry, Mrs.*
S Perry, Thelma*
G Queen of May
S Radiant*
S Rajah*
S Regel, Dr.*
F Royal
S Salem*
S Seith, Mrs.*
F Shirley
F Sir Michael Foster 1-3
F Sir Michael Foster #4
S Sirius*
I Serenade*
F Sonny
H Soudan
S Sovereign*
S Sungold*
S Sunny West*
S Tangerine*
S Taplow Yellow*
S Thunbergii*
S Tigert, Mrs. John J.*
I Vesta
F Vulcan
H Virginica*
G Wau Bun
F White, Lilla
S Winsome*
S Wondergold*
I Woodlot Gold
S Wyman, D. D.*
I Wyman, Mrs. W. H.*
I Yeld, George*
S Yellow Hammer #1*
G Yellow Hammer #2

[1] Symbols used in this table:
F—Full garden value throughout the winter in peninsular Florida.
G—Good garden value during the winter.
H—Buds stand perhaps 6" above the ground. There is no garden value in winter.
I—Buds stand perhaps 4" above the ground. There is no garden value in winter.
S—Very short buds that stand perhaps 1" above the earth.
*—Completely deciduous, no garden value during the winter. —J. V. W.

THE MILDRED ORPET DAYLILY IN CALIFORNIA

I did find the only real collection of *Hemerocallis* in this town this morning, and brought home samples for comparison from those in bloom,—*Calypso, Cinnabar, Bagdad* and *Chengtu. Mildred Orpet* certainly has more style in the shape of the flower than any of them, to my mind,—for one thing, her triangles are much more acutely defined, and there is just enough frill on her petals to make a good contrast with the severe sepal outlines, and her coloration is lovely and subtle. The sepals look somewhat like the flesh of a freshly sliced peach, but have a tone of their own that I cannot find a word for. The gold-brown patina of the petals is more like the color you find in Cymbidiums *(Orchidaceae)* than anything else I can think of at the moment. My plant bloomed in early summer and stopped, only to start in again this month and it is still full of buds. The stem measures exactly thirty inches.

Hemerocallis have not as yet found a real place in this part of California,—maybe because no one has taken a deep enough interest in them to push them as they deserve, but in the garden that I visited this morning they make a glorious spot, backed with rare *Hibiscus* that are also in bloom.

—*Mildred Orpet*

Santa Barbara, California,
September 24, 1940

HYBRID AMARYLLIS IN GEORGIA

Arthur J. Jones, *Georgia*

Lets pull up a chair and chat a little on Giant Hybrid Amaryllis. How far north can they be field grown successfully? (See Plate 195) Atlanta being about 325 miles north of Jacksonville, Florida and having an altitude of 1000 ft., the north and northwest winds send the thermometer plenty low at times during the winter months. While I write this, Jan. 19th., the radio is announcing a warning of zero temperature before tomorrow morning. This is about 15 degrees lower than a normal winter's lowest temperature. Upon the first warning no time was lost getting out bales of straw which is kept ready for just such an emergency. For over a month the beds have been covered with 4 to 6 inches of leaves which gives ample protection in normal winters.

The location selected for the amaryllis beds is on the east side of a gentle slope. The soil is sandy red clay; well drained and somewhat protected from the afternoon sun.

The fertilizer used is heavy liquid manure placed in holes made with a broom handle to the depth of the roots between the rows. Twice during the growing season hardwood ashes are spread. This is alternated with an application of acid phosphate. No further treatment is required as the soil apparently has all other requirements to produce large blooms on 24-inch sturdy scapes. With this treatment the bulbs grow to an enormous size—many attain 6-inch diameter. Three scapes

A. J. Jones, Atlanta, Ga. See page 216

Upper left, typical winter scene, Atlanta, Ga.; Upper right, hybrid amaryllis seedlings CD *months from seeds; lower, hybrid amaryllis seedlings in flats.*

Plate 195

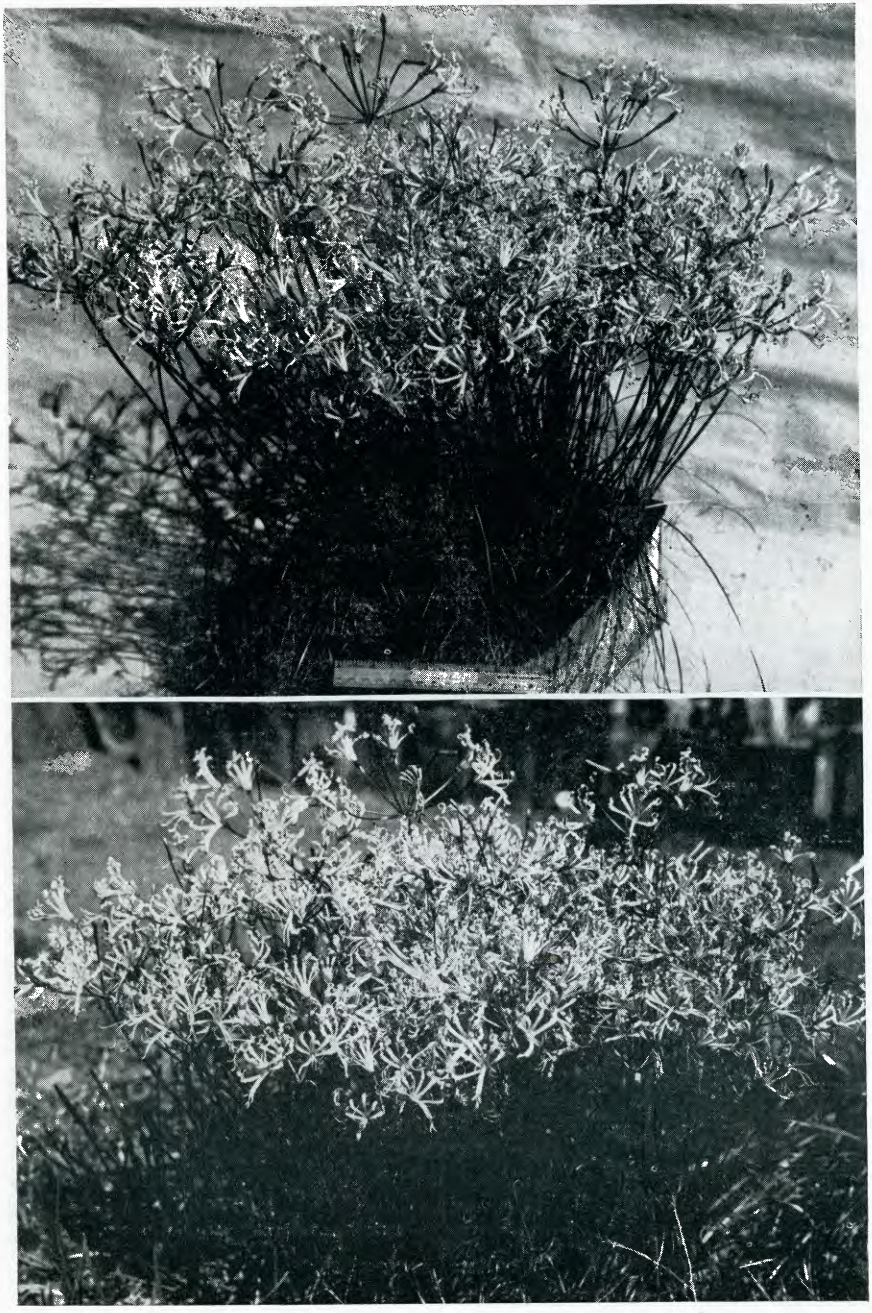
to the bulb is not unusual. Last season one small 2½-inch bulb showed 3 scapes totaling 13 blooms and averaging 5-inches across. After the growing season, upon examination, it was found that the bulb had increased over 1-inch proving that the heavy blooming had not affected the bulb. This bulb will be checked again this season. Many 16-month bulbs show numerous offsets. It is not uncommon to count 8 or more to the bulb (Plate 195).

Experiments show that the best soil for seed flats is. a 3-inch layer of 1/3 garden soil, 1/3 creek sand and 1/3 peat which had been used as a litter in the hen house. To this mixture is added 1 cup of chick size oyster-shell to counteract acid, one cup of acid phosphate for top growth, and 1 quart of hardwood ashes for bottom growth. The top layer is ½ garden soil; ½ sand. The seeds are planted in rows, almost touching, with just enough soil to prevent shifting, ¾ of each seed being exposed. The soil is kept dampened thru burlap until growth starts. The flats are then set in a sunny location, protected from wind and burlap is removed. As a protection from the strong sun; to prevent burning; old fashioned shutter blinds are placed at an angle. The shutters are set a desirable angle (Plate 195). These seed flats are standard 18″X24″ and contain 350 to 400 seeds. The generation is about 75 per cent. The tiny plants seem crowded but apparently this crowding does no harm.

The seedlings go thru their first winter in a glassed in pit under the little greenhouse, a leanto affair on the south side of the building, which is used for potted bulbs selected the previous season in view of hand pollinating for seeds. This pit is 3 ft. below the grade. There is considerable glass surface, and as an added protection in extreme weather, a muslin cover is placed over the flats. When the temperature went to the low of 2°, two layers of paper were laid over the muslin cover. All came thru showing no signs of injury from the bitter cold snap without artificial heat.

When conditions are favorable for transplanting seedlings outside, the flats are wetted down thoroughly so that no tender roots are lost in handling. The bed 4 ft., wide has been made ready with mulch paper in place with holes cut 6 inches apart each way in which the seedlings are placed. The mulch paper not only helps to retain moisture but also radiates heat to the soil which remains warm all night. The paper also eliminates weeding. The life of mulch paper is short but answers the purpose as the plants have a good start before the paper breaks down. However, this season I will experiment with a light asphalt roofing paper. After one year the small bulbs will be thinned out. Those showing many offsets will be removed with ample soil to a bed set aside for them. The first bloom will determine the results of the hand pollinations. The most desirable are retained for further breeding.

I trust this article will prompt others still farther north to give their experiences. It will be interesting to know how far north amaryllis can be field grown successfully.



R. A. Dyer, Pretoria

See page 220

Nerine filifolia Baker

Plate 196

A NOTE ON NERINE FILIFOLIA BAKER

R. A. Dyer

Division of Plant Industry, Pretoria

In January, 1937 Major B. Nicholson collected a few bulbs of *Nerine* near a stream in the neighbourhood of Mbabane, Swaziland, and forwarded them to the National Herbarium, Pretoria. Some of these bulbs flowered in the following April and were then identified with *N. filifolia* Baker. This identification indicates a very much wider range of distribution for the species than hitherto recorded. Previously according to Barker, under plate 568 (*Nerine filifolia* var *parviflora* Barker) in *Flowering Plants of South Africa,* it was known from the neighbourhood of Grahamstown in the eastern Cape Province to the district of Maclear and parts of the eastern Orange Free State. Thus a record in Swaziland is a considerable jump to the north-east. Before arriving at a decision as to the above identification the specimens were compared with *N. filamentosa* Barker, described and figured for the first time in *Flowering Plants of South Africa* plate 569 (1935) and again the "slender" nature of the specific distinction of this species from *N. filifolia* was felt.

The bulbs collected by Major Nicholson were planted in sandy loam in a 4 in. deep tray and given no special protection from sunlight or rain. By April, 1940 the tray was literally packed tight with bulbs which had increased greatly in numbers by budding during the intervening years. The photograph (Plate 196) reproduced here was taken then and gives some idea of the generous nature of this delicately beautiful plant.

Here follows a formal description of *Nerine filifolia* Baker taken largely from Curtis's Botanical Magazine, plate 6547 (1881) where the species was originally described:—

Bulb ovoid up to about 1 in. in diameter, growing in tufts or small clumps, outer tunic membranous, brown. *Leaves* up to 10 from a bulb at maturity but fewer in the young stages, contemporary with the flowers, very slender, weak, shorter than the scape or peduncle, glabrous, rounded on the back, channelled down the face. *Scape* about a foot long, slender, round, shortly but densely glandular-hairy; spathe-valves lanceolate, greenish. *Umbel* 3-10 flowered; pedicels spreading as they develop, densely glandular-hairy, usually longer than the flowers; perianth rose-red, about 1½ in. long; segments oblinear-lanceolate, up to about 1/12 in. broad, undulate on the margin towards the base, crisped and reflexed towards the apex, five of them usually more or less distinctly ascending and the sixth deflexed. *Stamens* about as long as the perianth, deflexed; filaments bright red; anthers dark red. *Style* at length longer than the stamens; stigma capitate. *Capsule* acutely lobed with two or three seeds in each cell.

7. HARVESTING, STORAGE AND FORCING

HARVESTING AND STORAGE OF AMARYLLID BULBS

W. M. JAMES, *California*

Proper care of bulbous plants during their dormant period is fully as important as it is while they are growing and flowering. A few amaryllids do best if left undisturbed—some kinds for several years. Others do better if dug after completion of their growing period and kept in storage until they are ready to grow again.

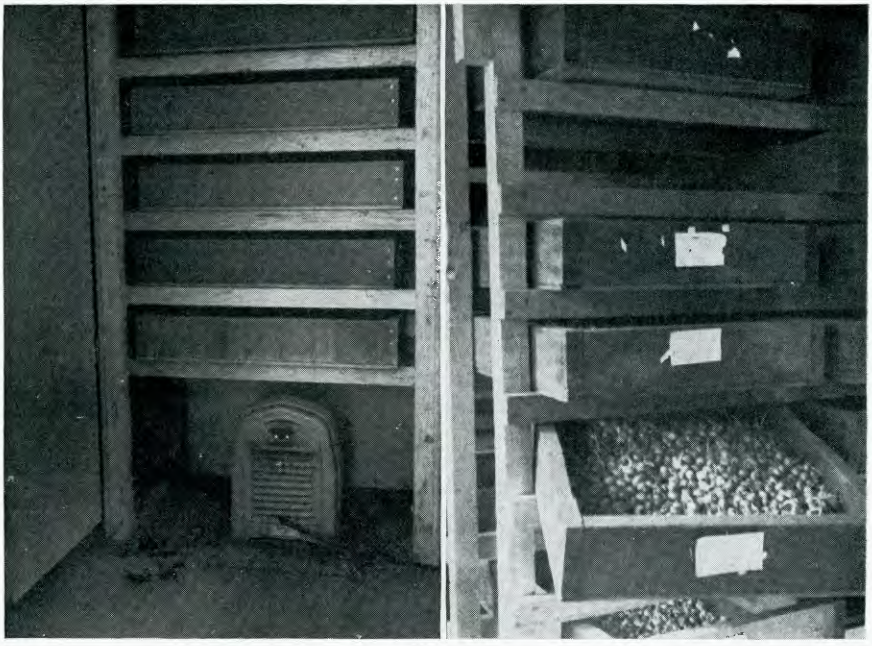


Fig. 58. Right, bulb storage racks and trays; left, showing heater in place for drying bulbs.

Harvesting presents no special difficulties other than finding ways and means to do it quickly and economically. Most amaryllids are ready to dig as soon as the foliage is ripened. Some—such as *Nerine filifolia* and many *Zephyranthes*—can be dug at any time without any appreciable setback if they are not dried out too much.

Where very large quantities of bulbs (such as *Narcissus*) are grown, digging is done almost entirely by specialized machinery. For smaller quantities, a screen such as that shown in the picture (Plate 197) is very useful. The trays are suspended from the frame so that they can be shaken easily and changed quickly. Trays with one-half inch or one-quarter inch mesh for the top and with one-eighth inch mesh or window

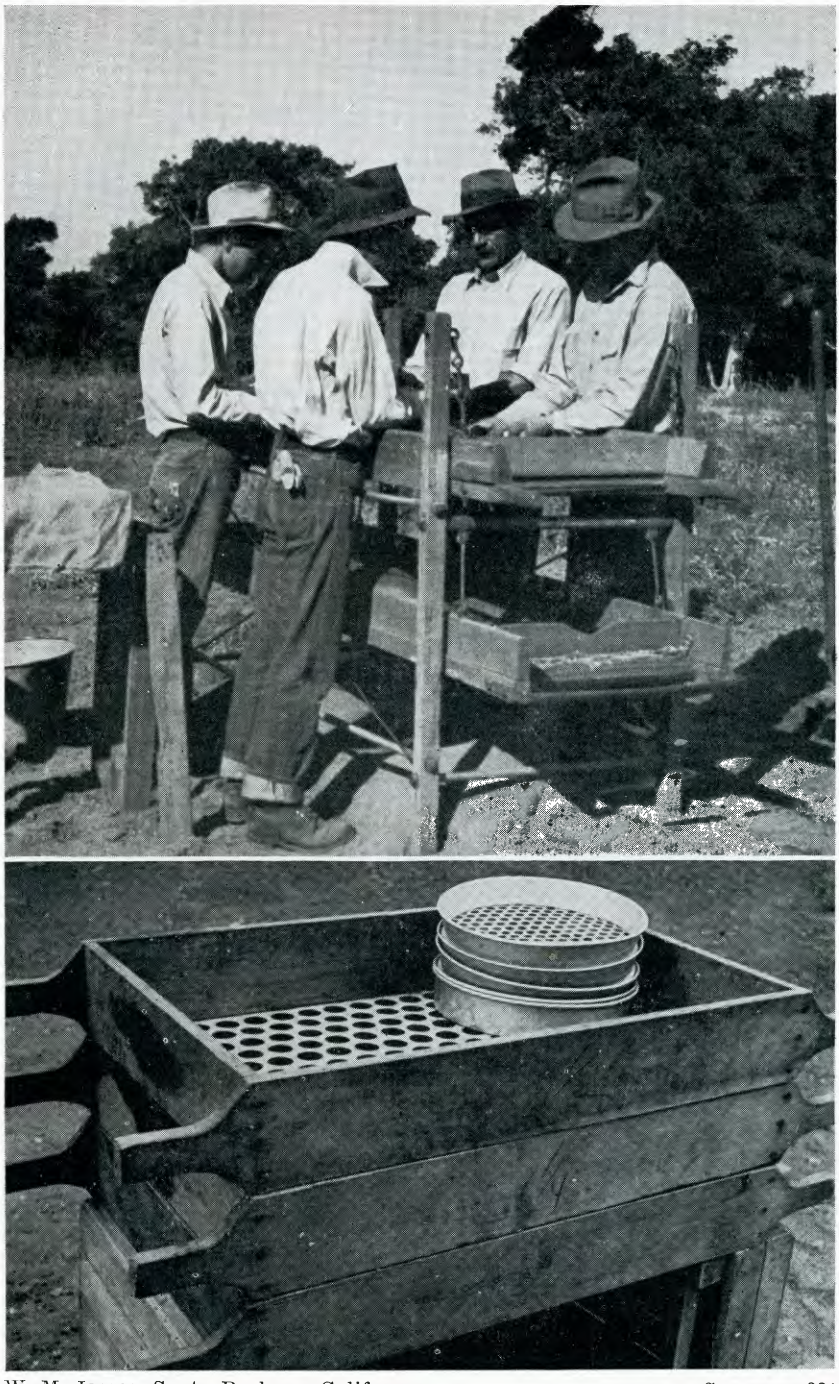
screen for the bottom can be combined for almost any size or type of bulbous plant. Large bulbs without small offsets can be easily dug with a shovel and picked up by hand. The storage trays described later on are very convenient for harvesting small amounts by hand.

Most amaryllids are best stored in trays or boxes under conditions where temperature and moisture can be under at least partial control. Again, where large quantities are handled, separate rooms or buildings are used and they are equipped with special trays or boxes best suited for the particular kind of bulb stored there. For general use in small or fairly large quantities, the racks and trays shown in the picture (Fig. 58) are very satisfactory. The shape and size can be varied to suit individual requirements. Those shown in the illustration are four inches by eighteen inches by twenty-four inches and have as a bottom small chicken wire netting, one-quarter inch hardware cloth or window screen. The very large bulbs are best stored in boxes. These boxes should be strong and so constructed that they can be stacked easily and securely, and yet have plenty of room for circulation of air. The name and any information desired can be written on a small piece of paper and attached to the front of the tray or box with a stapling machine. This is inexpensive, takes very little time and makes it possible to find any particular bulb very easily and quickly.

Storage facilities should be designed to take advantage of local conditions. For instance, an ideal box for many amaryllids for use either in the field or for storage can be made from parts of certain standard vegetable crates. Near vegetable growing areas or shook factories this standard cut material can be purchased and made into boxes cheaper than they can be made on special order by a mill. Storage rooms should be constructed and arranged so that plenty of air circulation can be provided and so that temperature is fairly constant.

Some amaryllids, such as *Milla biflora* and *Brodiaea capitata,* are subject to molds in storage and must be dried quickly after being dug. A small room or box, with racks that will hold the storage strays, is almost necessary. It should be constructed so that there is room at the bottom for a small electric heater with a fan (Fig. 58). The top should be left loose so that an opening can be adjusted to regulate the amount of heat around the bulbs. A frame covered with sugar cane fibreboard is easy to construct, serviceable and very satisfactory for this purpose. With a fan to assure air circulation, a small heater and box of this type will handle a surprising number of bulbs.

Careful observation will soon indicate just how deep it is safe to pile the various kinds of bulbs in the trays or boxes; how much ventilation they need; how long they can be kept in storage etc. After the trays and racks are once obtained and installed, the "filing system" described will prove much more satisfactory than stacking the bulbs in boxes of various sizes and shapes.



W. M. James, Santa Barbara, Calif. See page 221

Lower, bulb grading screens; upper, bulb grading screens in use.

Plate 197

8. THE SOCIETY'S PROGRESS*

SECRETARY'S MAIL BAG

Arthington Worsley, of Ventnor, Isle of Wight, England, writes under postmark of October 25th, 1940, that "We are all safe and no damage, and not a great deal elsewhere in Ventnor, and very few casualties, but plenty of noise of explosions and alarms". Mr. Worsley, an Honorary Fellow of the Society, and Dean of the amaryllid fraternity, tells of close-hand experiences of German bombing attacks on the Isle of Wight. He promises a photograph of a new species of *Eustephia.*

The big excitement in the American Amaryllid world in 1940 was due to the blooming of several bulbs of *Amaryllis procera,* the "Blue Amaryllis", during the spring months. Several growers have imported the huge, long-necked bulbs from Brazil in recent years. When their culture becomes better understood, these may become more frequent inhabitants of large conservatory and greenhouse collections, and even of window gardens.

The Kilgore Seed company of West Palm Beach, Florida recently announced plans to import fifty bulbs of the "Blue Amaryllis", *A. procera,* in the near future from Brazil. The estimated retail price of this rarity is about $5.00 each. The bulbs are cheaper in Brazil, but there are heavy expenses of duty, shipment, clearing papers, etc.

The Royal Horticultural Society of England through Mr. B. O. Mulligan, Assistant to the Director, made available to the writer of these notes some seeds of a new pink *Zephyranthes* from Mexico, collected by E. K. Balls in 1938, and which were flowered at the RHS gardens at Wisley this year for the first time. Mr. Mulligan writes that the field notes state the original bulbs were found growing in "partially shaded places under shelter of rocks in broken lava beds, altitude 8,000 ft."

Major Albert Pam, corresponding member for Great Britain, writes from London that two of his plants that bloomed in his garden—*Alstroemeria nemorosa* and *Bomarea campaniflora*—are being figured in the Botanical Magazine. These were introduced by Maj. Pam from collections made in Sao Paulo, Brazil, in 1934. He writes "As you can imagine, all our thoughts are about the war at present, so it is a very pleasant break to receive letters about gardening and interesting events in horticulture and botany."

Major Pam tells of some bulbs of *Phaedranassa Carmioli* from Costa Rica coming into bloom. This plant has never been well figured, he adds, and may form the subject of another plate in the Botanical Magazine.

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* The material in this section was prepared by Mr. Wyndham Hayward, the never tiring Secretary of the Society. We all owe him a very great debt of gratitude for all that he has accomplished for the advancement of the amaryllids.

—*Hamilton P. Traub*

A somewhat remarkable collection of hybrid amaryllis has been developed in the greenhouses of the Department of Horticulture, at the Illinois Agricultural Experiment Station, Urbana, Ill., under the general supervision of Dr. H. B. Dorner, Chief in Floriculture. Dr. Dorner writes that he has been growing *Amaryllis* for many years, but has not done anything special in the way of scientific breeding beyond the selection of choice seedlings from the best possible crosses. The collection had its foundation in a number of seedlings that were secured from E. G. Hill of Richmond, Ind., in 1913. "We feel that we have a very fine collection including whites, pinks, reds and maroons," Dr. Dorner adds.

A number of members of the Society are experimenting with color photography in their amaryllid studies. Some of the best work seen this year included a fine color print of an *Amaryllis* sent by S. Y. Caldwell, of Nashville, Tenn., and some Kodachrome pictures of various alstroemerias taken by H. L. Stinson in his gardens at Seattle, Wash. These last were very outstanding, and the huge clumps of bloom resemble azaleas in full flower, so very abundant are the colorful blossoms.

E. J. Anderson of Palm Beach, Florida, *Amaryllis* fancier who is believed to have been the first to bloom the "Blue Amaryllis", *A. procera,* in the United States, last February, mentioned in a letter that the photograph of the plant (Plate 190) that accompanied his article in this issue of Herbertia shows three flowers curled and wavy as to the petals, and a fourth normal and straight. This last was freshly opened, and the curled character is not assumed by the flowers until they have been open fully three or four days, according to Mr. Anderson.

The firm of Howard and Smith at Montebello, Calif., reports that unprecedentedly warm weather for the Los Angeles area drove thousands of city residents to the beaches last spring during the days of the National Amaryllis Show, and consequently reduced the attendance at this event far below expectations. The show itself, however, was well up to previous standards. The Howard and Smith firm, together with Cecil Houdyshel, W. E. Rice, W. M. James and others of the California members and active supporters of the Society, deserve the warmest commendation and praise from *Amaryllis* enthusiasts for their support of these California Amaryllis Shows, spring and fall, which have been made possible through their cooperation in recent years.

The new red daylily, *Mrs. John J. Tigert,* which was developed by the Florida Experiment Station, daylily breeding project, under the direction of Dr. H. Harold Hume and Prof. J. V. Watkins, will be released in limited quantity through commercial channels in late 1940. It is a "red" with more of the crimson color than any variety as yet well known in the trade.

The champion, long-distance record for moving and transplanting daylilies goes to ye Ed., Dr. Hamilton P. Traub, who took over 20,000

of his choicest seedlings with him from Orlando, Florida to the USDA Horticultural Station at Beltsville, Md., when he was transferred to the Washington area during summer of 1940. Dr. Traub is engaged officially in plant research projects for the United States Department of Agriculture. He reports that dry weather caused a loss of a few thousand seedlings but hopes for wonderful things from the "survival of the fittest".

W. E. Rice of Downey, Calif., sends a delightfully colored *Nerine* hybrid of his origination which arrived in Florida via air mail in perfect condition (the flower) and lasted a week or more in good shape, in a vase. The decorative possibilities of the amaryllids as cut flowers have scarcely been touched in America outside of the commoner sorts as *Narcissi* and hybrid amaryllis.

SECRETARY'S MESSAGE

Publication of the 1940 yearbook is a landmark in the efforts of the American Amaryllis Society to continue publication uninterruptedly in spite of discouraging world conditions in recent years. It bespeaks the loyal perseverance of the editor, officers and membership in upholding the ideal of faithful support for the advancement of the amaryllids.

The war in Europe has cut off a great part of the Society's contacts in other parts of the world, and has caused many members in other countries to turn necessarily from their studies of amaryllids and horticulture, as professionals and amateurs, to grimmer tasks. We may all pray in full earnestness that the situation may soon take a turn for the better to restore something like a normal intercourse between the nations.

Dr. Hamilton P. Traub has continued his diligent activities in behalf of the Society's work, as editor and director, spending long midnight hours in the supervision of manuscripts and illustrations as usual, and garnering from the far corners of the country his interesting and informative material. His eager zeal remains undimmed.

With four shows to its credit, and the present outstanding issue of Herbertia, your secretary points with pride to the record of the Society in this difficult year of 1940. The California spring and fall Amaryllis exhibitions, and the Amaryllis and Daylily shows held in Florida last spring, were events of exceptional horticultural importance on a nationwide scale. Their significance extends far beyond the narrow confines of the exhibition halls, and both directly and indirectly influences the appreciation of these magnificent flowers in the minds of thousands of receptive garden lovers who read and hear about the displays.

The secretary begs the membership to continue their loyal support of the Society in the usual way, and any additional financial aid would be most welcome and gratefully received, in these difficult times. Donations may be made for any specific purposes, as color plates for Herbertia, illustrations of Amaryllids, daylilies, special research projects, publications of monographs, establishment and maintenance of trial col-

lections, etc. The secretary asks all his many correspondents and co-operators to accept his sincere and heart-felt thanks for all their letters of friendly advice, suggestions and encouragement during the year past, as without them, the work of the Society would be dull indeed and probably much less worthy.

—*Wyndham Hayward,*
Secretary.

Lakemont Gardens,
Winter Park, Florida,
Nov. 1, 1940

NOTICE OF 1941 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 1941 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	Mr. Jan de Graaff

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 1941 will be held on the second Wednesday in April, as provided by Article 10, Section 1, of the Constitution, this being April 9, 1941. Therefore the names of nominees must be submitted by the voting members to the Secretary before February 10, 1941.

WYNDHAM HAYWARD,
Secretary.

October 1, 1940,
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 1940 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.

DATA CARD FOR HEMEROCALLIS

When describing daylily clones, all breeders and growers are requested to use the Official Data Card for Hemerocallis, devised by the eminent artist and horticulturist, J. Marion Shull, and fully described elsewhere in this issue. These cards should not only be used in describing new clones but also for the description of all clones grown in the various climatic regions.

These cards are available at present in the 3 inch by 5 inch size at the nominal price of $1.00 per hundred, to pay for printing, handling and postage. If the demand is sufficient, the same text will be printed in larger type on somewhat larger cards. Send orders to—

Wyndham Hayward, Secretary,
Winter Park, Florida

REPORT OF TRIAL COLLECTIONS COMMITTEE

The Trial Collections Committee reports the following accessions to the Society's collection of plants and bulbs since the 1939 yearbook report was published. A number of members of the committee having greenhouse facilities for the growth of tender plants and bulbs, and the United States Department of Agriculture are cooperating with the Society in this work at present.

Members are urged to remember the Society with trial lots of rare bulbs or seeds in its field when this may be possible.

A-279—Seeds of *Alstroemeria* species, from H. L. Stinson, Seattle, Wash.

A-280—Seeds of *Hymenocallis fragrans,* from Major Albert Pam, London, Eng.

A-281—Seeds of *Amaryllis rutila* var. *crocata* (?) mixed with hybrid *Amaryllis* seeds, from Karl J. Easton, Lake Worth, Florida, who received them from Sr. Joao Dierberger, Sao Paulo, Brazil.

A-282—bulbs of *Hymenocallis* species, from E. D. Aber, Jacksonville, Texas.

A-283—Seeds of *Amaryllis calyptrata* X *A. aulica,* from Major Albert Pam, London, Eng.

A-284—Seeds of *Zephyranthes sp.* collected by E. K. Balls (No. 4146) in Mexico (Pedregal) in 1938. Stems about 9-12 in. high, in cool house; flowers pale pink, found growing in partially shaded places under shelter of rocks in broken lava beds at 8,000 ft. altitude. Received from B. O. Mulligan, Asst. to the Director, Wisley Gardens, Royal Horticultural Society, England. Good germination obtained.

A-285—Seeds and small bulblets *Pancratium illyricum,* from Cecil Houdyshel, LaVerne, Calif.

A-286—Bulblets of *Haemanthus coccineus,* from Mrs. J. Norman Henry, Gladwyne, Penna.

A-287—Seeds of *Zephyranthes sp.* collected at Los Llanos, La Zanja, Argentina, from Dr. Alberto Castellanos, Buenos Aires, Arg.

A-288—Seeds and bulbs of *Zephyranthes* and other amaryllid species; collected at Ileal, near Alta, Argentina, from Dr. Alberto Castellanos, Buenos Aires, Argentina.

A-289—Seeds of *Pancratium illyricum, Amaryllis chilensis* and *Stenomesson flavum,* from Major Albert Pam, London, Eng.

A-290—Seeds and bulbs of *Zephyranthes* and other species, collected by R. A. Spegazzini "en los campos", province of Corrientes, Mercedes, Argentina. From Jose F. Molfino, Buenos Aires, Argentina.

A-291—Seeds of *Nerine filifolia,* from Major Albert Pam, London, Eng.

A-292—Bulbs of *Phaedranassa Carmioli,* shipped by Austin Smith, Zarcero, Costa Rica, and released by United States Department of Agriculture.

A-293—Bulbs of *Leucojum aestivum,* type common in California gardens; also winter growing *Zephyranthes sp.* (No. 10211A), *Stenomesson sp.,* (No. 401?) Vargas collection from Chile, being distributions from Goodspeed Andes expeditions, received from L. S. Hannibal, Concord, Calif.

A-294—Bulbs released by Division of Plant Exploration and Introduction, Bureau of Plant Industry, U. S. Dept. of Agriculture: P. I. No. 119708, *Ammocharis heterostyla;* P. I. No. 130551, *Habranthus robustus;* P. I. 118813, *Amaryllis aulica* var. *robusta;* P. I. No. 118442, *Amaryllis psittacine* var. *decorata;* P. I. No. 118440, *Amaryllis psittacina;* P. I. No. 118818, *Amaryllis rutila* var. *crocata;* P. I. No. 105304, *Nerine humilis;* P. I. No. 139133, *Stenomesson Pearcei.*

A-295—Tubers of *Alstroemeria sp.,* including *A. braziliensis,* from H. L. Stinson, Seattle, Wash.

—*Wyndham Hayward*

Winter Park, Fla.,
Dec. 12, 1940.

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1940-41

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Dr. Hamilton P. Traub

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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. Uphoff'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 *Gilliesieae* by Dr. Hutchinson; rating of daylilies for garden value by Mr. Kelso; daffodil articles by Jan de Graaff, and many other items on description, cytology, breeding, propagation, and amaryllid culture; with 44 plates and 10 figures; a total of 258 pages.

Volume 7 (1940). Dedicated to Latin America, and featuring articles on Latin American amaryllids; biographies of Drs. Philippi and Holmberg; report by Dr. Goodspeed on the amaryllids collected by the Univ. of Calif., Second Andean Expedition; reports on the flowering of the "Blue Amaryllis," *A. procera;* and many other important articles

on the description, propagation, breeding, culture, harvesting and storage of amaryllids. Of special interest are the important articles on the description, breeding and culture of daylilies by noted authorities. With 45 illustrations—30 plates and 15 figures—and a total of 242 pages.

The prices of the above described volumes are based on the available supply:

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Volume 6, 1939, $3.25 each, postpaid.
Volume 7, 1940, $3.25 each, postpaid.

Herbertia in sets postpaid to members:

Vols. 1, 2 & 3	—$10.00
Vols. 1, 2, 3 & 4	—$13.00
Vols, 1, 2, 3, 4 & 5	—$16.00
Vols. 1, 2, 3, 4, 5 & 6	—$18.50
Vols. 1, 2, 3, 4, 5, 6 & 7	—$21.00

Make checks payable to the American Amaryllis Society, and send orders to the Secretary,

Mr. Wyndham Hayward,

Winter Park, Florida.

THE BUYERS' GUIDE

Bulbs As An Investment

Caveat emptor—This is a Latin phrase signifying, "let the buyer beware or take care of himself." It was formerly held that a buyer must be bound by a bargain under all circumstances.

How fortunate that these precautions do not have to be observed with the following list of growers and dealers. All of them are interested in producing and handling a quality of stock which will give good results. The membership of the American Amaryllis Society is composed of buyers and sellers. Both are interested in the welfare and success of the Society and of its publication—HERBERTIA.

I always have, and still do, derive considerable benefit and pleasure from studying seed and bulb catalogues. In a way it provides an opportunity to learn something of far countries without moving from your own fireside.

The advertisers in HERBERTIA will appreciate being asked for a copy of their catalogue or bulb list. And then you can reciprocate by making some purchases.

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—W. M. JAMES.

Santa Barbara, Calif.
June 18, 1940.

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