HERBERTIA

VOLUME 3

DEDICATED TO

ARTHINGTON WORSLEY

EDITED BY

HAMILTON P. TRAUB

Mira Flores, Orlando, Florida

ORLANDO, FLORIDA

THE AMERICAN AMARYLLIS SOCIETY

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This Volume contains:
three portraits, one color plate,
and thirty other illustrations.

PREFACE

The kind of avocation, the advancement of the amaryllids, in which we are all interested, was really begun in earnest by the brilliant divine, William Herbert. Fortunately some of his thoughts on his hobby have been preserved to us in his Amaryllidaceae, published in 1837. They are as fresh today as if he had just uttered them, and almost every line of his essay, "On Crosses and Hybrid Intermixture in Vegetables" is pregnant with the wisdom and discernment of the born philosopher and scientist. His was a versatile genius, and everything he touched seemed to blossom forth. We will have an opportunity of honoring his memory in the 1937 *Herbertia,* which is the title of the present volume, and will be the name of your Year Book henceforth. The name is indeed appropriate since we all are trying to follow in his foot steps and are attempting to build on the foundation he so securely laid over a hundred years ago.

This volume of *Herbertia* is dedicated to Mr. Arthington Worsley who is by unanimous choice the Dean of the entire amaryllid fraternity. No one living has had as long an attack of amaryllid fever, or has worked in the field so broadly and with more genuine enthusiasm and success. His stimulating influence is appreciated in all quarters of the globe, and the American amaryllid enthusiasts are taking this opportunity of showing in a small measure their appreciation of his lasting contributions to the advancement of the amaryllids. They wish also to do honor to Mr. Worsley, the man—upright, generous and sympathetic. Those of us who have come to him for guidance and advice in their amaryllid problems have received every consideration—no detail was considered too unimportant for thorough discussion. His record, which is briefly sketched in his autobiography appearing in this volume, is one of which his native England, noted for great men, may truly be proud.

As we open the third volume of *Herbertia,* one of the most important aims of the Society has been accomplished. The use of the method of vegetative propagation of amaryllids, in those cases where natural increase is slow, has been generally accepted and is practised. In a reasonable number of years, we can look forward to the time when the best species and varieties will be available to all.

A beginning has been made toward the consideration of other subjects of importance to the members—the principles underlying the art of using amaryllids in the landscape, a complete inventory of amaryllid species, the evaluation of the many hybrids which are being introduced, the genetics and cytology of the amaryllids and methods of storing pollen, the growth of ideals with reference to types of flowers produced by amaryllid breeders, and other subjects of equal importance.

One of the outstanding articles in the present volume is Mr. Hunt's contribution on the use of amaryllids in the landscape. It will help us all in our efforts to make the best possible use of our plant resources. Who can so soon forget the "Sea of Atamasco Lilies"! It will encourage us to plan a "sea" of those amaryllids which are suited to our particular locality.

We are especially grateful to Messrs. Dyer and Compton in South Africa, who are opening up to us a wonderland of amaryllid species. Messrs. Standley and Macbride of the Field Museum are charting the wealth of material in tropical America.

Mr. Wyndham Hayward is doing very valuable work in making intensive studies of the amaryllids—some of the concrete results are presented in this volume. Such studies will lead to a critical evaluation of the plant material already gathered together. How he manages to accomplish so much is probably explained by his unbounded energy and unwavering purpose. The members of course know that the continued outstanding success of the Society can be traced to his door for his enthusiasm after three years has cooled not even one degree.

The creation of the Hemerocallis Committee with Dr. Stout as chairman is an event of great importance. The interest in this group is rapidly increasing which makes it desirable that problems peculiar to this group receive special attention.

Much valuable breeding material has been collected and this will be made available to the members as rapidly as possible. The *"Hippecoris Garfieldii"* bulbs are being propagated by the stem cuttage method and will be distributed to renewing members in 1937. Other items will follow as soon as practicable.

Mr. Percy-Lancaster of the Royal Agricultural and Horticultural Society of India is carrying on most important work on inheritance in amaryllids. *There is real need for more work of this kind.*

The inspiring article by the late Dr. David Griffiths on narcissi breeding in volume 2 is followed in this issue by an equally worth while contribution by Mr. Gibson of the Isles of Scilly Experimental Station. The Tazetta group of narcissi is apparently to receive the attention it so richly deserves.

In reading the reviews of the amaryllis shows one is struck by the steady progress in ideals as regards flower types. Three years ago, in spite of all the advice to the contrary, practically all had their minds set on the leopoldi-A type as the only goal for hybrid amaryllis. At the Third National Show practically all types were shown for the first time, including the ideal leopoldi-A types, and it was encouraging to note that *each* type was appreciated for its *individuality*. It is a well known fact, as pointed out by Mr. Hume, that interest in Camellias declined at one time because of too rigid limitation with reference to flower types. Above all we need variety, and more variety in amaryllids. Our organization without doubt is broad enough to make room for a number of flower types in hybrid hemerocallis, hybrid amaryllis, narcissi, and other amaryllids.

Our space is practically used up and we have touched on only a few of the outstanding contributions in this volume of *Herbertia*. Those not specifically mentioned here are equally worth while and will be appreciated by the membership.

Through the financial assistance of a member, Mr. A. C. Splinter, of Coconut Grove, Miami, Florida, we are able to reproduce the first color plate in *Herbertia*. *Leucocoryne ixioides odorata* will assuredly become one of the most popular subjects for naturalizing and winter forcing once its cultural requirements are fully understood, and sufficient stock is available.

As already indicated, the 1937 volume will be dedicated to the late William Herbert. His biography is being written by Mr. Arthington Worsley, and is almost completed. A general history of amaryllid breeding in England from Herbert's time to the present is also being prepared by Mr. Worsley and will be included along with the other features you expect each year.

This will be followed in 1938 by a volume dedicated to Mr. E. H. Krelage. He will contribute his autobiography, and will also be responsible for the symposium on continental European amaryllid culture which will appear in the same issue.

The 1939 volume will be dedicated to South Africa. The main features will be supervised by Messrs. Dyer and Compton. The 1940 issue will be devoted to Latin America, and the 1941 volume to Australia.

—Hamilton P. Traub,
Editor.

July 14, 1936,
Mira Flores,
Orlando, Florida.

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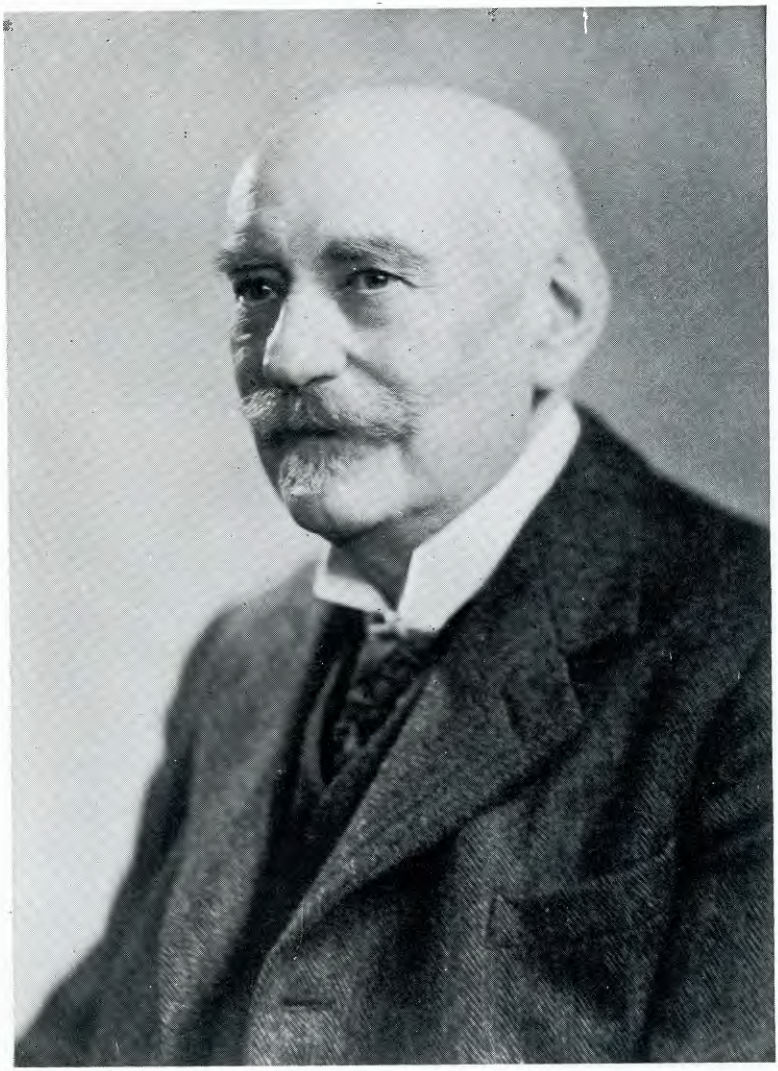
Manuscripts should be typewritten if at all possible and double spaced; photographs should have the name of the owner to whom credit should be given, and the subject, written on the back.

LIST OF ILLUSTRATIONS



very sincerely yours
Arthington Worsley.

A TRIBUTE TO ARTHINGTON WORSLEY

As long ago as the beginning of the century, when any discussion took place regarding amaryllids, the name of Mr. Arthington Worsley of Isleworth at once occurred to the mind. So well known had he become for the large number of wild species he had gathered together, for his knowledge of them, and for his skill in cultivating them, that he was, about that time, elected one of the small body of honorary members of the Royal Horticultural Society—an honour, bestowed upon only a very few distinguished horticulturists—and appointed a member of its Scientific Committee. He has been the man to whom one turned for advice on all questions concerning the identity, the mode of life and the cultivation of members of this group of plants—and his advice was always most generously forthcoming.

Some of the results of his study of the species of the family (which are often very difficult to define) have been given to fellow horticulturists in the Journal of the Royal Horticultural Society and elsewhere. His interest has been greatest with the plants of the family that occur wild, but it has not been restricted to these, as shown, for instance, by the fact that he has raised hybrid hymenocallis and hybrid nerines. As with most keen horticulturists, he has strayed at times into other paths, for he has written of conifers and Cornish gardens, of the flowering plants and ferns of Brazil, of the forests of Galicia, of garden cacti, and of such subjects as the cause of the limits of variation in plants.

The great regret of his fellow horticulturists is that his extensive and profound knowledge has not yet been embodied in a garden Monograph of the group to which he has devoted so much study.[1]

Aberconway

[1]Contributed by Lord Aberconway, President, Royal Horticultural Society.

LIFE AND CAREER OF ARTHINGTON WORSLEY
AN AUTOBIOGRAPHY

ARTHINGTON WORSLEY
at the age of four years.

Born in 1861, his ancestors being Lancastrians who had settled in Yorkshire towards the end of the 17th century, Mr. Worsley has had varied experiences of life and work in many countries. In company with his brother officers, he was presented at the Court of St. James's in 1882 to the late King Edward (then Prince of Wales) by the Prince's brother, the late Duke of Edinburgh, during the Victorian reign. Many modern critics decry the Victorian era, but forget that Britain was then enjoying a golden autumn-time of prosperous years the like of which will never be again experienced by any Briton.

Educated as a Civil Engineer, he subsequently specialized in mining economics, and it was in pursuit of his profession that he travelled widely in Europe, part of Africa, and especially in Central and South America. It might be thought that horticulture and mining had little in common, but his experience was otherwise, for letters of introduction from the Royal Gardens, Kew, enabled him to visit places which would otherwise have proved difficult of access on account of political disturbances. Especially was this the case in Cuba just before the revolution of 1895, for the Captain General in command of the Spanish army gave him a free permit carrying immunity against any interference, and, in places, sent a guard of cavalry with him. The adherents of Sr. Maximo Gomez thought that this permit would not carry him far without trouble, so they presented him with another document from their side of the fence. Between the two he got all over the "island-continent" without difficulty.

By some good chance, his professional work took him to countries of great botanical interest, and transit delays often gave time for a hurried study of plant life in the neighborhood. For instance, in his visit to Cuba he found time to accompany the Russian Commission of Imperial Domains into the tobacco lands of the Vuelta Abajo; to make the acquaintance of the well-known American geologist—Clarence King—at his temporary home at Dos Bocas, near Santiago de Cuba; to spend some days on the sugar estates of San Augustin near Los Cruces, and to visit a N. American sugar estate near the bay of Cienfuegos in order to study the various methods of sugar production. He also visited and examined the important mineral areas carrying haematite, copper, manganese, and bitumen in the island.

After more than 5 years work with the Civil Engineering Department of the North Eastern Railway, at Darlington, he took up a position in York as chief of the Yorkshire Sanitary and Engineering Association and carried out many works of arterial drainage in flooded areas, and structural work of various kinds. He was a Founder-Member of the Institute of Fuel under the chairmanship of the late Lord Melchett. Led an expedition of four engineers to examine five bituminous shale fields of central and southern Spain, on which was issued the Worsley-Auden Report, and, following a second and more extended examination, Mr. Worsley issued a subsequent Report. In the *Chemical Age* he made a Report upon the Scottish Shale Fields in which the costs of operation were critically considered and subsequently affirmed.[1] In 1928 he was a member of the World Power-Conference, held at the Imperial Institute which was attended by representatives from 40 nations, and he was invited to join the Berlin Konference held in 1929. He addressed the former conference several times on the economics of power derived from bituminous shales, and from peat and lignites. He was reported verbatim in the Transactions of the Conference—a stupendous book costing £42.0.0. per copy.

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[1]An abridged report appeared in **The Chemical Age** of 27/2/1926.

His memory of numbers was remarkable, and often held him in good stead. One day, in a merchant's office, he was presented with a great stone of some highly crystalized mineral and was expected to name it off-hand. Thinking it was possibly Kyanite, of which he remembered the determining basal angles of the crystals, he took paper and pencil, drew out a protractor on paper, marked off the determining angles, and verified the mineral in a few minutes. This mineral is always found associated with forms of mica, and no economic means of separation was known. Some of our leading grinding-experts gave up the problem as hopeless from an economic standpoint, but Mr. Worsley carried out tests under varying conditions and soon found a simple plan by which a cheap and practically perfect separation of Kyanite from Mica can be effected.

In the war time he examined the vast extrusive masses of pegmatite which outcrop in the far N. W. of Scotland. The importation of foreign pegmatite was no longer possible, and potash was needed.

The problem presented no mining difficulties but did present great economic uncertainties. He reported that the mineral could be obtained in quantity at a cost which showed a small profit, but that imported pegmatite was of a higher grade and of a more constant character. That this was a war-time proposition requiring either governmental assistance or a guarantee as to price over a long period, without one of which guarantees operation would involve undue risk upon Capitalists.

It was said that he had crabbed a payable national industry. But as no one has seriously undertaken the obtention of this Scottish mineral, this fact speaks for itself.

He was the author of many articles on economics—mainly in connection with minerals—in the London Daily Press, but more especially in the London technical journals—such as *The Mining Journal, The Chemical Age,* and *The Transactions of the Institute of Fuel Technology,* etc. Therein he treated at some length of Beauxite and of bituminous shales and coals of various classes; of the monetary confusion caused by demonetising precious metals, and gave two articles on the Royal Metals which created no little stir, *(Report of the Radium Sub-Committee, 1929, Empire Radium Deposits,* and *The Radio-active ores of Industrial Value)* which were followed up by articles in the *Daily Telegraph* of London in which Mr. Worsley proved that we were paying far too much for Radium up to hospital standard. His article on *The Silver Crisis* (30/10/26) caused that issue of the *Mining Journal* to become exhausted in a few weeks, but *The Coal Crisis,* published 3/9/27, did not seem to attract much attention at the time, although the British Government carried out the whole of his suggestions shortly afterwards. He also advocated in the *Mining Journal,* in February and March 1932, that attention should be paid to certain gold areas on the W. African Gold Coast, and much satisfactory development followed in the next few years.

Among unpublished works he wrote a treatise on High Grade Refractories.

He was the inventor and patentee of an electro-chemical bleaching process in which the instability of Hyposulphurous Acid was overcome, and did some research work for several parties, including the *St. John del Rey,* the *Mond Nickel Companies* and the *British Metal Corporation.*

In 1924 he had 3 mining reports due for presentation on the same day. To get them all ready he had to work 14 hours every day (including Sundays) for a fortnight. He did so, and presented them punctually. He promises not to do it again.

Some may think that, as narrated in this biography, he allowed his energies to spread over a field too wide for one man to traverse safely. But, if there is work wanting to be done which is being neglected, the temptation to do it is very great. So the writer will not now deign to offer any excuse for having strayed into such a wide field of work if he felt capable of adding anything useful to human knowledge.

Literary Work

In his more leisure years he wrote several books and many articles which were published in England and in Hindustan. Philosophy, Horticulture, and Genetics were his main subjects, and he broke all Trade Union rules by acting at various times as Author, Editor, and Publisher. His principal books are *Concepts of Monism, The Persian Philosophies* (Synopsis), *Recognition,* and *The Prayers of Philosophers.* The first was reviewed by critics from all the leading countries.[2] His articles secured much publicity in the Press of Hindustan, and most serious new books dealing with Indian and Persian thought were sent to him for review. The natives of these countries are not to be treated as illiterates and fed with the trivialities in which many British reviewers indulge. To suit them one has to absolutely read the books before reviewing them. Hence the *Times of India* sent him Col. Syke's *History of Persia* for review, and the *Hindustan Review* sent Coomaraswamy's great work on *Buddha and Buddhism,* and Dr. Mercier's *New Logic,* etc.

As a lecturer, Mr. Worsley has not done much, for those interested in such subjects are too scattered to form a large audience at any one place. By request, he did read papers to the Staff of the Special Neurological Hospital at Tooting on Memory States, and subsequently his paper was published in essay form. He has lectured before the Royal Horticultural Society; the India Society of London, and also at the Conference Hall, Streatham, and elsewhere, and has often taken the chair at London University at Lectures given by strangers to the University. Among unpublished matter, he had interesting correspondence with Ernst Haeckel on Monism, and with Karl Schumann on the Cactaceae, receiving from Schumann presentation copies of the English translation of his works.

Local Government Duties and Public Work

On his return from Central America in 1894 he made his home at Isleworth on the tidal Thames, married in 1900, and his wife and son are living with him. During this tour in 1893/4 he had spent some time in Caracas, where the protest of the British Government about the conduct of some Venezuelan police in the Yuruan district was causing much excitement. With his friend the late Prof. Ernst of the University of Caracas, Mr. Worsley had an opportunity of comparing the various maps of the Yuruan area, and, although they showed many discrepancies, he came to the conclusion that the Yuruan "outrage" took place in Venezuelan territory. On his return to England, finding that various *ad captandum* views were being expressed in the British Press, he expressed his own opinion at some length in the *Yorkshire Post.* Presently the late President Cleveland delineated the position of the United States of N. America and insisted upon the dispute being referred to arbitration. The war scare soon subsided, and in due course the arbitral commission, held in Paris, came to the same conclusion that Mr. Worsley had expressed.

Turning from international affairs to local matters, he was disgusted at finding that the tidal Thames was being treated as a drain by various local Authorities. This is the part of the Thames on which the citizens of London disport themselves, on which the great rowing contests of the world take place, and on whose banks thousands of visitors, artists, and pedestrians enjoy themselves. Pollution would render the Thames obnoxious instead of pleasurable to the people, and it did not seem the duty of anyone in particular to take up the cudgels on their behalf. So, as a village Hampden, he devoted himself to defending the river from misuse, and found support both locally and from the London County Council. Some success has already attended these efforts and some of the worst sources of pollution have been closed, but much still remains to be done in waking up the great Authorities and Government Departments concerned to a sense of their duties. The public soon recognized that something was astir, for the citizens of Isleworth and the local Press backed him up through thick and thin. When Middlesex County Council decided to dump down at Isleworth the great sewage works for all the

[2]Hindustan gave half-a-dozen Reviews in English, some of them 11 columns in length, and the Vernacular Press many others, some ofwhich puzzled the translators sadly. A number of special Reviews appeared, that of Dr. Julius Goldstein in the Frankfurter Zeitung being noticeable.

County (except the Lee Valley) instead of taking the sewage out to the sea as the engineer advised, a great protest meeting was held in the neighboring borough of Twickenham. Mr. Worsley was voted into the chair, much to the relief of many local-government magnates for whom this position presented difficulties. Unanimity was reached in a protest resolution. And now, before the Mogden Sewage Works are finished, the London County Council propose to expend £50 millions in a great scheme to take all the sewage of the London and suburban area out to sea.

During the Boer War he was one of the founders of *The South African Conciliation Committee* under the chairmanship of the late Lord Courtney, and was put upon the Executive. The Committee was disbanded shortly after peace was declared, and its members experienced the gratification of having the program, for which they had struggled, substantially put into operation by the British Government. He also attended and spoke at various conferences, such as that held at Trinity College, Cambridge, in June 1912, by the Aristotelian Society and other bodies, on "Purpose and Mechanism," Mr. Worsley claiming that the nature of "Purpose" was unknown apart from mechanical response to excitation of some kind.

For some years, early in this century, he maintained at Isleworth, a Climatological Station of the 2nd Order, under the Air Board, and submitted comparative air temperatures taken on thermograph charts with synchronous thermometer records.

He has been elected Chairman at many public meetings in the Boroughs of Twickenham and of Heston-Isleworth, and has successfully placed arguments before the Ministry of Health's Commissions and those of the Middlesex County Council at many Public Inquiries. He was also mainly instrumental in drawing out a Petition to H. M. The King in Council for the autonomy of Isleworth. He was chosen as Chairman of the Isleworth Watch Committee on its formation, and has acted as such ever since. The Ratepayers' Association made him its Acting Chairman. The Isleworth Electoral Area its Councillor on the Middlesex County Council, which placed him upon its Parliamentary and other Committees, and he has been a Justice of the Peace for Middlesex since 1907.

All these offices eat away one's time, and when life is on the wane, duty calls upon one to complete much unfinished work, and time taken from one work and given to another results in increasing the number of unfinished things, not in completing any of them. For instance, the editorship of the Isleworth Ratepayers' Magazine is not work to which every one aspires, or would undertake, but it, also, takes away some days in every month. Still, it is clearly better to die in harness rather than to doze away the last precious years during which duty to one's fellows can be performed.

Legal Troubles

Having made a Report upon the Gongo Socco Mine in Brazil, he was compelled to take the matter into the High Court, where he obtained a verdict in his favour. In 1895, he made a new point in British Law on the subject of the termination of tenantcies. His own notice being held, on appeal, by the High Court to be valid.

He wound up a Mexican Mining Company guilty of irregularities, and the High Court assented to the Liquidator he nominated.

He is still urging the claim of certain debenture-holders before the *Anglo-Mexican Claims Convention* for damage and losses to a Mexican Mining property during the revolutionary period. He also obtained a magisterial decision, against which no appeal was made, that the hybrid Ligurian honey-bee raised in an apiary on the premises of the owner was not, if a swarm strayed, liable to become the property of the finder as is the case with the endigenous British Black Bee.

Athletics

In the field of athletics, Mr. Worsley was at one time well known, especially on the cricket grounds of England and Scotland. He was for many years captain of the North and East Ridings of Yorkshire and was also often captain of the Marylebone Cricket Club sides at Lords and met with a fair measure of success both with bat and ball. Gifted with more than the average of physical strength and endurance, on one occasion he bowled throughout the innings of the opposing eleven,

then batted throughout the innings of his own side and remained undefeated at its close. Other cricketers have done the same thing, but not many of them. While captain of the N. & E. Ridings of Yorkshire he brought out some young cricketers of great merit, such as the late Frank Mitchell and the late D. Hunter, who subsequently took their place in international cricket. Among celebrated players with whom Mr. Worsley often played long since were Richard Daft, A. N. Hornby, George Freeman, F. R. Spofforth, W. L. Murdoch, and W. G. Grace (with whom he played during 21 summers.) The writer once got together a splendid side to visit the United States, but some delay across the water in arranging the program caused the visit to be put off. He had his own views as to dietetic training, and always advised professional cricketers not to attempt it, saying that those who had to play for 5 consecutive months should only aim at retaining normal good health. He used to quote two maxims—"Rules are only useful for those who, without rules, would not know how to conduct themselves. To all others, rules are merely hindrances."—and another from the Chinese classics—"The men of old ate when they were hungry, drank when they were thirsty, and slept when they were tired."—but, he added, "the men of old were the wise men of old, not the fools."

He published a series of articles of "Cricket and Cricketers" from 1870-1931, and was well known in angling circles. He also wrote on inland fishery matters, and on the parasites of the Salmonidae, etc., in the *Fishing Gazette,* and presented specimens of marine fish and of their parasites to the British Museum of Natural History.

At local regattas on the tidal Thames he also won events in sculling and was the donor of a challenge cup for the Thames.

Horticulture

Let us now leave such matters as have been narrated above, and turn to the amaryllids. For it is written in the Koran—"If a man has two loaves, let him sell one and buy a lily, for bread feedeth the body, but beauty nurtureth the soul."

It was not until some 40 years ago that Mr. Worsley was able to indulge to the full in horticulture. At Isleworth he had a garden of some size and was able to cultivate tender plants and bulbs. Very soon, fortified by the many bulbs which he had collected during his journeys in Venezuela, Central America, and Brazil, he had a collection of no little importance which he kept up until the great war. Lately he has been obliged to abandon the care of the major part of his collection, for the burden of taxation and the economic stress which has fallen upon us since then has quite defeated the efforts, or indeed the possibility, of most private individuals growing tender plants, or of spending their time in any other way than in striving to earn enough to pay the tax-collector. These are the labours of Sisyphus, endless in time and unproductive of any good results, for there is no limit to the extravagance and waste of Governments.

The really interesting point in the career of one who had many and varied interests, is,—what first drew his attention and devotion to the amaryllids? But here again we must give the same reply which inevitably follows every sort of inquiry seeking a solution in the inner core of things. *He did it because he couldn't help it.* One idle afternoon he strolled into a neighboring gardener's green-houses and there saw a lovely lady in the guise of a *Hippeastrum* in full glory. The die was cast. There could be no turning back, for beauty was awakened in the soul.[3] He shows no sign of abandoning this love, and congratulates the Amaryllis Society in that the United States of N. America was the first country to realize that love of the amaryllids is a special cult appealing to those whose eyes are trained to beauty and symmetry. May it long flourish.

No one who has ever climbed in the Sierra from Petropolis, and seen *Hippeastrum procerum* at home, can forget the amazing beauty of the scenery, unmatched, probably, in this world (c. f. Monograph in Gard. Chron. of 4/5/29). If he does not then and there fall in love with the amaryllids, he should be provided with a

[3]Bacon said, in his Essays—"The mind of man is as a glass, eager to receive the image of the universe, joying to receive the signature thereof, as the eye is of light."

Arthington Worsley
at the age of 29 years

new pair of eyes. The writer made a special visit to Brazil to see this sight, and was taken round by his friend the late P. M. Binot. Since then, the scenery in other parts of the world seems commonplace. So one gains and loses at the same time.

Beauty, which fills the lover with delight, is a sense of accord, or reconciliation, between the divine within us and the divine without. The old Persian love story of Laila and Majnun is true for all time—"To realize the beauty of Laila one must look with the eyes of Majnun"—and never was this truth borne in upon the writer with such overwhelming assurance as when he spent those glaring August days in the Alhambra at Granada. Every niche and crevice, every detail of those wondrous ceilings and slender columns, was picked out in light or shade. One lived over again with the ancient Moors, loving just what they had loved, filled with the same admiration, falling into the same ecstatic condition of delight. Was one just living and looking back on the old times, or was one experiencing over again what one had loved long since. Was it cognition of beauty, or recognition? Who can say.

In 1899 Mr. Worsley found a complete cure for mildew on vines, by fine spraying with water at a temperature not much below boiling point. As this requires skilled application, the President of the Royal Domains of Germany thought that it would prove difficult to guarantee efficient application on a large scale in vineyards. But where properly applied on a small scale it proved a complete remedy in one or two applications.

He raised several new cross-bred plums and apples of proved value at Isleworth and also a hybrid sub-evergreen oak, and attended the Darwin Ceremonials held at Cambridge University in 1909. He often took the Chair at the dinners and meetings of the Horticultural Club, such as that on 21/10/13, when Professor Bottomley laid claim to certain advantages from using a specially prepared form of Peat, which claims Mr. Worsley held were limited, as he had carried out experiments with peat prepared in this way. He also took the Chair and spoke on 6/5/14 when the subject of the lecture and discussion was "Indian and Persian Gardens." He at times took the Chair at the Scientific Committee of the Royal Horticultural Society. He also lectured before the Royal Horticultural Society on 21/3/31 on "Amaryllis."

The late H. J. Elwes, of Colesbourne Park, Cheltenham, was a lover of amaryllids. One very wet day he came to see the Isleworth garden, and, showing some annoyance at the weather, remarked—"Well, we cannot see much to-day"—"Why not?" Mr. Worsley replied. "I have over a thousand paintings and drawings, mostly of amaryllids, which are ready for you in the library." He stayed so long examining them that he missed his last train. As the outcome of this visit he would have the writer publish a new work to be called *The Amarylliæ Displayed*, with coloured figures of every typical species. On a fuller examination of the matter to be published, he realized how our knowledge of the *Amarylliae* had grown since Herbert's time, and that several volumes of great expense would be entailed in publication, if the whole ground was to be covered. So the R.H.S. took the matter in hand, but, at the time, the hypothecation of the needed funds presented difficulty as other work was already in hand. Moreover the number of members interested in amaryllids was limited, so the matter was not undertaken. The work would have included some 50 genera, and fully 100 typical plates would have been wanted. Then followed the death of H. J. Elwes, and the great war still farther increased the estimated cost of production. Since then no further project for publication has been put forward, and an opportunity seems to have slipped by. The collection of paintings and drawings has, however, been placed in security in London.

In the field of Genetics he opposed some of the earlier adherents of Mendelism, who, in his view, wished to push their theories farther than observed facts warranted, and criticised some of their statements before the Scientific Committee of the R.H.S.

He read a paper on his own observations on hybrids, showing that the changes from the parental types in first hybrids could not be brought into accord with recorded changes in crosses among mongrel plants, and that the Mendelian advocates were dealing exclusively with the latter crosses.

At the *Third International Conference* on Genetics, held in London in 1906—The late Professor Bateson in the chair—Mr. Worsley read a paper on "Hybrids among the *Amarylliae* and *Cactaceae*," giving a list of 19 hybrids in each division, and discussing the observed mutations in the hybrid progeny of each of them. He also gave the observed colour changes in 45 cinerarias and in some *Gesneraceae*.

At the *Fourth International Conference* (Paris 1911) he submitted a paper showing the results of 1181 inter-generic cross-pollenizations in the *Amaryllieae*, each of which had been effected on 5 or 6 separate flowers. The tabulated results showed that *Brunsvigia* and *Amaryllis*, *Vallota* and *Gastronema*, *Elisena* and *Hymenocallis (Ismene)*, *Eucharis* and *Urceolina* and *Zephyranthes* and *Cooperia* had been reconciled. Some botanists complained that the author had often made use of sub-generic in place of generic names, but he had a good reason for exercising this distinction, for in not a few cases some sections of a genus are not fertile with other sections, and we have no proof that because *Elisena* will fertilize *Ismene* it must also fertilize *Hymenocallis* proper. Therefore such distinctions need to be maintained until our knowledge is more complete. Since 1911 some other sub-genera have been reconciled.

The raising of mongrel plants is a nurseryman's job, and the jumble of characters resulting has certainly given us many improved varieties, but has also in some genera—such as *Hippeastrum*—destroyed the individuality which is so delightful in a collection of species. With the exceptions of a strain of self-coloured ultra-marine cinerarias, which he perfected and fixed so that they came true from seed, and of a strain of gigantic bluebells of which he raised 6 generations of selected seedlings—the original strain of *Scilla Hispanica* having been given to him by the late John Weathers of Isleworth—Mr. Worsley devoted himself to inter-specific and inter-generic hybridization. This latter is very speculative work. Up to 1911 he had made some thousand cross pollenations, but had only obtained a few outstanding successes. The first, named *Ismene festalis (Elisena longipetala* x *Ismene calathina)*, is now grown in most warm temperate countries, and is hardy on the coasts of the Mediterranean Sea. The second, *Ismene aurea (Elisena longipetala* x *Ismene Amancaes)*, is not yet in general cultivation.

Among inter-specific hybrids he raised a splendid red-flowered *Crinum*, which the late W. Watson named "*Worsleyi.*" [W. Watson in Gard. Chron. 2/2/01. p. 71.] This was a cross between *C. Moorei* and a Jamaican form of *C. scabrum*. Although when in a young state it grew vigorously, it became quite decrepit after flowering, and has died out of cultivation. When Mr. Watson first saw it in flower in 2/6/00. he took off his hat to it, saying, "This is a gentleman." Quite a number of hybrid crinums die out in our greenhouses. Dean Herbert gave a long list, none of which are now seen alive, but—"*De Mortuis nil disputandum.*" Mr. Worsley also raised *C. giganteum* x *C. Moorei*, and *C. amanteum (C. giganteum* x *C. amabile)*.

Among the nerines, Mr. Worsley raised hybrids on the little *N. pudica* and also on *N. corusca*. Subsequently he selfed both strains and raised several charming forms, but, recently, the public rage has been for size only, irrespective of brilliance of colour, and in this race after ugliness he will not compete.

His hybrids between *Brunsvigia* and *Amaryllis* have been so fully dealt with that they need not be referred to here. He also raised hybrids between *Zephyranthes Andersoni and Cooperia pedunculata*. These latter genera do not appear to be generically distinct, and should be joined up into one genus.

He was one of the judges at the International Show held in London in May 1912.

In 1900 he was elected as an honorary member of the Royal Horticultural Society and made a member of its Scientific Committee. He has been granted a First Class Certificate for:

1. *Brunsdonna Parkeri alba* (11/9/28) an albino of the 3rd generation.

The R. H. S. have awarded him also Awards of Merit for 9 plants.

2. *Ismene festalis*—a bigeneric hybrid—30/5/05 at Temple Show.
3. *Cactus Coopermanni*, a bigeneric hybrid—14/5/12.
4. *Brunsdonna Parkeri alba*—an albinoid sport—9/11.
5. *Brunsdonna blanda—Amaryllis blanda* of Herbert—11/9/28.
6. *Agapanthus inapertus*—1913.
7. *Cereus Amecaensis*—1912.
8. *Blandfordia Cunninghami*—1913.
9. *Phyllocereus roseo-purpureus*—7/1930.

Numbers 1, 2, 3, 4, 5, and 9, were hybrids raised by Mr. Worsley at Isleworth, the others were grown by him from imported plants.

Although biographies are inclined to be heavy reading, the party whose deeds are delineated may have had lighter moods. In this particular case he found time for composing a few stanzas, and now that his life's work is nearly over he does not look back upon it with regret. He has no "back words" for anyone—they all did their best according to their lights—so he takes leave of his readers in this style and asks their pardon if he has wasted any of his time.

Do I repent that each succeeding sun
My lotted span of days remeasureth;
Do I repent, now many years are run,
That Honour's baubles flaunt not coming Death;
That in my heart, far from Fame's blandishment
Peace holds her court, and throned is Fair Content—
Do I repent?

Published Writings

In addition to the books, etc., mentioned in this biography, and excluding engineering and mining Reports furnished to various clients, Mr. Worsley was the author of the attached list of 50 writings on horticultural and botanical subjects, and also of 157 writings published in various journals, etc., consisting of Reports on Public matters (12); Histories and Monographs (6); Pamphlets and Reviews (6); Articles in Journals (52); Local Government documents and Reports (16); Transactions of various Conferences (8); and various publications (57);—making 207 with the horticultural publications. There are others which are not listed.

Articles on Horticulture and Botany

In book form. Paper cover. *The Genus Hippeastrum* (Wesley, London, 1896).
List of Amaryllideae, etc., gathered in Grand Canary, Cuba, Jamaica and Venezuela, (Wesley, London, 1900).
Stricklandia cucrosioides, with fig., Gard. Chron. 5/10/01.
Crinum Wimbushi and *Crinum Samueli (Sps. Novae)*, Gard. Chron. 25/11/02.
List of Plants, etc., gathered near Petropolis and near Lisbon. (Journal R. H. S. 5/04).
List of Plants, etc., gathered near Land's End, Cornwall. (Journal R. H. S. 6/07).
Hybrids among the Amarylliae and the Cactaceae, Analytical charts, etc., (Genetics; R. H. S. 1906).
Hybrids among the Amarylliae, descriptions of 27 hybrids, lists of crosses, etc., (Gard. Chron. Jan. and Feb. 1901).
Anemone variata (Journal R. H. S. 7/09).
Amaryllis Parkeri (Journal R. H. S. 11/09).
Hybrids of Nerine flexuosa. Comparison of mutations among. (Journal R. H. S. 3/09).
The Genus Polianthes, with figure, formulae, and analysis. (Journal R. H. S. 5/11).
Variation as limited by the association of characters. (Journal R. H. S. 5/11).
Hippeastrum Forgetii (Journal R. H. S. 7/12).
Conifers in the lower Thames Valley (Journal R. H. S. 10/03).
Germination in Amaryllideae (Journal R. H. S. 4/03).
Germination in Amaryllideae with 3 figs. (Journal R. H. S. 5/04).
Bulb extension in Amaryllids (Journal R. H. S. 4/03).
Crinum amanteum (hybrid), *C. giganteum x C. Amabile*, Gard. Chron. 28/11/03.
Cereus Kewensis and C. MacDonaldiae (Journal R. H. S. 8/13).
Hybrids of Phyllocactus crenatus and Cereus grandiflorus. Parallel descriptions of *Cooperi, Wrayi*, and *Thomasianus* (Journal R. H. S. 8/13).
The Genus Agapanthus. Description of *A. inapertus* (Journal R. H. S. 12/13).
Forest trees of Spanish Galicia (Journal R. H. S. 4/14).
The Genus Veltheimia (Journal R. H. S 11/14).
Tritonia bracteata (Gard. Chron.)

Habranthus advenus, Max., with fig. (Gard. Illustrated, 15/10/27).
Brunsdonna (Amaryllis) Parkeri, with fig. (Gard. Chron. Illustrated. 3/10/25).
Brunsdonna Parkeri, with another fig. (Gard. Chron. 14/11/25).
The Brunsdonnas (Journal R. H. S. Vol. LI. Part 1. 1926).
Nerine filifolia, with 2 figs. (Gard. Illust. 7/11/25).
Crindonna memoria Corsii (C. Howardii) Comparative descriptions of parents and hybrids, with fig. (Gard Chron. 1928).
Hippeastrum Arechaveletae with fig. (Gard. Chron. 7/28).
Hippeastrum barbatum (Gard. Chron. 7/28).
Nerine flexuosa (Gard. Chron. 1928).
Genus Lycoris. A garden review of (Gard. Chron. 1928).
Hybrid Cacti (Gard. Chron. 1928).
Colour variation in hybrid Cacti and other plants. (Gard. Chron. 11/28).
Amaryllis (Brunsvigia) Slateriana, with fig. (Gard. Chron. 12/1/29).
Seedling, Self-fertile, and Constant-cropping Fruit trees. (Gard. Chron. 12/1/29).
Garden Crinums, with 2 figs. (Gard. Chron. 23/3/29).
Hippeastrum procerum, with 4 figs.—a Monograph—(Gard Chron. 4/5/29).
Silver-leaf and Victoria plums (Times. 22/7/29).
Plants of the Cape Peninsular—a review of—(Gard. Chron. 26/10/29).
Nerine (Hort.) Attar, with fig. (Gard. Chron. 12/29).
Phycella bicolor, fig. (Gard. Chron. 12/29).
Amaryllis (Brunsvigia, and *Crinum* in part)—Lecture at R. H. S.—(Journal R. H. S. 1931).
Hardier Hippeastrums (Gard. Chron. 12/31).
Amaryllis Baptiste alba (Gard. Chron. 1933).
Habranthus Chilensis, fig. (Gard. Chron. 1932).
Pamianthe Peruviana, with 3 figs. (Gard. Chron. 25/4/36).

ERNST H. KRELAGE HONORED

"Having served as president of the General Bulb Growers' Society of Holland since 1906, Ernst H. Krelage announced at the recent general meeting of the Society that he did not wish to be re-elected. Being already an honorary member of the Society, he was unanimously elected honorary president. The membership then presented to him his portrait painted by the famous Hungarian master, Mendlik, now living in Holland. Addresses in honor of the retiring president were made by the representative of the Minister of Agriculture, by the vice-president of the Society and by others, including Prof. van Slogteren who as president of the Nicolaas Dames Foundation, tendered Mr. Krelage the large gold medal for personal services to horticulture, an honor which had never been bestowed before."[1]

Under date of February 4, 1936, Mr. Krelage writes from his home, 6 Stolbergstraat, Haarlem,—"I am starting soon on a family visit to Java—Netherlands East Indies— . . . . At my present age of 67 years I cannot give a [finished] autobiography for the 1938 Year Book, but shall be pleased to send you some notes".

[1]Florists Exchange, February 15, 1936.

A TRIBUTE TO DR. HOLMBERG[1]

Dr. Eduardo L. Holmberg, the author of the important monograph on *Amaryllidaceas Argentinas,* which appeared in 1905 in the *Annals of the Argentine Museum of Natural Sciences,* is an internationally known naturalist,and ranks as one of the greatest students of plant and animal life that South America has given to the world.

For several years he has been in complete retirement from all active work, and at the age of 83 years, is the venerable dean in Latin America, of the followers of Linnaeus, Darwin and the other intellectual giants working in biology for the last two hundred years. He is one of the last surviving members of that school of scientists who considers an encyclopedic learning as a necessity. Besides his vast fund of knowledge in the fields of zoology, botany and pedagogy, he is equally well versed in philosophy and literature.

He occupied himself principally with the different branches of the natural sciences, in particular with zoology and botany. He produced monographs in these fields of genuine merit. His study of the Amaryllidaceae was carried on while serving as director of the Jardin Zoologico of Buenos Aires. The monograph of the Argentine Amaryllidaceae is now out of print and copies are extremely difficult to obtain, except occasionally through dealers in second hand books in Buenos Aires.

In recent years, Dr. Holmberg suffered a long and serious illness, but is recently reported to be considerably improved in health.

THEODORE L. MEAD, IN MEMORIAM

Mr. Theodore L. Mead, of Lake Charm, Oviedo, Florida, passed away in his 85th year on May 4, 1936, at Fernald-Laughton Memorial Hospital, Sanford, Florida. He suffered a paralytic stroke at his home on April 22, and had been under treatment since that date. Funeral services were held in Orlando, May 7, and he was laid to rest in Greenwood Cemetery, Orlando.

Mr. Mead had lived a long, full and useful life, the details of which were recounted in the autobiography appearing in the 1935 Year Book which was dedicated to him. He was the venerated pioneer horticulturist and plant breeder of the Southeast and on the publication of his autobiography he received the congratulations of his many friends in the United States and abroad.

Always his home was the Mecca of plant lovers. Many will cherish the memory of a personally conducted tour over the Mead estate which is notable for rare plants, especially orchids, palms, bromeliads, caladiums, amaryllis, and cacti. He retained his personal charm and acute mental faculties until the last, and could give off hand the scientific name or breeding history of any plant on his grounds.

To a host of friends his passing will be a distinct personal loss. His contributions to the advancement of ornamental horticulture are of genuine merit, especially in the breeding of orchids, bromeliads, caladiums and amaryllis. On the basis of his work he holds an important place in the horticultural hall of fame.

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[1]Compiled from data furnished by Sr. Jose F. Molfino, Chief of the Laboratorio de Botanica, Ministry of Agriculture, Buenos Aires, and Sr. Salvador Siciliano, Secretary; and Prof. Martin Doello-Jurado, Director, Argentine Museum of Natural Sciences, Bernardino Rivadavia, Buenos Aires.

REPORT OF THE SECRETARY

The Year since the 1935 Year Book went to press has been an eventful one and one of steady progress in the "advancement of the amaryllids", with great promise for the future.

The membership has shown a healthy increase of interested new arrivals, and the addition of several new corresponding members in far lands has given the Society a truly international significance. Among the new countries now represented in our corresponding membership roll are Denmark, Finland, Canada, Brazil, Venezuela and India.

All corresponding members are respectfully requested to send in their contribution of an annual news-letter early in the year, so that the editor's task will be simplified. The corresponding members enrolled during the year are: Mr. Bengt M. Schalin, Jorvas, Finland; Sr. Joao Dierberger, Sao Paulo, Brazil; Dr. H. Pittier, Caracas, Venezuela; Mr. John Lotan, Hull, Quebec, Canada; Mr. O. Mohr, Glostrup, Denmark, and Mr. Sydney Percy-Lancaster, Alipur, Calcutta, India.

The Third Annual National Amaryllis Show of your Society was held in Orlando, Florida early in April, 1936 and proved a distinguished exhibition of the very highest quality. The Society was honored by having as chief judge for this show Dr. H. Harold Hume, Assistant Director, in charge of Research, of the Florida Agricultural Experiment Station, Gainesville, Fla., veteran botanist, horticulturist and author on these subjects. Details of this National Show will be found elsewhere in the Year Book.

There have been most creditable exhibits of choice hybrid amaryllis at a number of important flower shows in the United States during the year, notably at Palm Beach (Fla.,) Flower Show in late February, where Mr. John T. Scheepers entered an outstanding display of hybrid amaryllis, mainly imported Dutch bulbs. The International Flower Show in New York recognized the growing popularity of Amaryllis by providing a new class of sizeable proportions for these blooms at the 1936 event in March.

The 1935 Year Book received a warm welcome and the highest praise of competent critics in all parts of the world of horticulture. I believe that the Year Book came to the attention of many thousands of interested persons through the medium of these notices, resulting in the enrollment of numerous members. The Society's annual is gradually taking its place as one of the foremost special plant publications, and is gaining worldwide recognition as a reference work of the utmost importance in its field.

The 1936 Year Book, which bears the title "Herbertia", for the first time, in honor of Dean Wiiliam Herbert, pioneer in Amaryllid studies, will assuredly surpass its precedecessors in all matters of style, interest of content, value of the research outlined and in the quality of the illustrations. It is a triumph of editorial skill and conscientious diligent supervision on the part of its editor, Dr. Hamilton P. Traub, the formative and guiding genius of the Society, whose keen, scientific mind and infectious enthusiasm are surpassed only by his modesty.

The trial collection of the Society has been favored with a number of important acquisitions during the year, which are listed in the report on that subject. Additional donations will be welcomed, and also good photographs of new or outstanding amaryllids in flower. Major Albert Pam of England has been particularly kind in this respect.

Three items from the trial collection have been made available to members in 1936, two Zephyranthes species and one hybrid of interest and desirable qualities. Other items will be made available for similar release when sufficient stock has been worked up.

The most pressing need of your Society at the present time is for new members, at least two hundred more members than our rolls now contain, to assure a continuance of the same fine quality of articles, printing, paper and illustrations in the Year Book. Prices along all these lines are increasing, and the outlook is for a considerably higher cost of all the services that go to make the complete Year Book, in future issues. Your Society was fortunate in being able to close its calendar year of 1935 with all accounts paid and the treasury "in the black" by a very small amount.

Your officers extend their sincere appreciation to all members and advertisers for making this possible.

Renewals of the "faithful" have been coming in with gratifying regularity in the present year and the secretary trusts that the members will continue their missionary work in the field of persons who might be interested in joining the Society. Gift memberships to plant-loving friends are suggested as most suitable and helpful.

The American Amaryllis Society is your Society and its possibilities of success and service are limited only by the cooperation it receives from the component members. Your officers have tried to make it a living, human organization, with fresh, forward-looking and progressive interests and aims. In this regard I would respectfully call your attention to the inspiring character of Mr. Arthington Worsley's life story, a refreshing picture of the well-rounded career of a gentleman, a scholar and a distinguished horticulturist, which opens this "Herbertia". It may well serve as an example to youth through the years to come. It is stimulating in its simplicity and modesty. Your secretary can only say that he regrets Mr. Worsley's excessively modest estimate of his horticutural achievements.

Faithfully,

June 3, 1936,
Lakemont Gardens,
Winter Park, Florida.

WYNDHAM HAYWARD,
Secretary.

NOTICE OF 1937 NOMINATIONS

To the members of the American Amaryllis Society:—

As provided 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, together with the names of those whose terms expire, this information and notice is hereby incorporated below, and same will take the place of a separate mailed notice to the members to this effect for 1937 elections.

President	MR. E. G. DUCKWORTH, Florida
Vice Presidents	MR. T. H. EVERETT, New York MR. E. A. MCILHENNY, Louisiana MR. FRED H. HOWARD, California
Secretary	MR. WYNDHAM HAYWARD, Florida
Treasurer	MR. RALPH W. WHEELER, Florida
Director at large, for 3 years	MR. AL. G. ULRICH, Missouri

Article 7, Section 1 of the Constitution, provides that any voting member may submit to the Secretary, not less than 60 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 for 1937 will be held on April 14, being the second Wednesday of the month. Therefore the names of the suggested nominees must be submitted to the secretary before February 12, 1937.

April 23, 1936,
Winter Park, Florida.

WYNDHAM HAYWARD,
Secretary.

REPORT OF TRIAL COLLECTIONS COMMITTEE

During the season 1935-36 steady progress has been made in adding to the Society's collection of *Hemerocallideae, Alstroemeriaceae* and *Amaryllidaceae.* Members have been kind enough to share some of their rare species with the Society and these are being grown on for study, and identification in some cases. Later, when sufficient stock is available distribution will be made to members in the case of items not readily obtainable.

Seeds or bulbs for the Trial Collection should be sent to the Chairman of the Committee at Winter Park, Florida, or to the New York Botanical Garden, Bronx Park, Fordham Branch P. O., New York City, in the name of the American Amaryllis Society The New York Botanical Garden is an official cooperating agency of the Society.

ACCESSIONS, JULY 1, 1935 TO MAY 30, 1936

A-32 *Zephyranthes simpsoni.* Pinkish-white flowering species close to Z. treatiae and native to South Florida. Grown from seeds collected by Dr. Hamilton P. Traub in Lee and Collier Counties, Florida. Partly distributed to members in 1936.

A-33 *Zephyranthes pulchella.* Species collected by Robert Runyon near Brownsville, Texas; a yellow-flowered species intermediate between *Z. texana* and *Z. longifolia.* Partly distributed to members in 1936.

A-34 *Zephyranthes sp.* Probably *Z. robusta;* seed and bulbs contributed by Mrs. Emma M. Foster, Covina, California.

A-35 *Beschorneria yuccaoides.* Seeds of this rare succulent type, formerly included in the *Amaryllidaceae,* contributed by E. O. Orpet, Santa Barbara, California.

A-36 *Cooperia sp.* White flowered species, probably new, from the vicinity of Angleton, Texas; foliage similar to that of *Z. longifolia.* Contributed by Dr. Hamilton P. Traub.

A-37 *Lycoris squamigera.* Wide-leaved type; contributed by Carl H. Krippendorf, Cincinnati, Ohio.

A-38 to A-46, incl. Contributed by Major Albert Pam, England.

A-38 *Hippeastrum procerum.* Rare violet-flowered species.
A-39 *Hippeastrum pratense.* Miniature type.
A-40 *Hippeastrum tucumanum.* From Argentina.
A-41 *Hippeastrum reginae.*
A-42 *Hippeastrum psittacinum.*
A-43 *Hymenocallis quitoënsis.*
A-44 *Pamianthe peruviana.*
A-45 *Cyrlota (Vallota* x *Cyrtanthus sanguineus).*
A-46 *Hymenocallis caymanensis.*

A-47 *Hippeastrum aulicum.* Contributed by Mr. E. B. Martyn, Government Botanist, Georgetown, British Guiana.

A-48 *Alstroemeria sp.* Red-flowered, contributed by Mrs. John H. Churchwell, Jacksonville, Florida.

A-49 to A-50, incl. Contributed by Major Albert Pam, England.

A-49 *Zephyranthes macrosiphon.* Large-flowered species from Mexico.
A-50 *Alstroemeria campaniflora.* Species collected by Major Pam in Brazil.

A-51 *Hippeastrum sp.* Possibly *H. rutilum;* contributed by Dean H. Asper, Concordia, Kansas.

A-52 to A-53 Contributed by E. O. Orpet, Santa Barbara, Calif.

A-52 *Haemanthus sp.* Identity unknown.
A-53 *Haemanthus coccineus.* (See also A-11, 1935 Year Book).

A-54 to A-60 Contributed by Dr. Hamilton P. Traub.

A-54 *Zephyranthes tubispatha* from Utuado, Puerto Rico.
A-55 *Zephyranthes carinata* from Utuado, Puerto Rico.
A-56 *Zephyranthes carinata* from Dorado, Puerto Rico.
A-57 *Zephyranthes eggersiana* from St. Thomas, Virgin Islands.
A-58 *Zephyranthes tubispatha* from St. Thomas, Virgin Islands.
A-59 *Zephyranthes biflora* from St. Thomas, Virgin Islands.
A-60 *Hippeastrum equestre* from El Semil north of Ponce, Puerto Rico.

A-61 *Hippeastrum hybridum;* seeds, contributed by Mrs. E. M. Foster, Covina, Calif.

A-62 *Amaryllis belladonna;* Florida grown bulbs, contributed by John A. Springer, Orlando, Fla.

A-63 *Cyrtanthus spp.;* red and white; seeds originally sent by Mrs. J. W. Archbell, Unkomaas, Natal, South Africa, and contributed by Mrs. W. E. MacArthur, Jacksonville, Fla.

A-64 *Hymenocallis speciosa;* three seeds; contributed by Major A. Pam, England.

A-65 to A-66 Contributed by Mr. E. N. Blake, Laredo, Texas; seeds;

A-65 *Zephyranthes sp.;* yellow-flowered.
A-66 *Zephyranthes sp.;* white-flowered.

A-67 *Zephyranthes spp.;* mixture of bulbs, including *Z. ajax* and others not positively identified; contributed by Dean Asper, Concordia, Kansas.

A-68 to A-74 Contributed by Dr. A. B. Stout, Director of Laboratories, New York Botanical Garden, New York City;

A-68 *Hemerocallis hybrid, Vulcan.*
A-69 *Hemerocallis hybrid, Bijou.*
A-70 *Hemerocallis fulva rosea.*
A-71 *Hemerocallis hybrid, Midas.*
A-72 *Hemerocallis hybrid, Margaret Perry.*
A-73 *Hemerocallis hybrid, Lady Fermoy Hesketh.*
A-74 *Hemerocallis hybrid, Queen of May.*

A-75 *Hymenocallis tenuiflora;* 6 bulbs; contributed by the Division of Plant Exploration and Introduction, Bureau of Plant Industry, U. S. Department of Agriculture. Stock originally from the Philippine Islands.

A-76 *Sprekelia sp.;* one bulb each of two types; contributed by Mrs. Emma M. Foster, Covina Calif.

A-77 *Nerine sp.* (near *Nerine falcata,* Baker); seeds; contributed by Mr. R. A. Dyer, Pretoria, Union of South Africa; "flowers pink in large umbels, bulb up to 2½"; originally collected in Brits District of Transvaal at 3,200 ft. altitude, by Mr. A. O. D. Magg, Jan. 14, 1935". Seeds sent to Society collected from plants in Pretoria, Feb. 25, 1936; received in Winter Park, Fla., April 22, 1936; seeds partly sprouted, planted at once.

A-78 *Crinum parvum;* bulbs contributed by The Lady Muriel Jex-Blake, Kenya Colony, British East Africa; two bulbs bloomed soon after planting with tiny umbels of pink-striped white flowers like a miniature "Milk and Wine Lily"; see also A-30, in 1935 Year Book.

A-79 to A-80 Contributed by Garfield Park, Chicago, Ill., Conservatory;

A-79 *"Hippecoris Garfieldi";* listed as *Hippeastrum* (seed parent) x *Lycoris aurea* (pollen parent) selected lot of bulbs.
A-80 *"Hippecoris Garfieldi";* listed as *Lycoris aurea* (seed parent) x *Hippeastrum* (pollen parent); three bulbs.

May 30, 1936,
Lakemont Gardens, Winter Park, Fla.

WYNDHAM HAYWARD,
Chairman.

THE SECRETARY'S MAIL BAG

One of the most charming exhibits at the Third National Amaryllis Show in Florida in April, 1936 consisted of two pots of *Hippeastrum rutilum crocatum*, dainty saffron-colored species of Amaryllis native of Brazil, entered by Mr. Frank Vasku of Winter Park. The flowers have a charm that is unsurpassed and in the opinion of some, unequaled by the best of the hybrids. The form and color are so pure and delicate.

Members residing in the vicinity of New York should take advantage of the opportunity of viewing the experimental planting of new and old Daylilies on the grounds of the New York Botanic Garden in Bronx Park. Dr. A. B. Stout, leading Hemerocallis breeder of the United States, is director of the laboratories at the Garden. The show lasts from May to September inclusive.

One of the most difficult things to obtain is a good Amaryllis photograph. In fact taking a photograph of any Amaryllid seems to be fraught with many difficulties before a satisfying and life-like picture is achieved which will stand the acid test of reproduction by engraving in the Year Book. The Amaryllids seem to have more character as flowers than other families of plants, and they either "take a good picture" or they don't, usually they do not. In the Year Book the standard of illustrations is set as the best possible under all circumstances. Members having photographs of new and rare Amaryllids are urged to send them in for possible use in future "Herbertias". They should be original and never before published.

Mr. Thomas H. Everett, horticulturist at the New York Botanic Garden, and recently elected a Vice-President of the Society, visited the Society's secretary at Winter Park, Fla., with Mrs. Everett for a day in December 1935, and was also shown over the Amaryllis propagating house and growing fields of Mr. I. W. Heaton, at Orlando, Florida. Mr. Everett evinced much interest in the newest developments of the vegetative propagation methods as applied to various Amaryllids.

The *Cyrtanthus* species are getting a little closer to our vision. They are becoming more common in the rare plant and bulb nurseries of the United States, and apparently thrive under similar conditions to *Zephyranthes*. *Cyrtanthus sanguineus* has red flowers like a tiny Amaryllis, and most of the other species have tubular pendulous flowers. They are due for a rise in popularity, as are the nerines. Half a dozen species are now available, but they are still very rare.

Miss K. Stanford, a new member from South Africa, and a prominent seedswoman, will make a lecture tour of the United States during the summer of 1936, speaking on "South African flowers," under the auspices of the National Council of State Garden Clubs.

Mrs. Jerome W. Coombs, of Scarsdale, N. Y., member of the committee in charge of preparing the new booklet on "Judging the Amateur Flower Show," published by the National Council of State Garden Clubs, Inc., 30 Rockefeller Plaza, New York, N. Y., sends the Society a copy. Mrs. Coombs is a member of our Society and a sincere Amaryllid enthusiast. She recently returned from a South African garden exploration trip, and has an interesting article on the subject in this Year Book. The judging booklet has a page devoted to the Amaryllis standards of our Society.

The late Henry Nehrling's book "Die Amaryllis", published in the German language, Berlin, 1909, and the outstanding monograph on the *Genus Hippeastrum*, is still available in print from the publishers, Paul Parey, Verlagsbuchhandlung, Hedemanstrasse 28-29, Berlin, SW. at a price of less than $1.00.

Mr. John T. Scheepers of the Fifth Avenue firm of John Scheepers, Inc., leading retail bulb specialists, has been appointed chairman of the membership and exhibition committees of the Society. Mr. Scheepers has probably done more than any other person in recent years in the importation of fine European types of hybrid Amaryllis for exhibition purposes and private collections. He is also prominent in the affairs of the New York Florists Club, the Horticultural Society of New York and is a member of the International Flower Show Committee which supervises the holding of the great spring exhibitions in New York City.

The Las Positas Nursery of Santa Barbara, Calif., Mr. Wm. R. Dickinson, owner, has gone in for nerines, hybrids and species, and will have a stock worked up in another season or so for commercial distribution.

The Federated Circles of the Garden Club of Jacksonville, Florida made a feature of Daylilies (Hemerocallis) at their annual Flower Show on April 30, 1936. Numerous interesting large-flowered and dwarf types were on display. Several of the Amaryllis Society's most active members reside in Jacksonville.

All members in the Pacific Coast area should make an attempt to attend the Fourth Annual National Amaryllis Show in Southern California in the spring of 1937. The Show will be held in the vicinity of Los Angeles. Details may be obtained late in 1936 from Mr. Fred H. Howard, managing director, at Montebello, Calif. Mr. Howard is a vice president of the Society, and a noted rosarian and Amaryllis breeder.

Many Amaryllis growers, amateurs and professionals, complain of their troubles and trials with the "pure white" hybrids. For some reason, perhaps being pure albinos, these are constitutionally weaker than colored types of hybrid Amaryllis. However, we have the following notation from J. W. Byrnes, in charge of the U. S. Department of Agriculture greenhouse collection of Amaryllis at Washington: "We find that pure white bulbs are weaker and are a little slower coming into bloom. We have no difficulty flowering them in two years from seed." That speaks well for the cultural methods of Mr. Byrnes, judging from the writer's experiences with several hundred seedlings from "pure white" seed.

The Society's corresponding member for England, Major Albert Pam, a banker in private life, made a flying trip to the United States in the Fall of 1935, and among other places visited the private horticultural show places of two members of the Society, Mr. Clarence McK. Lewis, New York City and Mr. Pierre S. du Pont, Wilmington, Del.

The Horticultural Society of New York, of which Mr. Henry F. du Pont, Charter Member of the A. A. S., is President, will hold its 29th annual Autumn Exhibition at the American Museum of Natural History, New York City, November 5th to 8th 1936 inclusive. Amaryllid fans should notice Class 14, for Nerines, "collection to cover 50 square feet."

We have the following note from Mr. Robert T. van Tress, Horticulturist of the Garfield Park Conservatory staff, Chicago, originators of the "*Hippecoris Garfieldi*," described elsewhere in this annual: "We are carrying on further hybridizing experiments and have at present some seedlings of a cross between *Hippeastrums* and *Clivia*, and another cross between *Hippecoris* and *Sprekelia formosissima*". When these flower we shall look forward with interest to receiving Mr. van Tress' report on them. There is apparently a greater affinity of genera and consequent greater possibility of bi-generic hybrids in the Amaryllis Family than had been believed.

Characteristic of the great difficulty in obtaining authentic information and plant specimens from some districts in South America is the following quotation from a letter by an American Consul in a South American country, relative to obtaining a list of the bulbs of the Amaryllis Family native to that country: "Although no efforts have been spared to secure information from the Department of Agriculture, it is evident that no botanist or nursery specialist in the government's service can give the desired data on the subject." Therefore the Society particularly urges persons in close touch with the situation to give their cooperation with these problems. We need complete lists of the Amaryllidaceae and Alstroemeriaceae native to Colombia, Bolivia, Chile and Brazil.

Dr. A. B. Stout, the Daylily authority of the New York Botanical Garden, has loaned us color paintings of his new varieties, "Charmaine" and "Theron", being the best of the rosy-pink and the purple black types respectively, of the Hemerocallis novelties of his breeding that have been named to date. These are not yet released commercially, and from the interest already evidenced in them, there will be a colossal demand for them when they are finally ready for sale. In daylilies "the first hundred plants are the hardest." A faster method of commercial propagation will be most helpful.

"I am very interested in the Amaryllidaceae," writes Mr. S. Percy-Lancaster, Secretary of the Royal Agri-Horticultural Society of India, from Calcutta, where he has become the Society's newest corresponding member. However he adds "Here in India there are no keen gardeners who care for any but the temporary annual flowers and a few shrubs". Mr. Percy-Lancaster is the son of the Mr. Lancaster who sent a collection of crinum species to Theodore L. Mead of Oviedo, Fla., many years ago (see Mead Autobiography, page 20, 1935 Year Book). He promises to send the Society some of his *Cooperanthes* bulbs for distribution *(Cooperia* X *Zephyranthes* hybrids).

". . . I am having some fun and am selling some bulbs so I can keep on raising more and can select out the best to keep," writes member Hermon Brown from Gilroy, Calif., (March 3, 1936) and apparently Mr. Brown has the right idea. The enjoyment is the main thing in raising Amaryllids, in private or business life.

"*Haemanthus König (King) Albert* holds its leaves until about January or February," writes C. W. Codwise of Bonita Springs, Fla., "and starts new growth about April 1st. The bud and leaves appear together, the former a little in advance. The large bulbs make one or two offsets a year, and one or two seeds, which are of slow growth. The flower ball is about 8 inches in diameter and very striking, and lasts about two weeks from the first flush. I have to tie them up in the rainy season as they are somewhat top-heavy with their handsome foliage." He adds that blooming size bulbs run from 2½ to 4 in. diameter.

"Amaryllis are being forced in small quantities (in Holland) and are often sold directly to the retailers from the grower," Mr. O. Mohr, of Glostrup, Denmark, informs us, in describing a survey of the winter flower markets of Holland that he made during the season just past. Mr. Mohr is one of the most progressive growers of cut flowers in northern Europe and is corresponding member for Denmark.

For those Amaryllid enthusiasts who find the gorgeous hybrid Amaryllis a little too gorgeous, or not sufficiently intimate, the writer can recommend wholeheartedly two dainty small-flowered Amaryllids that are most charming and intimate, if any bulbs can be that. These are *Leucojum vernum,* the spring snowflake, and *Cyrtanthus lutescens,* one of the Ifafa Lilies of South Africa. The flowers of the *Leucojum* are miniature drooping "bells," one or two to the scape, with green dots on the outside petal tips. The *Cyrtanthus,* apparently, will come to rival the *Zephyranthes* in popularity when better known. *C. lutescens* has tiny tubular

flowers that are pendulous and utterly intriguing. The color is yellow to deep yellow with a cast of orange.

Members of the Society are earnestly requested to renew their subscriptions early in 1937 and take no chances of missing the 1937 "Herbertia", which even at this distance gives assurance of outstanding interest. It will be the issue of issues, devoted to the foundation work of Dean William Herbert with the Amaryllis Family. The 1937 Year Book will mark the centennial of the publication of his famous monograph on the "Amaryllidaceae," now a very rare work. On the continued, and better still, increased support of the members and advertisers will depend the size and format of your Society's issue of "Herbertia" next year (1937). Your generous subscription will help do honor to the original Amaryllid enthusiast. We still hope to have an original colored plate and a cloth binding for the 1937 issue, but this will depend on the response of the membership.

Mr. Ellsworth P. Killip of the Smithsonian Institution, Washington, D. C., has prepared a monograph on the *Genus Bomarea,* sister group of the *Alstroemerias,* and one of four genera in the *Alstroemeriaceae* (see Hutchinson, page 74, 1935 Year Book.) This is a group of considerable botanical and horticultural importance, especially cultivated in greenhouses in England and on the continent, but little known in the United States. English nursery catalogues offer several varieties. The plants are mostly climbing herbaceous perennials and will be more generally grown when better known. Mr. Killip's paper is of technical nature and is awaiting publication. The officers of your Society regret that the financial resources of this organization do not as yet permit us to sponsor the printing of such worth-while monographs as special publications apart from the Year Book. With the aid of special donations this would be possible, and any members willing to undertake the expenses of such an enterprise are invited to communicate with the Board of Directors through the Secretary. It is hoped that a special fund may be inaugurated in a few years for this purpose. The cost of such a publication as Mr. Killip's monograph would probably be between $300 and $500. According to Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian, Mr. Killip's monograph would run to about 75 pages of matter similar in make-up to the "Contributions from the United States National Herbarium."

"I realize", writes Dr. Freeman Weiss, Senior Pathologist of the United States Department of Agriculture (March 22, 1936) "that Amaryllids have pathological problems and that these are not now receiving any scientific attention. There is, of course the well known rust or red spot, (Dr. Weiss' article, 1934 Year Book) but in addition I have seen a root rot and at least two kinds of bulb rots. These troubles may result from mismanagement, but it is often the case that new plant cultures which appear very free from pests and diseases at first, become more and more prey to such as their range of culture is widened and intensified."

The Society is gradually bringing to light old time publications and monographs on Amaryllids. In 1936 we received from Mr. Cecil Houdyshel of LaVerne, Calif., the "Amaryllis Number" of the late John Lewis Childs' magazine,—"The Mayflower," which was published in 1904, and also the 1909 "first and last" Luther Burbank Amaryllis Catalog, from Mr. J. B. Pettit, of Fruitland, Ontario, Canada, postmaster of that town and Amaryllid fancier of many years. What forgotten or neglected publications will it be in 1937?

With the steps already made and the progress going on all the time in *Hemerocallis* breeding, one hardly knows what to expect next. Out of Dr. Stout's laboratory have come some amazing varieties, and the end is not yet. There are *Theron* and *Charmaine,* not to speak of *Vulcan* and Dr. Stout writes that there are still better ones on the way. The very latest is bicolored Daylilies, with alternate petals and sepals in light and dark colors. We draw attention to an excellent article by Mrs. Thomas Nesmith in the June, 1936 House & Garden,

entitled "Daylilies", and Dr. Stout's note in the same number with a picture of one of the new bicolored types. Garden lovers with the inclination should secure the new varieties to keep up with the advances in this wonderful group of plants.

Sr. Joao Dierberger, Jr., a member of the firm of Dierberger & Cia., Rua Libero Badaro, 20, Sao Paulo, Brazil, the foremost nursery, seed and landscaping firm of Brazil, visited the "Herbertia" editor, Dr. Hamilton P. Traub at Orlando in November, 1935. Sr. Dierberger, whose father organized the firm bearing the family name, is a brilliant young horticulturist who has done much for the advancement of horticulture in his native country.

Mr. I. W. Heaton reports that the stock of hybrid Hippeastrum, *War* (Heaton, 1934) has been sold to Max Schling, New York and that the name has been changed to *Mephisto*.

June 1, 1936
Lakemont Gardens,
Winter Park, Florida.

WYNDHAM HAYWARD,
Secretary.

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[1]Deceased May 4, 1936.

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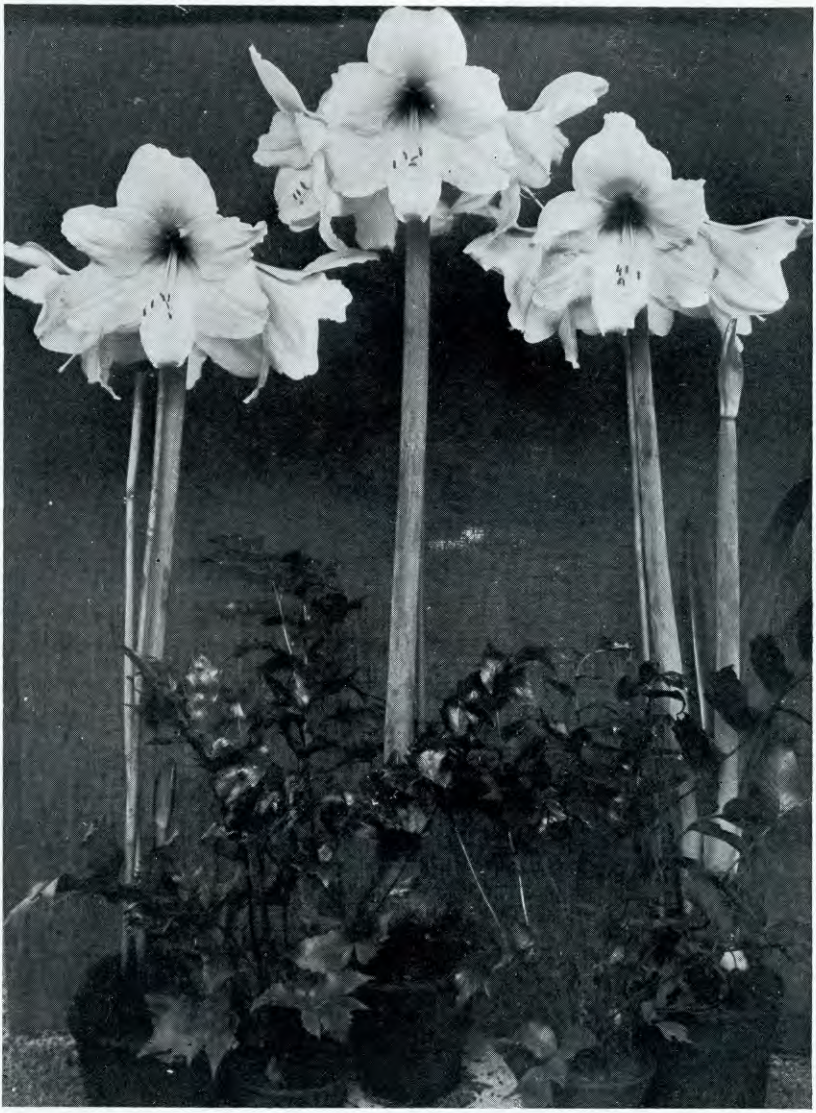
Dr. Hamilton P. Traub, *Florida*
Mr. Al. G. Ulrich, *Missouri*
C. G. van Tubergen, Ltd., *Holland*
Mr. M. C. Varnier, *Florida*
Mr. Frank Vasku, *Florida*
Mr. Leonard H. Vaughan, *Illinois*
Mr. P. Vermeulen, *Illinois*
Mr. R. A. Vickery, *Texas*
Mrs. C. E. Wait, Jr., *Florida*
William T. Walke & Sons, Inc., *Massachusetts*
Mr. L. L. Waller, *California*
Mr. Robert Wayman, *New York*
Mr. L. Webb, *Missouri*
Prof. William S. Webb, *Kentucky*
Dr. Freeman Weiss, *District of Columbia*
Wells Amaryllis Gardens, *Florida*
Mr. Percy E. Wells, *New York*
Mr. T. A. Weston, *New York*
Mr. R. W. Wheeler, *Florida*
Mr. Thomas W. Whitaker, *Georgia*
Mr. C. E. White, *Massachusetts*
Mr. Cedric Wilkerson, *California*
Miss Ellen Williams, *Hawaii*
Mrs. Grace B. Williams, *West Virginia*
Mrs. Millar Wilson, *Florida*
Mrs. Harry M. Wilten, *Texas*
Mr. Floyd M. Wingert, *Florida*
Mr. P. A. Winkler, *Texas*
Mr. Russell S. Wolfe, *South Carolina*
Mr. Arthington Worsley, *Middlesex, England*
Dr. S. H. Yarnell, *Texas*
Mrs. Fred G. Yerkes, *Florida*
Mr. Tadao Yoshioka, *California*
Mr. Cornelis Zandbergen, *New York*
Mr. E. P. Zimmerman, *California*

** Deceased October 1935: membership continued in his memory by his mother, Mrs. H. S. Nicholson, Fort Lauderdale, Florida.



John Scheepers

Scheepers White Hybrid Amaryllis

Leopoldi type B, pure white with light greenish markings in throat, flowers 8″ diameter; exhibited at the Spring Flower Show at Aalsmeer, Holland, 1936.

H. King, Pretoria, Union of South Africa

Cyrtanthus Balenii Phillips

"The coral red flowers of this species may be found in profusion during mid-winter near St. Lucia Bay, a 'wild' area of the east coast of South Africa. The bulbs flower fairly regularly in shallow pans at the Division of Plant Industry."
—R. A. DYER.

1. REGIONAL ACTIVITIES AND EXHIBITIONS

AN INTRODUCTION TO THE SOUTH AFRICAN AMARYLLIDACEAE

R. A. Dyer, Botanist,
Division of Plant Industry,[1] *Pretoria*

The importance of climatic and soil conditions in the cultivation of bulbs has been stressed repeatedly. Both factors vary considerably in different parts of South Africa; for instance, the south western Cape has the rainfall restricted largely to the winter months, whereas this condition changes progressively to a summer rainfall as one advances into Natal, the Orange Free State and the Transvaal. In some localities in these areas the annual rainfall may be 30-50 inches, while in Namaqualand it may be as low as 3-5 inches per annum. Soil and other habitat conditions also vary considerably. Many places are eminently suited to the cultivation of exotic species of Amaryllidaceae such as the *Hippeastrums,* but as far as I know, few if any of these, play an important part in the horticultural trade of this country. On the other hand, largely due to this wide range in habitat conditions, South Africa has been endowed by nature with a very rich flora in which Amaryllidaceae occupy an important position. Many of them were introduced to European gardens during the 17th and 18th centuries. Some belonging to the genera *Nerine, Haemanthus, Cyrtanthus,* etc. have remained favourites ever since. Enthusiam for their cultivation locally increases annually. It is not surprising, therefore, that attention in this country has not been directed more extensively to the science of hybridisation.

The following notes on Amaryllidaceae in South Africa are of necessity very incomplete. The wealth of species will be appreciated by a study of the list compiled by Prof. R. H. Compton, Director of the National Botanic Gardens, Kirstenbosch, and published elsewhere in this volume. At various times recently I have made notes on different species and, when looking over them, I found that most of those I had referred to, had been figured in "Flowering Plants of South Africa." It then occurred to me that this publication might well be available to readers in some convenient library and by consulting it, those interested would find not only beautiful coloured plates but also detailed descriptions and distribution records. This then is my reason, and apology if need be, for the numerous references to this publication, which for brevity have been placed in brackets, thus [t.511] denoting coloured plate No. 511 in "Flowering Plants of South Africa."

The whole of part 1 of Vol. 15 (1935) was devoted to *Nerine* and five of the ten species enumerated were classified as new species, namely: *N. Peersii, N. alata, N. tulbaghensis, N. Breachiae* and *N. filamentosa,* all figured and described by Miss W. F. Barker. The others were *N. flexuosa* Herb., *N. humilis* Herb., *N. Krigei* Barker, *N. filifolia* Baker *var parviflora* Barker, *N. Masoniorum* L. Bolus. While opinions may differ on what plant-forms are or are not worthy of specific rank, it does not detract from their respective horticultural merits. *N. Bowdeni* Watson has proved one of the most successful parents in hybridisation experiments in England on account of its more hardy nature than other Cape species. This inherent quality is no doubt due to the fact that in its native habitat it is subjected to severe frosts and occasional snow during winter. An outstanding species of *Nerine,* closely allied to *N. lucida Herb.* (t. 134) and *N. falcata* Barker, a strong growing pink species (t. 511), occurs in countless thousands in some unfrequented open plains of the Transvaal. A number of the bulbs were brought to Pretoria during 1935 and after one season's cultivation the size of the umbel has increased appreciably. Whether it has potential value for hybridisation remains to be proved, and it is hoped to supply the experimental garden of this Society with bulbs at a later date for such trials. The genus is further illustrated under t. 132, *N. Frithii* L. Bolus and t. 355, *N. sarniensis* Herb., the most widely known species and one of the most handsome.

[1]Dept. of Agriculture and Forestry, Union of South Africa.

A very closely related genus to *Nerine* and nearly as attractive, but not so well known in horticulture, is *Hessea*. Generally speaking, specimens of *Hessea* are not so abundant as those of *Nerine* but during February of this year what is considered to be an undescribed species was collected in the eastern Transvaal and brought to Pretoria with the information that its flowers transformed an area of grassveld into a sea of deep pink. The delicate species *Hessea Rehmanni* Baker (t. 120) has since been transferred to *Nerine* by Mrs. L. Bolus. The two genera are distinguished mainly by the character of the anther attachment, whether basifixed *(Hessea)* or dorsifixed *(Nerine)*. Further the perianth segments of *Nerine* are usually longer, narrower and crinkled along the margin. Other species of *Hessea* figured are *H. Zeyheri* Baker (t. 43) and *H. Mathewsii* Barker (t. 404).

Buphane disticha Herb. is one of the most widely spread species in Southern Africa but never found in mass formation as is often the case with others. It occurs in grassveld areas of high rainfall in the Transvaal and Natal and extends into some karroid areas of the Cape with a relatively low rainfall. The bulb is very large, very thickly protected by the dry remains of leaf bases, and usually partly exposed above ground. Annually, after the flowering period in early spring, two opposite series of leaves grow out in a unique fan formation. The plant has an historic interest also in that it contains a most potent poison, one of the ingredients of Bushmen's arrow poison which caused the death of many an early explorer. On account of this, *Buphane disticha* soon received the common name "gifbol," meaning poisonous bulb. Even at the present time it figures occasionally in court cases of native poisoning and in murder charges.

Ammocharis falcata Herb is another species with a wide distribution according to the existing classification. Some doubt has arisen as to whether it is one and the same species which extends from the drier areas of the Cape into the Orange Free State, Bechuanaland and the Transvaal. Dr. H. G. Schweickerdt, South African botanist, temporarily stationed at Kew, is accumulating data to elucidate this problem. The bulb is very large and produces annually a number of opposite, falcately spreading leaves. The large umbel of bright pink flowers compares most favourably with the larger species of *Brunsvigia*. Seed sets freely and, owing to its water content, germinates almost immediately after bursting from the capsule. For this reason it is problematical whether the seed survives a long sea voyage. Although I have no information on the number of years which elapse before seedlings flower for the first time, I have little doubt that it would be considerably more than for species of *Nerine*, all of which have considerably smaller bulbs.

With regard to *Buphane disticha* and *Ammocharis falcata*, a description of the former appeared under t. 230, but the coloured illustration of the latter was inadvertently placed with it.

Most species of *Crinum* share the horticultural disability of a protracted juvenility. Were it not for this *C. crispum* Phillips, a new species described in 1934, (t. 532) would soon gain widespread popularity. It grows abundantly in some unfrequented parts of the Waterberg and Pretoria districts and is attractive both for the beauty of its large, white or pale pink flowers, and for the unusual "crisped" leaves. A near ally of this is the widely distributed *C. longifolium* Thumb. *Crinum campanulatum* Herb. a species of exceptional beauty, is found abundantly in inland depressions, near Grahamstown, which during the rainy season, become "vleis" (small lakes or ponds). At this period the plants flower, and later when the vleis usually dry up and the soil bakes very hard, the leaves die down and the bulb enters a resting period. So far as I know, it has done poorly under cultivation, except when grown in permanent water.

Cyrtanthus, another typical South African genus, is well represented in "Flowering Plants of South Africa": we have *C. contractus* N. E. Br. (t. 4), a species very closely related to *C. angustifolius* Aiton, which occurs occasionally on the stony and grass covered hills near Pretoria. *C. rotundilobus* N. E. Br. (t. 37) is a smaller species from the grassveld between the Cape and Natal. In the same volume one finds the better known and far more handsome species, *C. sanguineus Hook.* (t. 25) and *C. obliquus* Ait. (t. 35), both from the eastern Cape, the former favouring fairly dry but protected conditions in coastal bush, whereas the latter flourishes in open, often stony grass country. *C. McKenii* Hook. f. (t. 33) originates from temperate situations along river banks in Natal. More recently there have appeared

C. Galpinii Baker (t. 159) and *C. Balenii* Phillips (t. 343), two rather similar species with one medium-sized flower. Trials might prove them of considerable merit. *C. helictus* Lehm. (t. 99) resembles the above two species and would have been an established favourite in gardens many years ago were it not for the difficulty experienced in cultivation. It inhabits areas in the eastern Cape subjected to extreme conditions of heat and drought, the bulbs being found under the protection of small shrubs. In contrast to the requirements of *C. helictus, C. Huttoni* Baker from the same geographical region is restricted to moist, shady cliffs, where the scarlet flowers make a pleasing sight overhanging the road up the Katberg Pass. *C. flava* Barnes (t. 559), with yellow flowers, is the smallest known species in the genus and has been recorded only from the type locally near Grahamstown. It was described first in 1931 in "South African Gardening and Country Life" by Miss Barnes. *C. collinus* (t. 211) is a rare species from the Cape similar to *C. angustifolius*.

The beauties of the bright yellow flowers of the endemic genus *Anoiganthus* represented by the two species *A. breviflorus* Baker (t. 144) and *A. luteus* (t. 539), seem to merit greater attention than they appear to have received. The former is widely spread in marshes at altitudes usually over 2,000 ft. in the eastern Cape, Natal, Swaziland and adjacent territory, whereas the latter is found in the grassveld of Natal below 2,000 feet.

The value of *Haemanthus Katherinae* Baker (t. 136) as a decorative pot plant has been emphasised by other writers and there is no need for repetition. In contrast to the open inflorescence of this species, *H. natalensis* Pappe (t. 32) is one of a larger section with a condensed pin-cushion-like umbel. Both species mentioned may be found under the protection of woods in Natal.

H. sacculus Phillips (t. 531) from the Transvaal has an "open" inflorescence and is the equal of *H. Katherinae* in beauty and would probably respond well to similar methods of cultivation. Some of the pin-cushion type, such as *H. magnificus* Herb, are no less handsome, whereas *H. albiflos* Jacq. (t. 190) is a relatively unattractive example.

Genera such as *Gethyllis* and *Apodolirion*, represented by *A. MacOwanii* Baker (t. 533), are of morphological rather than horticultural interest. The solitary flower, although beautiful, is very fugacious; the young ovary is subterranean but as it matures it is pushed up from below and ripens above ground, giving off a sweet aromatic odor.

The acceptance of Dr. J. Hutchinson's classification of the Monocotyledons (1934) enriches the Amaryllidaceae in South Africa by the two genera *Agapanthus* and *Tulbaghia* at the expense of the Liliaceae. Early botanical writers described about eight species of *Agapanthus*, but Baker in Fl. Cap. Vol. 6, page 402 (1897) classified all known forms under the one name *A. umbellatus*. This name, however, has to give place to *A. africanus* Hoffmgg. which has priority according to International Rules of Nomenclature. Incidentally it was the first plant figured in "Flowering Plants of South Africa". Due to the energies of several collectors within recent years, material from various localities has been accumulated at Kirstenbosch. In the March number of "South African Gardening and Country Life" (1934) Miss Leighton published a short account of the genus. Some of the old names were resuscitated and some new ones added, making a total of eight species recognized at the time with the prospect of more to follow. To impart to readers a more graphic impression than I can give of the beauty of *Agapanthus*, I quote from an article by a different author which appeared recently in the periodical mentioned above. "Our Agapanthus—It grows at its best in the shadows of the kloofs and krantzes of Natal and among the rocks beside the loitering streams. Celestial things borrowing their raiment from the silver blue of summer skies".

Species of *Tulbaghia*, when viewed as individuals, are rarely what might be termed "showy" and to produce an attractive display require to be grown in quantity. *T. fragrans* Verdoorn (t. 438) with an umbel of 30-40 flowers, is probably the most attractive member of the genus and has the additional advantage of a pleasant scent. It was described and figured for the first time in 1931 from material collected in the Lydenburg district, Transvaal. This is another "subject" which I hope to introduce to members of the Society through the experimental garden. It is most nearly allied to *T. violacea* Harv. (t. 9), which, however, has the characteristic garlic smell.

In this brief introduction to Amaryllidaceae in South Africa, many interesting species have escaped mention, outstanding examples being *Vallota speciosa* Dur. and Sch., *Amaryllis Belladonna* Linn., *Brunsvigia spp.* and *Clivia miniata* Regel. (t. 13) During the past six years or so Miss G. Blackbeard, of Grahamstown, has been using the last mentioned species in hybridisation experiments with very promising results. It is intended to refer to her work in the next Year Book, by which time also, I hope to have gathered more information relating to horticultural activities with Amaryllidaceae in this country.

SOUTH AFRICAN AMARYLLIDS

Mrs. Jerome W. Coombs, *New York*

During a trip to South Africa in 1934, I saw in flower many representatives of the Amaryllis Family. South Africa has a great abundance of amaryllids, an abundance in which we have been slow to claim a share. They are plants, too, which almost without exception, may be grown well in this country, out of doors in the south and the warmer parts of the west, in greenhouses and sunrooms in the north, sometimes as summer bulbs. Many will bloom on window-sills.

Freesias of the Irid group have been grown commonly for years. These other South Africans will generally need only the same treatment and will bloom as easily. Many are grown successfully already but they should be much better known. Their principal need is a long rest after flowering under entirely dry conditions. This is very important.

When grown in the colder parts of the country in pots, they will not, as the Tulips and Hyacinths do, need the weeks in a cool dark place for root-making. They start growth at home generally when the rains give them their signal. They need only heat and water to begin their growth. Some of them, possibly, may be slow about blooming but once established, no flowers could be more faithful. Year after year they will produce their lovely, often fragrant blossoms in the same pot. I happen to know of one pot-grown bulb of *Crinum Moorei* which has sent up its stalks of white and pink fragrant lily-like flowers for over twenty years without a break and is still as healthy as ever.

I think the first amaryllids which I saw in South Africa were *Cyrtanthus angustifolius,* with a small umbel of slim, long-tubed, drooping flowers of bright red on a rather long stalk and *Cyrtanthus Mackenii,* with pale cream-yellow flowers. They were growing near a tiny stream, among ferns and are dainty flowers, well worth planting. Further up the stream came later the taller *C. obliquus,* with pendulous flowers of bright scarlet, tipped with green. The long narrow tube of the *Cyrtanthus* flowers would help to identify them. Other good species are *C. collinus, C. O'Brieni, C. carneus, C. parviflorus* and *C. sanguineus.*

Though considered only a weed in its own country, the little bright yellow *Hypoxis stellata var. Gawleri* is pretty. It often avoids the lawn mower and stands up, gay and defiant, about 10 inches high, the starry flowers spread out flat. The white form, with the three outer segments green on the back, is also attractive and *var. elegans,* with a large or small blue-black or purplish spot at the base of the segments, is handsome.

Amaryllis belladonna is a South African native which is said to be hardy in the north if planted deeply. It is well worth cultivating, with its big rose-red flowers on stalks a foot or more high. The south and west know it quite well but it is not at all common in the north. Closely related is *Ammocharis* with its species *falcata* and *coccinea.* I have never seen one in America. They have a many-flowered umbel of open, trumpet-like flowers and *A. falcata* is very fragrant. They have a rather short stem and a crimson globe of flowers. They are odd and attractive. I saw them growing in Natal. They suggest a "gollywog" just a little bit. They would grow out of doors in the warmer regions and in pots in the north or possibly might be grown in the garden in summer, as they bloom rather late.

Another near relative of *Amaryllis belladonna* is the *Brunsvigia* or Candelabra Flower which has a giant cluster of crimson-scarlet blossoms at the end of a long stalk. The cluster is sometimes two feet across, suggesting a candelabra. It is very handsome. The strap-shaped leaves are produced after the flowers. *Brunsvigia Josephinae* and *B. gigantea* are especially fine.

Vallota purpurea, known in South Africa as the Berg or George Lily and in England as the Scarborough Lily, is a fine, lily-like flower, scarlet to dark red, with funnel-shaped flowers. I did not see it growing wild but I hung over a fence at Knysna, a little seacoast resort on the Indian Ocean and admired its beauty in a quaint little garden, it has been grown to some extent in America but might be much better known.

One day in the South African springtime, October, I was in a region which was like the abode of Oliver Herford's yak, "so far from anywhere". I was absolutely alone in a place filled with the ruins of a bygone civilization, a temple and fortifications of vast size and absolutely unknown origin. It is a strange country, almost uncanny. Tall tree Euphorbias grew among the ruins and queer low succulents. Suddenly there was a gleam of brilliant pink and I came on a gorgeous flower cluster. The stem was short, less than a foot long, the leaves had not developed but there were clustered at the end of the stalk in bud and flower, 20 to 30 huge, trumpet-shaped flowers, seven or eight inches long, pink with a crimson line down the outside of the segments and with long prominent stamens. It was a gorgeous sight. The plant was *Crinum forbesianum* and it would lend an exotic air to any flower-show, if it could be brought here. How I tried to bring home some of the enormous bulbs, as big as a person's head and did not succeed, is another story. I hope to get seeds some day. Crinums are lovely flowers and of the easiest cultivation; *C. Moorei* is mentioned above and *C. longifolium* is another good one, with a white, crimson-striped flower. There are many others.

Nerines are becoming more and more popular and never lose their charm. The lovely flowers, pale creamy pink, through coral shades to deep crimson are charming in themselves with their often flattened circle of lily-like flowers which have prominent, protruding stamens, growing at the end of a long stalk. An added attraction is the strange glitter of their surface as if it were set with thousands of tiny mirrors. At night, it looks as if strewn with gold-dust. I saw a delicate, dainty pink one, *Nerine appendiculata,* growing by a stream but in America, the Sarniensis hybrids are the best known. Any of the Nerines will repay cultivation and they are so easy to grow that they will bloom in a pot on a window-sill. I know they will because I have grown them there.

Two very curious amaryllids are *Haemanthus* and *Buphane,* the latter short-stemmed and interesting when it raises its thick stalk and crimson or purple globe of flowers among the grass of the Veld; the former, the Blood or Snake Lily, which shows a mass of bright stamens surrounded by bracts, often brilliant scarlet. It looks rather like a snake with uplifted head. The leaves are queer too. Sometimes there will be only two leaves and they may be nine inches broad and lie flat on the ground. I saw some of these odd flowers growing in a little glade in the Rain Forest at Victoria Falls in Southern Rhodesia. I saw them again in a "kloof" or valley among the mountains of the Cape Province and in other places. I have seen them grown under glass here in America and always there is the feeling that nature sometimes seems to enjoy a joke. The odd ways of these flowers are probably no joke, only a perfect adaptation of the plant to its surroundings but it was always an event to come on their broad, flat leaves or snake-like flowers. It was very delightful to be able to bring back some of the bulbs under a special permit from the U. S. Department of Agriculture.

I saw other amaryllids; *Hessea, Gethyllis, Cyanella* and others and gorgeous masses of the blue and the white, the tall and the dwarf *Agapanthus,* which Dr. J. Hutchinson of Kew now includes among the amaryllids but I must stop here with the reminder that the beautiful flowers of this South African group will well repay us for any care which we can bestow on them.

A. E. Challis

Canadian Government House White Hybrid Amaryllis

NOTES ON THE WHITE AMARYLLIS AT GOVERNMENT HOUSE, OTTAWA, CANADA

A. E. Challis, *Government House, Ottawa, Canada*

During recent years many white amaryllis have appeared on the market. Most of them were lacking in some of the essential qualities which constitute a good amaryllis. In the case of some, the face of the flower was white, but the back was stained with red or pink. Others required one to stretch the imagination to call them white. "Green with a small quantity of white," would more accurately describe many so-called whites. Lack of size in the bloom was the weak point of another class. As lately as 1934 I had three bulbs of white amaryllis sent me from Holland, but so far I have not succeeded in getting a bloom from them that reaches six inches in diameter.

My own experiments have been confined entirely to the whites. This is due to the fact that I have only a very limited amount of space. My aim has been to produce a white with the three essential qualities,—purity, form and size.

The group photograph shows a number of seedlings including two pure whites. In my opinion the one in the lower right hand corner is the best shaped bloom, but it does not possess the vigor of some of the seedlings. Later in the season, two more whites came into flower.

The variety shown in the upper center of the plate has been named *Stansted.* Before this could be recorded, it was inspected by a committee appointed by the Canadian Horticultural Council, and it was on their recommendation that the variety was named and recorded by the Council. The flower shown measured thirteen inches and any person fond of mathematics can easily calculate the size of the flower by measuring the diameter of the stem.

It will be seen that we have secured purity and size, but the third essential quality—form—is still missing. Next spring we hope to flower the first of the progeny of these four white plants. It may be that among these seedlings there will appear one or more which will reach our standard of purity, form and size.

Through the kindness of one of your members, I have had the pleasure of reading the 1935 Year Book of the American Amaryllis Society. May I congratulate all those concerned upon the results of their efforts. Interesting, authoritative and up-to-date, it should prove satisfying to all who are growing amaryllids.

NEWS-NOTES FROM GERMANY

The copy of the very interesting 1934 Year Book has been received, and I shall write a review on it for *Gartenschönheit* and also for *Gartenflora.*

I shall also do my best to secure information concerning the best strains of amaryllis in Central Europe for some notes in a future issue of the Year Book.

Mr. Bornemann, in whom you are interested, died long ago and most of his hybrids have been lost. We do not have at present such good strains in Germany as they have in England and Holland.

Berlin-Charbg, 9,
11. April 35. Camillo Schneider.

* * * * * * * *

At Sans Souci near Potsdam there is quite a good collection of amaryllis. I know Director P. Kache well who has brought it together. I spoke with him about the stock he has. He told me that it does not contain anything new. We have at present no one in Germany who tries to raise new varieties by scientific breeding methods. About 30 years ago or even longer there were two persons in this country who took great interest in amaryllis.

There are no pure white amaryllis at Potsdam. I know them only from England where Mr. Lionel de Rothschild has the best collection I ever have seen. The Holland growers most likely have them also. I have seen the Potsdam-Sans Souci collection almost every year but have not as yet found a really pure white one comparable with what Mr. Rothschild has.

Berlin-Charbg. 9. CAMILLO SCHNEIDER.
17. June 35.

* * * * * * * *

You will be interested to note that Director Lobner at Friesdorf near Bonn a Rh. has made some new amaryllis crossings but the work has not progressed far enough at present for a report. In another season I hope to have more news for the members.

Berlin-Charbg.9. CAMILLO SCHNEIDER.
14. June 36.

NEWS-NOTE FROM BRASIL

Hippeastrum rutilum crocatum has reddish-orange colored flowers with yellow tones and should prove valuable in your breeding work. I secured several bulbs of this species and will make some crosses during the next blooming period which will probably be in November-December. As soon as possible I will send seeds for the American Amaryllis Society Trial Collection. On my next trip to Rio de Janiero, I will make further enquiries about other yellow-toned amaryllis.

9. January, 1936 JOAO DIERBERGER, JR.
Sao Paulo, Brasil.

NEWS-NOTE FROM AUSTRALIA

I have made extensive enquiries about the late John Bidwell, the originator of the Belladonna-Brunsvigia hybrids. He was the Director of the Sydney Botanical Gardens from the early '30's to about 1855, but these dates have not been definitely fixed. I can find no papers by him at the Gardens but am making further enquiries.

"Telopea", Military Road, G. K. COWLISHAW.
Mosman, N. S. W. 17-3-36.

AMARYLLIDS AT THE 23RD ANNUAL INTERNATIONAL FLOWER SHOW, NEW YORK, MARCH 16-21, 1936

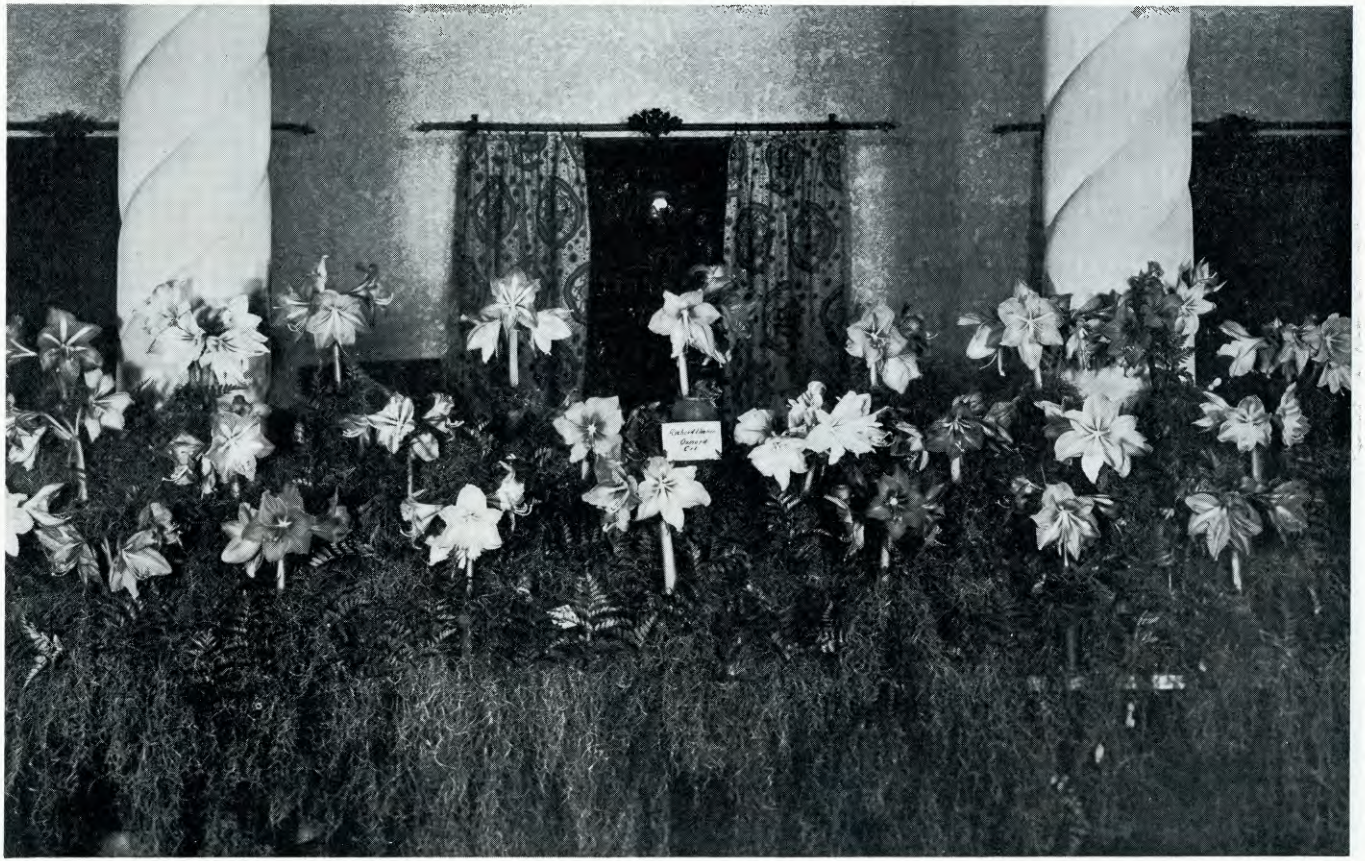
FREDERICK KIRKHAM, *New York*

Amaryllis were strongly featured at the twenty-third annual International Flower Show in New York, March 16-21 of this year, and one of the outstanding classes of the exhibition was the new class for *display of hybrid Amaryllis, 50 sq. feet,* which was added by the schedule committee in recognition of the increasing popularity of this beautiful flower.

The awards in this special class were as follows:

First: Mrs. John M. Schiff, Oyster Bay, L. I., N. Y.
Second: Mr. Rosewell Eldridge, Great Neck, L. I., N. Y.
Third: Mr. Marshall Field, Huntington, L. I., N. Y.

(continued on page 113)



American Amaryllis Society

Richard Diener, Oxnard, Calif., Exhibit, awarded first prize for best display at the Third National Amaryllis Show, Orlando, Fla., April 7-8, 1936

American Amaryllis Society

Heaton Exhibit, Third National Amaryllis Show, Orlando, Fla., April 7-8, 1936

THIRD ANNUAL NATIONAL AMARYLLIS SHOW, ORLANDO, FLORIDA, APRIL 7 AND 8, 1936[2]

H. HAROLD HUME, *Gainesville, Florida*

The third National Amaryllis Show of the American Amaryllis Society was staged in the Chamber of Commerce Building, Orlando, Florida, April 7 and 8, 1936. Thousands of hybrid amaryllis and representatives of many other Amaryllids were displayed. The holding of the exposition was well timed for the most part, and the exhibits were noteworthy both for quantity and quality. Upwards of ten thousand people saw the blooms.

At the first show held in Orlando in 1934, the feasibility of shipping Amaryllis flowers in bud long distances was demonstrated. This was repeated for the 1935 show. Richard Diener's colorful display merited the first place award for a striking showing, the more meritorious because the flowers in bud had come all the way from Oxnard, California.

Noteworthy among the flowers displayed were the varieties of Dutch origin shown by I. W. Heaton. These illustrated the perfection of form and color to which the Holland amaryllis breeders have been able to bring their varieties. Also they emphasized the difference in the ideals held by breeders in Europe and in America.

The awards made in the several classes were as follows:

SECTION A, AMARYLLIS (GENUS HIPPEASTRUM)

CLASS 1, Single entries of *Hippeastrum* species; *Hippeastrum Johnsoni, first,* Frank Vasku; *second,* W. Hayward. *Hippeastrum rutilum crocatum, first,* Frank Vasku. *Hippeastrum rutilum fulgidum, first,* Frank Vasku. *Hippeastrum equestre major, first,* Frank Vasku, *second,* W. Hayward. CLASS 2, Best collection of botanical species and varieties, *first,* W. Hayward; *second,* Frank Vasku.

CLASS 3, best collection of 10 or more Grandiflora varieties (Exhibition types), *first,* I. W. Heaton, Orlando, Florida; *second,* Richard Diener, Oxnard, Calif. CLASS 6, best display, *first,* Richard Diener, Oxnard, Calif.; *second,* I. W. Heaton, Orlando, Fla.

CLASS 10, best bloom in show, I. W. Heaton with Scheepers-Warmenhoven entry, a handsome Leopoldi type A, compact petal salmon shade.

Grandiflora Varieties

Reginae type A (rounded petals), CLASS 201, white without markings, *first,* Wyndham Hayward. CLASS 202, white with slight pale red markings, *first,* I. W. Heaton. CLASS 203, white with lighter red markings, *first,* Wyndham Hayward; *second,* Mrs. W. K. Miller, Orlando, Fla.; *third,* Mrs. R. E. Kline, *fourth,* I. W. Heaton. CLASS 211, orange without markings, *first,* I. W. Heaton. CLASS 212, orange with slight markings, *first, I. W. Heaton.* CLASS 221, red with slight markings, *first,* Mrs. R. E. Kline, *second,* I. W. Heaton. CLASS 223, dark red, *first,* Frank Vasku; *second,* Peterson & Riedel. CLASS 226, rainbow and tricolor types, *first,* I. W. Heaton.

Reginae type B (pointed petals), CLASS 251, white without markings, *first,* Frank Vasku; *second,* Wyndham Hayward. CLASS 252, white with slight pale red markings, *first,* I. W. Heaton; *second,* Frank Vasku; *third,* D. A. Anderson, Orlando, Fla. CLASS 253, white with lighter red markings, *first,* John Springer, Orlando, Florida; *second,* I. W. Heaton; *third,* Albert Stuckie, Orlando, Fla.; *fourth,* D. A. Anderson. CLASS 254, white with lighter red stripes, etc., *first,* Mrs. A. Morton, Orlando, Fla.; *second,* John Springer; *third,* D. A. Anderson. CLASS 255, white with red stripes, etc., *first,* Wyndham Hayward; *second,* John Springer; *third,* Mrs. R. E. Kline, Win-

[2]EDITORIAL NOTE—The committee of judges was constituted as follows,—Mr. H. H. Hume, Chairman, Gainesville, Fla., Mr. A. T. Coith, and Mrs. Geo. M. Bahrt, both of Orlando, Fla.

dermere, Florida; *fourth,* Mrs. A. Morton. Class 262, orange with slight markings: *first,* I. W. Heaton. Class 263, orange with distinct markings, *first,* I. W. Heaton.

Class 266, pale red with distinct markings, *first,* John Springer; *second,* I. W. Heaton; *third,* D. A. Anderson. Class 267, lighter to light red without markings, *first,* Mrs. A. Morton; *second,* Harry E. Searles, Orlando, Florida; *third,* I. W. Heaton; *fourth,* Albert Stuckie. Class 268, lighter to light red with slight markings, *first,* Mrs. R. E. Kline; *second,* Wyndham Hayward; *third,* Albert Stuckie. Class 269, lighter to light red with distinct markings, *first,* John Springer; *second,* Peterson & Riedel; *third,* Harry Searles. Class 271, red with slight markings, *first,* I. W. Heaton; *second,* D. A. Anderson; *third,* Mrs. A. Morton. Class 272, red with distinct markings, *first,* Wyndham Hayward; *second,* Mrs. A. Morton. Class 273, dark red, *first,* John Springer; *second,* Frank Vasku; *third,* Mrs. B. A. Dominick, Orlando, Florida; *fourth,* Harry Searles. Class 277, any other color (strawberry red), *first,* Wyndham Hayward.

Leopoldi Type A, (compact petals); Class 302, white, with slight pale red markings, *first,* I. W. Heaton. Class 318, lighter to light red with slight markings, *first,* I. W. Heaton. Class 319, lighter red to light red with distinct markings, *first,* Wyndham Hayward. Class 321, red with slight markings, *first,* Wyndham Hayward. Class 326, rainbow and tri-color types, *first,* Mrs. A. Morton.

Leopoldi Type B, (pointed petals); Class 353, white with lighter red markings, *first,* I. W. Heaton. Class 363, orange with distinct markings, *first,* Mrs. R. E. Kline. Class 368, lighter red to light red with slight markings, *first,* I. W. Heaton. Class 369, lighter red to light red with distinct markings, *first,* I. W. Heaton. Class 371, red with slight markings, *first,* Frank Vasku.

Decorative Types (new class, size no object); Class 51, white without markings, *first,* W. Hayward. Class 52, white with slight pale red markings, *first,* I. W. Heaton; *second,* Frank Vasku; *third,* W. Hayward. Class 53, white with lighter red markings, *first,* I. W. Heaton; *second,* Peterson & Riedel. Class 63, orange with distinct markings, *first,* W. Hayward; *second,* John Springer; *third,* Peterson & Riedel. Class 68, lighter red to light red with slight markings, *first,* John Springer, *second,* W. Hayward; *third,* D. A. Anderson; *fourth,* Mrs. R. E. Kline. Class 72, red with distinct markings, *first,* Wyndham Hayward; *second,* Harry Searles; *third,* D. A. Anderson, *fourth,* Mrs. B. A. Dominick. Class 76, rainbow and tricolor types, *first,* Wyndham Hayward, *second,* Albert Stuckie. Class 77, any other color, *first,* Mrs. R. E. Kline, *second,* W. Hayward.

Grand Prize, First Class Certificates, etc.

Grand prize (hybrid Amaryllis), *for most points,* I. W. Heaton.

First Class Certificates, (awarded for meritorious new varieties as worthy of naming and propagation for introduction) I. W. Heaton, 8 certificates; Richard Diener, 4 certificates; Wyndham Hayward, 4 certificates; John Springer, 3 certificates; Frank Vasku, 3 certificates; Mrs. R. E. Kline, 2 certificates, for floral arrangement and for culture (bulb exhibited with four bloom scapes); Mrs. A. Morton, 1 certificate.

Awards of Merit, to Richard Diener, for display of California grown hybrid Amaryllis shipped by air express; to I. W. Heaton and Heaton Bulb and Palm Co., for decorative display of Florida-grown hybrid Amaryllis.

Best Bloom awards, in various types: *Reginae Type A,* I. W. Heaton; *Reginae Type B,* Frank Vasku; *Leopoldi Type A,* Frank Vasku; *Leopoldi Type B,* I. W. Heaton; *Decorative Type,* Wyndham Hayward.

SECTIONS B, C, AND D

Class 501, Hemerocallis, (Day Lily) hybrids, *first,* Wyndham Hayward, with "Midas" (Stout) and "Chrome Orange" (Mead), *Honorable mention,* E. L. Lord, Orlando, Fla., for display of hybrids including "Sovereign", "Estmere," etc., on second day of Show. Class 801, Crinums, (a) hybrids, *first,* Wyndham Hayward, with "Cecil Houdyshel" (Houdyshel) and "Peachblow" (Mead). (b) Species, *first,* Wyndham Hayward, for *Crinum Kunthianum; second,* Dr. H. P. Traub, for *Crinum*

Asiaticum. CLASS 851, *Zephyranthes; first,* W. Hayward, *for Z treatiae.* CLASS 901, *Clivia miniata hybrids, first,* Wyndham Hayward. CLASS 1001, *Hymenocallis occidentalis, Honorable mention,* W. Hayward. *Eucharis grandiflora, first,* Frank Vasku; *second,* W. Hayward.

* * * * * * * *

A few comments from the judges, A. T. Coith, Orlando; Mrs. George M. Bahrt, Orlando; and H. Harold Hume, Gainesville, Florida, may not be out of place,—

More space to afford open arrangement of the specimens would be highly desirable. Each class should, if possible, be shown distinct and apart from others. This would result in a more beautiful display from the standpoint of the exhibition as a whole.

Would it be well to give greater regard to the number of flowers borne on the scape with emphasis upon those bearing four blooms or more? It would appear advisable for breeders to establish this number as their minimum.

Is there such a thing as having blooms too large? We incline to the belief that the future of the amaryllis hybrid group will be best served by stressing form, color and artistry rather than size. Flowers of too large size may even affect injuriously the popularity of these plants. It is possible that size may accentuate defects without increasing the value of good points in blooms.

It is our belief that the decorative value of flower form should be emphasized more strongly. As an instance of this, there appears to be an appeal in the flowers of *Hippeastrum rutilum* varieties in separated petals and upturned blooms that may have distinct value. Too great formality in the flowers may result in lack of interest, such as happened with Camellias a number of years back.

For the Show as a whole and in the interest of the entire undertaking, flowers of many lovely amaryllids and related plants, absent from the 1936 exhibition, can well receive attention to the end result of a larger and more varied display. We refer to Hymenocallis, Crinum, Zephyranthes, Sprekelia, Alstromeria, Clivia and Hemerocallis, to mention only a few. It might even be worth while to consider holding a secondary show for those that cannot be brought into flower for March or April staging.

Those who undertook the planning and holding of the 1936 Show are entitled to great credit for the excellence and variety of the exhibits and for the work they did in the interest of fine plants and good gardens.

AMARYLLIS FLOWERS SHIPPED FROM COAST TO COAST

I. W. HEATON, *Florida*

In connection with my duties as manager of the Third National Amaryllis Show, I had the pleasure of receiving and handling Mr. Richard Diener's exhibit of hybrid amaryllis. These flowers were cut, packed and shipped from Oxnard, California on Thursday, April 2nd. Traveling by air express, the shipment was delivered to me by the local express agent at 1.30 P. M., April 4th. The blooms were taken to our packing shed, stems were cut, and scapes placed in cool water, each stem standing upright, where they remained in the open air. On Monday they were removed to the exhibition hall to be staged. These flowers had been shipped dry, three scapes tied in a bunch. They arrived in good condition with one exception. In every case the first two buds had tried to open in transit and for this reason the flowers were twisted, facing upright. When staged the stem was inclined to correct somewhat the upright position of the flowers. Only one suggestion for improvement could be offered. If the blooms had been cut one day earlier in development, they would not have opened in the packing case. The size of the flowers might be slightly smaller if cut earlier but would be in better condition for exhibition with the flowers in normal position on the scape.

THREE AMARYLLIS SHOWS

MRS. GEORGE M. BAHRT, *Florida*

Exhibited at each of the amaryllis shows held at Orlando, were quantities of clear bright blossoms banked in *Asparagus plumosus* and set off by graceful palms. At each show the arrangement of these blooms was similar and the general effect was essentially the same. Each year however, as a result of the strides made in amaryllis culture—production of new varieties of unusual coloring and more perfect specimens—a keener delight and enthusiasm was experienced.

At the 1934 First National Show most of the blooms were white with red markings, or in various shades of red, and the flowers were arranged with such care that the shades graded into each other very harmoniously. The reds so dominated the show, however, that the pure white and the copper gold entries stood out as conspicuously as if they had been framed.

In 1935, at the Southeast Regional Show, there were fewer flowers exhibited, but a number of very fine specimens, especially of the Leopoldi type were shown. On the whole there were more entries other than red than were displayed the previous year. The Aztec Lily *(Sprekelia formosissima)* was exhibited for the first time at these shows and it attracted a great deal of attention because of its peculiar orchid-like shape.

The Third National Show held this year was even better than the two previous shows. There was a tendency to replace the more common reds so dominant the first year with the more pleasing and striking shades of red. Pure white, white with distinctive markings, bronze and orange colors were more in evidence than before. Although outnumbered by the Reginae type, the Leopoldi type as a whole outclassed them in real beauty. Some of the perianths were so rounded that they gave the appearance of orbicular instead of star-shaped flowers. The exhibit of the Reginae type from Mr. Diener in California deserves special mention. Because of the mammoth well formed and beautifully marked flowers of fine texture, they typify varieties other than the Leopoldi type which may have considerable artistic and ornamental value.

A third type known as the "Decorative" was introduced for the first time this year. It differs from the other types in that the size of the bloom is not considered of primary importance. The recognition of this type added greatly to the show since it brought in flowers of unusual texture and color which otherwise might not have been entered because of size limitation.

To-date flower arrangement has not been a feature of the show but the Decorative type would furnish excellent material for it. Flower lovers everywhere are becoming interested in artistic floral arrangement to show off the beauty of the flower to the best advantage, and as the amaryllids are becoming more and more popular each year it seems appropriate that some space be set aside at future shows for artistic arrangements of amaryllids in bouquets for both homes and public places.

THE 1936 AMARYLLIS SHOW OF THE BUREAU OF PLANT INDUSTRY, U. S. DEPARTMENT OF AGRICULTURE

The twenty-third annual Amaryllis Show of the U. S. Department of Agriculture was held at the Department Greenhouses, Fourteenth Street and Constitution Avenue, N. W., Washington, D. C., from March 19 to March 26, 1936, inclusive, being open each day from 9:00 a. m. to 9:00 p. m. The display was viewed by 28,387 people, including classes from public and private schools, members of garden clubs, and out-of-town as well as local florists and commercial growers.

The exhibition comprised 1,260 amaryllis bulbs, each of which bore two or three flower stems, some more than two feet long, with from two to seven flowers on each stem, making a display of several thousand flowers ranging in color from dark velvety red through various shades of red, pink, orange, yellow-orange and striped

U. S. Department of Agriculture

White Amaryllis at the 1936 U. S. Department of Agriculture Amaryllis Show

U. S. Department of Agriculture

Amaryllis Show, U. S. Department of Agriculture, March 19-26, 1936, Washington, D. C

types to pure white. A number of the blooms measured eleven inches from tip to tip.

The plants were arranged in the exhibition house on two side benches and on a center elongated pyramidal staging. Small pots of *Vinca major* with rounded grey-green leaves edged with white were placed between the pots of amaryllis to form a pleasing combination with the pointed dark green leaves, thick silvery green flower stems and clear bright blossoms of the amaryllis. Several large pots, each containing a group of bulbs in flower, were placed along the ridge of the center staging to provide accent notes.

The bulbs in the Department's collection of amaryllis are hybrids resulting from many years of breeding conducted by Department of Agriculture experimenters since 1909 when twelve varieties were imported from England. The Amaryllis Shows are exhibitions of the results achieved by the Department in one of the many phases of its work to produce improved forms. Department workers with amaryllis have successfully endeavored to obtain longer stems, new shades and larger flowers. The white amaryllis was produced through successive selection and cross-pollination of striped flowers showing the most white. A group of seedlings, flowering for the first time this spring, revealed new subtleties of color, particularly in the pink and red shades.

The Department has held an Amaryllis Show each year since 1912 with the exception of the years 1914 and 1915.

DAFFODIL NOTES

Miss Mary McD. Beirne, *Virginia*

The Editor has reminded me of a promise to continue some Daffodil notes, begun in the Amaryllis Year Book for 1935.

He writes that his copy has already gone to press. So the best apology to be made at the moment, is a hurried dispatch, listing popular entries, observed at our Spring Narcissus shows.

The author visited or judged exhibitions of narcissi during the past season, in several sections of Virginia, as well as in the states of Maryland, Pennsylvania and New York. Popular opinion therefore, may thus be interpreted, through expressions from this particular section of the country.

Among Yellow Trumpets, *Aerolite* is still a favorite and will continue, in all probability, to replace many older varieties, as it becomes available. The two *King Alfred* seedlings *Warwick* and *Matamax* appear close competitors; while *Lord Antrim* is invariably shown in fine form. Its great height and good even color never fail to excite interested comment from visitors.

In the classes for White Trumpets, it is significant that the far-famed *Beersheba* is gradually giving place to more vigorous types of plants, such as *Everest, La Vestale* and the semi-dwarf *Mrs. John Bodger. Kantara* does not seem to develop, in this country, the high quality necessary for show, which it exhibits abroad.

Askelon is another White, which has not become sufficiently acclimated, to achieve the distinction promised for it. But there are many more better varieties on their way.

Penquite, with neat yellow perianth and richly colored golden orange cup, deeply frilled at the margin; *Diolite*, a very large show flower with crown of light yellow, slightly reflexed perianth and deep orange rim to the cup, were two grand Incomparabilis noted.

Porthilly is a bit disappointing to those who anticipated a more sensational flower. But very possibly, this may be due to the vagaries of the past season.

Killigrew showed itself, as always, of the same high quality both in color and form.

Of the Bicolor Incomparabilis, *Adler* continues a favorite. The flower is purest white with beautifully proportioned cup of chrome yellow, deeply frilled tomato color at the edge.

L'aiglon, a star-shaped beauty of soft creamy white is adorned with a scarlet-orange rim; while *Clava* remains distinct and outstanding because of clean cut colors, petals purest white and a bowl shaped shallow crown of clear bright yellow.

In the Barrii section *Alcida* appears ubiquitous and unfailing in popularity; a giant of creamy color with a telling blood-orange frill.

Seraglio, an exceptional beauty in this same class, is almost as important as the incomparably lovely *St. Egwin,* a tall, large clear self-yellow show flower of the highest quality.

Among Bicolor Barrii, there seems little to approach *Hades,* in the depth of the warmth of its fiery colored crown. Also one is startled by the beauty of the Brodie's *Forfar,* with purest white perianth and an all red cup.

Ely Ney has the whiteness of a poeticus with crown of lemon yellow, edged deep blood red.

In the Leedsii section, there are few flowers finer than the great *Giant Tenedos,* now moderately priced. *Gracious,* Van Leeuwen's creation is another remarkable and distinguished variety of its class. *Daisy Schaffer, Marmora* and *Grayling* are all blue ribbon candidates, possessing alike the finer qualities of distinction and form.

Nelly, Distingue and *Pucelle* are beautiful varieties among short-cupped Leedsii. *Pucelle* is possibly the most rarely seen of the group. It was this flower which we said last year, is always spoken of abroad, as the White *St. Egwin* and *not Nelly,* as quoted through typographical error.

NATIONAL AMARYLLIS SHOWS FOR 1937 AND 1938

The Board of Directors at its Spring meeting awarded the fourth or 1937 National Amaryllis Show to Southern California, and the fifth or 1938 Show to New York City.

The arrangements for the 1937 Show will be made by Mr. Fred H. Howard, Vice-President of the Society. This will be the year of the centennial of Herbert's Amaryllidaceae, published in 1837, and in honor of the author, the William Herbert Medal, the highest award of the Society, will be awarded for the first time. For details about the Show write to Mr. Fred H. Howard, Montebello, Calif.

Mr. John Scheepers, Chairman of the Exhibitions and Awards Committee, will be in charge of the fifth or 1938 National Amaryllis Show to be held in New York City. Mr. Scheepers will make detailed announcements later through the 1937 Year Book and the horticultural and local press.

SOUTHEASTERN REGIONAL AMARYLLIS SHOW IN 1937

The 4th. Southeastern Regional Amaryllis Show will be held in early April of 1937 in Florida. The Show will be managed by Mr. I. W. Heaton, member of the Exhibitions and Awards Committee for the Southeast. Announcements will be made through the local and horticultural press.

2. COLOR DESCRIPTION

PHOTOGRAPHING FLOWERS IN NATURAL COLORS

AUGUSTUS WOLFMAN,

E. Leitz, Inc., New York, N. Y.

It is indeed very desirable to the individual engaged in the study of plant life and flowers to obtain photographs of the various specimens he studies, and it would be of much greater value if the latter could be reproduced in their natural colors. Systems which make color photographs possible have been available for some time, but these systems have been cumbersome to handle, requiring a relatively long exposure, and the use of a large number of filters to correct the unbalanced color sensitivity of the emulsion on the film or plate, various conditions of light requiring the use of the different filters.

Now there is available the Dufaycolor process which employed in conjunction with the Leica camera makes the taking of natural color pictures of plant specimens a simple matter. The relative speed of this film is about the same as that of ordinary roll-film such as the Eastman N. C. Roll-film, opening up many possibilities in the taking of color pictures.

Before going into further detail about this process it would be well to review some facts upon which a color process is dependent. White light (daylight) consists of all the visible colors of the spectrum, and for practical purposes is divided into three primary colors, red, green, and blue. White light is obtained by a mixture of these three colors, whereas other colors are obtained by various mixtures of them, as, yellow light is produced by a mixture of red and green light, magenta by mixing red, and blue, etc.

The essential feature of Dufaycolor film, upon which the process is dependent, is a screen or pattern on the base of the film consisting of microscopic lines and squares composed of the three primary colors. In use the film is loaded into the Leica camera with its base side, rather than the emulsion side towards the lens. This is contrary to the usual practice wherein the emulsion faces the lens.

The light coming from the lens first passes through the color screen then reaching the emulsion, affecting the latter. Each line and square of color acts as a filter producing on the emulsion directly behind it a record of its color. The strength of the individual record behind each line or square is dependent upon the amount of the color of the square or line in the subject.

The film is first developed as a negative; the negative is then bleached out leaving the emulsion which has not yet been affected by light. It is treated with a clearing bath after having been bleached, and then exposed to light and again developed, the result being a positive. The film is now fixed and hardened in the usual manner. After washing, the film is dried, presenting a transparency exhibiting the subject in its natural colors.

The formulas for processing Dufaycolor film are as follows:

Formulas can be mixed in smaller quantities as required.

1. First Development

Metol	16¼ grams
Hydroquinone	5 grams
Sodium Sulphite (dry)	125 grams
Potassium Bromide	7 grams
Sodium Carbonate (dry)	87 grams
Potassium Thiocyanate	22½ grams
Water up to	2,500 cc

Dissolve all chemicals in the order given, cool to 65° F.
Development time in the above bath with correctly exposed subjects: 3½ minutes at 65° F. (This developer will keep in a tightly stoppered bottle or in case a tank is used, use a tight fitting cover.)

2. Wash 2 minutes.

3. Bleaching Bath (Reversing)

Potassium Permanganate	3 grams
Sulphuric Acid	10 cc
Water	1000 cc

Bleach until image is clearly visible, time about 4 minutes. Bleaching is completed when the image is clear and there is no veiling. A weak light can be turned on after 2 minutes for inspecting the film.

4. Wash for about 2 to 3 minutes in running water.
5. Rinse for 2 minutes in following clearing bath.

Clearing Bath: 2½% of Sodium Bisulphite

Sodium Bisulphite	25 grams
Water	1000 cc

6. Wash 3 minutes after clearing.

7. Expose film to strong artificial light (100-watt bulb) for about 3 to 4 minutes. Then the film is redeveloped in any good metol-hydroquinone bath. The following may be used: (Film can be underexposed but not over)

Metol	4 grams
Hydroquinone	18 grams
Sodium Sulphite (dry)	200 grams
Potassium Bromide	4 grams
Sodium Carbonate (dry)	75 grams
Water up to (at 125° F.)	4000 cc

Time of final development: 3 to 4 minutes at 65° F., or even 6 minutes if required. When image is thoroughly darkened, development is complete.

8. Rinse thoroughly (2 to 3 minutes)

The film is now fixed and hardened and given a final washing. Use weak acid fixing bath—wash in running water 20 minutes—wipe dry with cotton or a viscose sponge in order to avoid water marks.

Dufaycolor Film is provided for the Leica camera in daylight loading and unloading spools containing enough film for 30 exposures. As has been mentioned the emulsion is so well balanced in color sensitivity that no filter is required in ordinary daylight photographing. However when photographing distant views in which case there usually exists an abundance of ultra-violet light, to which the film is very sensitive, a U. V. (ultra-violet) is employed. With Photoflood or Photoflash illumination it is necessary to employ the Dufaycolor No. 1-A filter to eliminate some red light, for this illumination contains a larger proportion of red light than daylight. The Dufaycolor No. 1-B filter is used for ordinary mazda light. This filter has the ability of holding back a greater amount of red light than the 1-A filter and is employed in this case because ordinary mazda light contains a greater proportion of red than Photoflood or Photoflash illumination. When employing an exposure meter the film speed at which the latter is set for Dufaycolor film is 16-degrees Scheiner.

With the use of the Sliding Focusing Copy Attachment which the Leica camera accommodates greatly enlarged color photographs (macrophotographs) of a specific part of a flower, etc. can be taken. This will reveal minute detail not visible on normal inspection, and will also exhibit the color of the enlarged section. Stereoscopic color photographs can also be taken with the Leica camera in conjunction with the Stereoly Attachment, so that the subjects will be seen in their full depth as they exist in nature, and in addition with the color imparted to them through the use of Dufaycolor film. The subjects will appear in the stereoscopic pictures practically in the same way as they are normally seen.

It is quite evident from the brief description of Dufaycolor film that when employed with the Leica camera and its various accessories, it affords the individual interested in plant life an invaluable tool for obtaining records of various specimens.

In addition it must be borne in mind that the Dufaycolor film preserves the natural color of the specimen. At present it is only possible to produce color transparencies with this process, which may be viewed by transmitted light, or can be projected on a screen with the aid of one of the special Leica projectors. However many experimenters are working on the production of actual color prints through the use of Dufaycolor Film and one may expect that in the future color prints will be available.

THREE-COLOR, ONE-EXPOSURE CAMERA [1]

The customary method of making a set of colour-separation negatives for colour photography is by successive exposures on separate plates through the appropriate colour filters. Usually three negatives are required. This method fails for snapshot exposures of moving objects. For many years inventors have attempted to devise three-color cameras operating with a single exposure during which all three images are simultaneously recorded. Several of the optical devices which have been used to achieve this end were briefly described by Dr. D. A. Spencer in 1933 *(Photog. J. 74:103.1934)* and a further method was described in 1934 *(Ibid. 74: 244.1934)* by the late W. T. P. Cunningham.

One of the less difficult methods depends on the use of two inclined, semi-reflecting, plane mirrors. Light from the camera lens strikes the first mirror and a portion of it is deflected to form an image on one of the photographic plates placed behind its suitable colour filter; the remainder of the light goes on and meets the second mirror, which deflects a portion on to the other plate, and the remainder goes on to the back of the camera where the third filter and plate are situated. One objection to this method is that reflection takes place at both surfaces of each mirror and if the mirrors are thick, double images may be formed. This has led to the use of thin pellicle mirrors which are said to have been suggested by Geisler so long ago as 1910 *(see Spencer, loc. cit.)* and have recently been made as commercial articles by Mr. H. O. Klein. It is said that other ways of avoiding double images with this general arrangement of semi-reflecting mirrors are also available.

The method has therefore led to considerable practical success and at present there are available two cameras which make use of it. These were both shown at the recent British Industries Fair. One is the Taylor-Hobson three-colour camera (Vivex system) and the other is the Klein tri-colour camera invented by Adrian B. Klein and manufactured by Messrs. Bellingham and Stanley, Ltd. These cameras are said to work successfully to give exposures ranging from 1/25 sec. to 1/10 sec. in winter sunshine. Inquiries about these cameras should be addressed, in relation to the first to Colour Photographs, Ltd., Victoria Road, Willesden, N. W. 10; and in relation to the second to Messrs. Farquhar and Maloney, 15-16 Newman Street, London, W. I., or to Messrs. Bellingham and Stanley, Ltd., 71 Hornsey Rise, London N. 19.

COLOR PRINTS BY THE EASTMAN WASH-OFF RELIEF PROCESS

Under date of June 2, Mr. R. P. Meinhard of the Eastman Kodak Company, Rochester, N. Y., writes with reference to color prints by the Eastman Wash-Off Relief Process,—

"The process yields prints of great beauty and accuracy, and has created unusual interest throughout the country. It requires considerable technique, but we judge your group would be equal to it, and the results are very much worth while. I expect shortly to have a print of a picture made at a recent flower show. I believe that the subject will be of particular interest to the Amaryllis Society, and, if possible, I shall send it to you for your inspection."

The process is described in detail in *Studio Light,* 27: 4-8. 1936, published by the Eastman Kodak Company, from which the following brief statement is quoted,—

"A prolonged study of existing processes of making three-color prints on paper

[1] Nature, 135: 479. 1935.

has been made . . . . with the result that satisfactory materials and working instructions for a thoroughly practical process have been available to color photographers for about two years.

"The process selected for its distinct advantages over other processes previously employed was that in which relief images are formed on transparent supports, dyed with water-soluble dyes, and the dye images transferred to paper.

"The advantages are the ease with which the print quality is controlled, the opportunity of making duplicate prints at low cost by redyeing the same relief images, and the possibility of printing on a variety of available paper surfaces. Transparencies can also be made by superimposing the dyed relief images instead of transferring the dyes to paper."[2]

THE FISCHER COLOR CHART

The Fischer Color Chart, published by the New England Gladiolus Society, was adopted as the official standard by the American Amaryllis Society in 1933, and since that date the Publishers have kindly agreed to offer this very valuable Chart mounted on heavy cardboard to members of the American Amaryllis Society at $2.00. Send orders to your Secretary, Mr. Wyndham Hayward, Winter Park, Florida.

R. H. S. HORTICULTURAL COLOUR CHART[3]

The Royal Horticultural Society, Vincent Square, London, S. W. I., has decided to publish a Colour Chart for Horticultural purposes. With this in view a Committee has been appointed to collaborate with Mr. Robert F. Wilson, Art Director of the British Colour Council.

It is pointed out that the utility of this Chart need not necessarily be restricted to horticultural purposes, but it will be useful for all purposes where colour is employed, either by the amateur, professional or trade: be it for paints, textiles, printing, etc., etc.

The successful production of such a Colour Chart is governed by the following factors:

(a) That it must be in a handy form:
(b) That the range of colours must be sufficient:
(c) That the book must be cheap.

After examination of the *Repertoire de Couleurs* (Oberthur et Dauthenay) and *Ridgway's Colour Standards* (both books out of print), it is thought possible to produce a book containing a hundred colours, each with four tones, making a total of 400 tones, which would serve a very useful purpose to all gardeners and lovers of flowers. In proportion to the popularity and success of this proposed Chart, it is the intention to produce a supplementary section of a further hundred colours, giving a further 400 tones, which would be so prepared as to be easily interpolated in the first section, making two volumes with a total of 200 colours and 800 tones. The volumes will be Royal Octavo and the plates either loose in the cover or held on a loose-leaf binding system. The descriptive matter on each plate would consist of the name of the colour, that is, the standard name given by the British Colour Council, being the name applied to the colour for whatever purposes the colour may be used in any and every business. These names will also be rendered in French, German, Italian and Spanish: a reference to such of the tones as correspond with those of the

[2]EDITORIAL NOTE—The color print referred to above was received by the editor, and it proved to be a most wonderful art object. The subject is a display of red roses in a tall wicker basket set against a colorful stone garden or patio wall. The tile floor in the fore-ground has rich tones, and brilliant tulips in flower are on either side at the base of the flower container which in itself is an object of great beauty. This gives only a very inadequate word description of a very colorful subject.

[3]This announcement was received from the Secretary of the Royal Horticultural Society and is given in full for the benefit of the members.

Repertoire de Couleurs, Ridgway's and *Ostwald's Colour Standards:* and the colours and tones described by flowers and plants well known throughout the horticultural world.

The first volume of 100 colours, in four tones, has been estimated at 10/- per copy, a price which it is thought should be popular. It may be presumed that the second volume can be produced at the same price.

It is, however, essential that some idea of the edition should be ascertained. Those interested in the publication of the chart may notify the Society of their willingness to support the proposal. It must be borne in mind that, should the anticipated demand be exceeded, it might be possible to reduce the price and thus make the Chart of more universal and of greater value.

Every endeavour will be made to produce the first section during 1936 or early in 1937, and active preparations will be carried on for the issue of the second volume should the demand justify it.

USE OF THE FISCHER COLOR CHART IN DESCRIBING HYBRID AMARYLLIS

I. W. Heaton, *Florida*

A complete description of amaryllis flowers must contain not only the classification of form and type but also an accurate description of color, based upon a standard chart and thus eliminating the common indefinite color designations, pink, salmon, flame, etc., and substituting a definite color value.

The Fischer Color Chart dividing the three primary colors, into the six spectrum colors and subdividing each of these into the intermediate hues, greatly simplifies finding the true color index. The chart is further simplified by each intermediate hue being separated into six sections, each designating a degree or depth of color. Thus beginning with red we have from the middle circle outward the following values,—Red, Light Red, Lighter Red, Lightest Red, the latter two being commonly called pink. Inward from the same point we find Dark Red and Darker Red. Adjoining the red segment on the right is Orange Red, and on the left Violet Red, which complete the red segment. Next on the right are the Red Oranges, followed by Orange and Yellow Orange, while to the left range Red Violet, Violet and Blue violet. These intermediates are always designated by the predominating color, Orange Red which is basically Red with an Orange cast. The actual use of this chart is much simpler than the description. Use a small section of the petal, being certain the color extends definitely to the edge. A glance will decide which segment of the chart contains the basic color. Beginning with the darker shades advance the petal over the face of the chart toward the outside lighter tones, until the correct color value is found. If the correct tone cannot be matched upon the chart, then the imagination must be used to determine the indefinite color variations between any two segments of the chart. For example we find our flower is red, but does not correspond to the red section of the chart, being lighter than the red but darker than the light red section. This shading is described by using the terms Red to Light Red, indicating a degree of color lighter than Red but darker than Light Red. The so-called Salmon shades may involve a transverse description between two chart segments. Following the color segment outward we find it does not match the Lighter Orange Red, but contains too much Red to fit the Red Orange section. This value would be designated by the description Lighter Orange Red to Lighter Red Orange. As an example, a complete description of an amaryllis may be clearly given as follows,—"Eight inch compact leopoldi type, Light Red to Light Violet Red, darker veins and narrow yellow keel."

EFFECT OF AMOUNT OF LIGHT ON AMARYLLID FLOWER COLOR

HAMILTON P. TRAUB, *Florida*

During the three day Southeastern Regional Amaryllis Show at Orlando, Florida, April 3-5, 1935, the effect of the amount of light on amaryllid flower color was plainly demonstrated. The noticeable changes were in *hue* and *value* but not in *purity*.[4]

Unfortunately the judging was delayed until the third day. By that time some remarkable color changes had taken place. In some cases, white flowers which normally would have shown very slight pink markings when expanded in full sun light or even in half shade, opened during the third day entirely white. Some types of white amaryllis which would have had a greenish throat under normal conditions were pure white. These were evident changes in color *hue*. Medium reds, under normal conditions, opened on the third day as lighter reds indicating a change in color *value*.

In recognition of the facts stated above, the Special Committee on Nomenclature and Description recommended for 1936 and 1937 that all amaryllid flowers put on exhibition be expanded in not less than half full sunlight prevailing at the season. It was fully realized that the number of sunny hours per day or even the sunny days would vary for different seasons or for various sections, and would not lead to strictly comparable results at the various shows. Such a minimum standard, however, would eliminate any attempt at "nature faking" by the method of expanding the flowers in shaded rooms prior to the exhibition, and would tend to minimize the confusion in color description that might result if no such standard were adopted. It might be advisable to indicate the light conditions and to describe the color of amaryllid flowers as they appear when opened in full sunlight as contrasted with the color when expanded in a shaded room.

Definite data on the effect of the amount of light on amaryllid flower color are being gathered and at a later date a more comprehensive paper will be prepared.

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[4]Color may vary in three different ways, and these variations are the basis of the three attributes of color,—**hue,** referring to differences from White, Black and neutral Grays; **value,** referring to the holding of a position in the light-to-dark scale, and **purity,** which, in addition to **hue,** refers to the presence or absence of Gray. See "A Dictionary of Color" by A. Maerz and M. Rea Paul, First Edition, McGraw-Hill Book Co., 370 Seventh Ave., New York; London, 6 & 8 Bouverie St., E. C. 4.

3. DESCRIPTION AND PHYLOGENY

HYLINE WORSLEYI

The Genus Hyline. Under date of December 14, 1935, Mr. Arthington Worsley writes as follows regarding the *Genus Hyline,*—

"The *Genus Hyline* was established by Herbert and verified by Baker as distinguished by having linear segments, a very short staminal cup and no tube. Although it is said to have the habit of *Hymenocallis,* this may apply to its foliage only, and it is said to differ therefrom in its numerous ovules and free perianth segments. Herbert founded his *Genus* upon a dried and rather squashed specimen gathered by Gardner in October 1838 and neither in Herbert's time nor since then has a live specimen been seen at Kew.

"The *Genus* remained monotypic until I received live plants of an unnamed species in 1895 and 1898. One of the first lot carried a flower scape in July 1895 and some of the second consignment flowered in May 1899.

"The fugacious nature of the flowers and the fact that the foliage is only distinguishable from that of many other amaryllids by one with wide experience with such plants, may account for the *Genus* being so rarely imported and hence so little known to horticulture. The important characteristic, that of its numerous ovules, justifies Dr. Hutchinson in placing the *Genus Hyline* in a separate section together with the *Genera Pamianthe, Stenomesson* and *Pancratium* under the *Tribe Eucharideae* in his new phylogenetic arrangement of the *Amaryllidaceae.*

"In my live plants of the new species of *Hyline,* no staminal cup was found. It is certain that the description of *Hyline Gardneriana* was made from a solitary dried specimen, which I examined at Kew. This new species is also distinguishable therefrom by its much wider leaves and segments and its fewer flowers. It grows best under the treatment given to *Eucharis grandiflora.*"

Publication of the species. In 1899, Geo. B. Mallet, who occupied the position of gardener to Mr. Worsley, published the first description of the species, which had been named for Mr. Worsley by the late W. Watson, in Gard. Chron. Ser. III, xxvi. 102,—

"This new species has recently flowered here, bulbs having been imported from Brazil in a case of miscellaneous **Pancratiums.** The leaves are distichous, 1½ ft. in length and 2" in width, glabrous green in color, with an acute apex. The scape is 15" high, bearing an umbel of two white flowers, each 8" long. The perianth segments each measure ½" in width, 7" in length, five of which are ascending, recurved, and interlaced, forming a singular mass; the lower segment is quite straight, half enclosing the filaments, which are in three ranks, of two each, the longest filaments reaching to the tip of the segment; the style being equally long. The general aspect of the flower is that of **Griffinia.** The flowers are singularly beautiful, and emit a faint perfume in the evening. They collapse on the second day after opening. This plant has not matured seeds. **H. Worsleyi** differs from **H. Gardneriana** in having a two-flowered umbel, a much longer flower, and much wider segments. **Hylines** may be distinguished from **Hymenocallis** (which they much resemble out of flower) by a peculiar crackling sound given out by the leaves when handled. They require the same treatment as that afforded to **Hymenocallis.**"

With reference to Mr. Mallet's description, on the basis of which the species was listed in the *Index Kewensis,* Mr. Worsley states that the statement "The general aspect of the flower is that of *Griffinia*" cannot be substantiated, but he is quite right in saying that the leaves, "when handled, give out a peculiar crackling sound." In view of the fact that the original published description is lacking in certain particulars, a complete description written by Mr. Worsley specially for *Herbertia,* is here reproduced.

Hyline Worsleyi Mallet, Gard. Chron: 102. 1899

Bulbs—3″ or less in diam.; deciduous or partly so, and closely resembling those of some *Hippeastrums;* offsets often numerous.

Leaves—8 to 14 appearing before the flowers, glabrous, sub-distichous and sub-prostrate; about 10″ long at flowering time but elongating to double this length when mature; maximum width 2″ to 2½″.

Scape—Lateral or from between the leaves; edged, 8″ to 14″ high, bearing a pair of flowers.

Spathe—Erect, acute, 3″ high; bracteoles a pair.

Arthington Worsley

Hyline Worsleyi

Pedicels—Erect, ¾″ to 1¼″ long.

Season of blooming—when growth of foliage is partly mature.

Flowers—Large, erect, white with greenish base, the very tips sometimes slightly ruddy; somewhat refracted from the ovary; not widely expanded; both flowers open simultaneously in the evening and close next morning. They bear some resemblance to those of *Elisena longipetala* especially on the morning after closing when all the segments are found twisted up together. During the night of expansion a slight Eucharis-like fragrance is noticeable. The span of the flower is 5″ or less in some cases and up to 6″ in others.

Tube—None.
Segments—6″ to 7″ long by ½″ wide; the upper 5 lying together, the lowest supporting the filaments, the whole suddenly curled up at the apices. In some cases the outer segments are ⅝″ wide.
Cup—None.
Stamens—Exserted, 3 longer and 2 shorter than the 6th one, straight and free, lying contiguously along the lowest segment, 5½″ to 5″ long.
Anthers—¼″ to less than ½″ long, versatile; pollen—yellow.
Style—6″ long, sometimes spirally twisted; apex deep purple-red and ascending abruptly.
Stigma—A mere point.
Ovules—Many.
Seeds—Unknown.
Source of type plants—Ceara, Brazil.

The excellent picture of the species, *Hyline Worsleyi*, reproduced in this issue of *Herbertia* was made by Mr. Worsley in 1895, and it is the first time that this species is pictured. Mr. Worsley intended to include it in his contemplated monograph on the Amaryllidaceae, but this has been much delayed, and he decided recently to publish the picture together with a complete description of the species in *Herbertia* for 1936.

Mira Flores,
Orlando, Florida *Hamilton P. Traub.*
May 11, 1936.

A NEW TEXAS COOPERIA

Wyndham Hayward

An attractive addition to the interesting Genus *Cooperia* has been observed in the trial collection of the American Amaryllis Society during early summer, 1936. The new type, which has been adjudged to be worthy of specific rank, has been given the name *Cooperia Traubii.*

There are two other species of *Cooperia,* both known for about 100 years, and well distributed in garden cultivation, *Cooperia Drummondii,* Herbert, and *Cooperia pedunculata,* Herbert. Morton, in his "Check List of the Bulbous Amaryllidaceae of the United States" (1935 Year Book, A. A. S.) gives the range of *C. pedunculata,* the largest type, as south-central Texas and parts of Mexico, and that of *C. Drummondii* as Southern Kansas, Oklahoma and Central Texas into Mexico. The new species seems to be most closely related to *C. Drummondii.*

The type specimen bloomed in the trial collection garden of the Society at Winter Park, Florida on the night of June 8, 1936 and was observed by the writer, in the course of routine inspection of the bulbs then in flower. The blooming bulb was among several donated to the trial collection by Dr. Hamilton P. Traub of Orlando, Fla., a director of the Society and editor of its Year Book (Herbertia). The history of the bulbs is as follows: They were collected in Brazoria County, near Angleton, Texas, southeast of Houston by Mr. R. H. Stansel for Dr. Traub's personal collection. On receipt of the bulbs during 1935, Dr. Traub presented samples to the Society's trial collection. At Angleton the bulbs grew on a grassy plain.

After careful comparison with published descriptions and with blooming specimens of the other two *Cooperias* in his garden, the writer found sufficient differences in the new type to justify its being given specific rank. It was decided to name the species *Cooperia Traubii* in honor of its donor to the Society's trial collection, mainly because of Dr. Traub's deep interest in amaryllids and in the State of Texas and Texas flowers and horticulture. He was formerly chief of the Division of Horticulture, Texas State Agricultural Experiment Station until he assumed his present position as Senior Horticulturist, with the United States Department of Agriculture in 1930.

The accompanying photographs (the type specimen; and one other specimen selected at random) will show the particular ornamental merits of this new *Cooperia,* which in many ways is a more charming flower than the other *Cooperias,* especially because of the long and slender perianth-segments.

The bulb of the new species is small, about 5/8" in diameter, and the foliage is narrow and delicate. The habit of growth is similar to that of *C. Drummondii,* and in no way does the plant resemble *Cooperia pedunculata* in a horticultural sense. *C. pedunculata* is much larger and more vigorous, both in bulb, flower and foliage. It does not resemble *C. Drummondii var. chlorosolen* Herb. which Baker (Amaryllideae, 1888) characterizes as follows: "Perianth-tube stouter, tinged with green; limb longer, less rotate. Leaves a little broader". The limb of *C. Traubii* is not at all rotate. The foliage of *C. Traubii* is smaller than that of *Drummondii,* but the flower is larger when fully opened. The color is the same as in the others, pure white, with only a faint tinge of pinkish red on the reverse of the petals. This reddish coloring is much stronger in *C. Drummondii.* The general appearance of the flower is quite star-like. The tube is long, nearly 5 inches. The petals, long and narrow, are a brilliant and gleaming white. The entire flower is approximately 2½ inches across the diameter of the face when wide open.

The principal botanical point on which *Cooperia Traubii* is proposed as a new species is the form of the petals and the general size and structure of the perianth. The anthers of *C. Traubii* are erect, characteristic of the *Cooperias.* The flowers open in the early evening and remain in good condition through the next morning and longer since the type specimen was gathered at 10 A. M. June 9, 1936, and was then in excellent condition.

COOPERIA **TRAUBII,** new species

Bulb globose, 5/8 inch diameter; neck 1 inch; leaves about 4, narrowly linear, glaucous, drooping, up to 9" long and contemporaneous with the flowers; peduncle slender, fragile, hollow, 7 to 7½ inches long; spathe valve 1 and ¾ inches long; ovary sessile; perianth tube long, 4¾ to 5 inches, limb 1¼ inches long; segments pure white with faint tinge of reddish pink on reverse, long and slender, 3/16 to ¼ inch broad; anthers ¼ to 3/8 inch long, erect; style projects so that stigma is 3/8 inch above the anthers. Type specimen collected June 9, 1936 at Lakemont Gardens, Winter Park, Florida, from bulbs secured by Dr. Hamilton P. Traub from Angleton, Texas and donated to the Trial Collection of the American Amaryllis Society. At Angleton the bulbs grew profusely on a grassy plain. The type specimen, (Hayward No. 101) has been deposited in the United States National Herbarium, Smithsonian Institution, Washington, D. C.

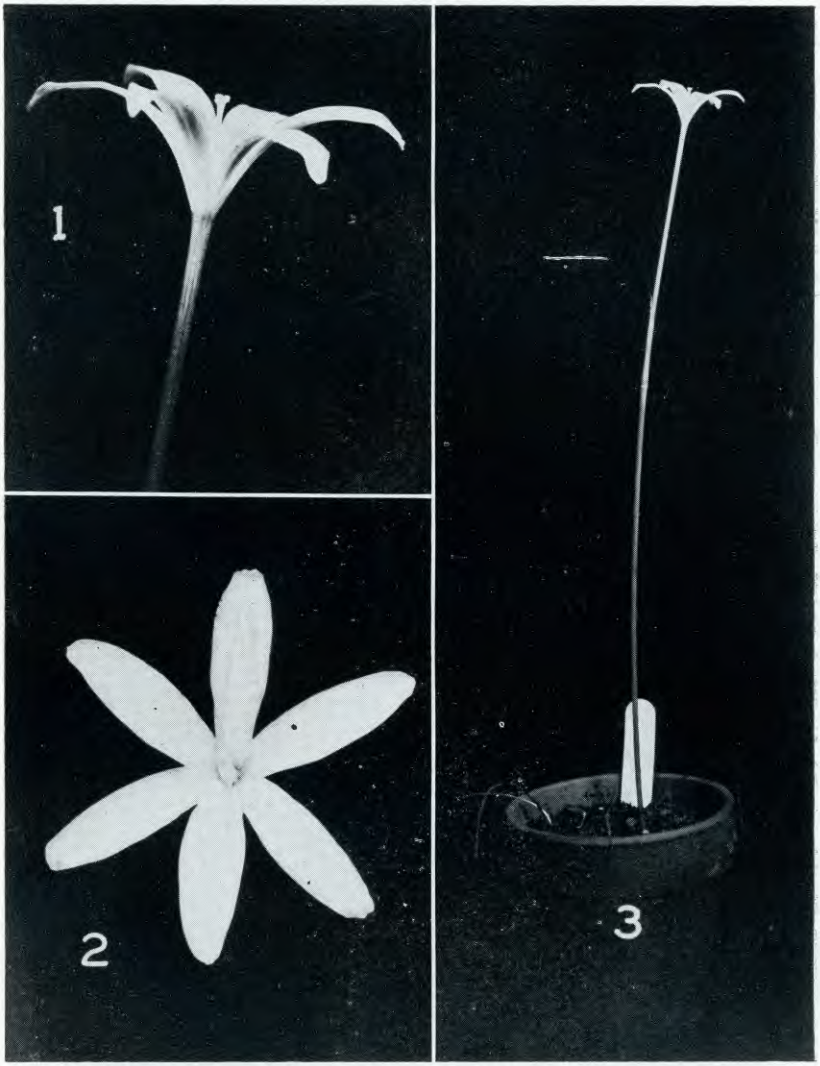
COOPERIA **TRAUBII,** species nova

Bulbous globosus, 1.6 cm. diametro, collo 2.5 cm. longo; folia ca. 4, auguste linearia, glauca, decurvata, usque ad 22.5 cm. longa; pedunculus gracilis, fragrilis, fistulosus, 17.5-19 cm. longus; spathae valva 4.4 cm. longa; ovarium sessile; tubus perianthii elongatus, 12-12.7 cm. longus, segmentis albis, externe pallide rubescentibus, tenuibus, 3.2 cm. longis, 5-6.5 mm. latis; antherae 6.5-10 mm. longae, erectae; stylus quam stamina 10 mm. longior.

June 9, 1936
Lakemont Gardens,
Winter Park, Florida

Wyndham Hayward

Cooperia Traubii, sp. nov.
The type plant



Chas. T. O'Rork, Jr.

Cooperia Traubii

Figs. 1 and 2, side and top view of flower, natural size; Fig. 3, entire plant, 3/10 natural size; plant selected at random.

AMARYLLIDACEAE

NATIVE TO THE UNION OF SOUTH AFRICA

R. H. COMPTON, *Director,*

National Botanic Gardens, Kirstenbosch,

Union of South Africa

The following catalogue of South African Amaryllidaceae is arranged according to Dr. Hutchinson's system—

AGAPANTHEAE [1]

1. AGAPANTHUS [1]
2. TULBAGHIA [1]

ALLIEAE—Not represented

GILLIESIEAE—Not represented

GALANTHEAE—Not represented

AMARYLLIDEAE

3. AMARYLLIS, Linn.
   1. *Amaryllis Belladonna, Linn.*

4. BRUNSVIGIA, Heist.
   1. *Burnsvigia Josephinae,* Gawl.
   2. " *grandiflora,* Lindl.
   3. " *Slateriana,* Benth.
   4. " *minor,* Lindl.
   5. " *gigantea,* Heist.
   6. " *Cooperi, Bak.*
   7. " *sphaerocarpa,* Bak.
   8. " *striata,* Ait.
   9. " *natalensis,* Bak.
   10. " *Radula,* Ait.
   11. " *radulosa,* Herb.
   12. " *undulata,* Leighton.
   13. " *appendiculata,* Leighton.
   14. " *Bosmaniae,* Leighton.

5. NERINE, Herb.
   1. *Nerine sarniensis,* Herb.
   2. " *curvifolia,* Herb.
   3. " *Moorei,* Leichtl.
   4. " *flexuosa,* Herb.
   5. *Nerine angustifolia,* Bak.
   6. " *pudica,* Hook f.
   7. " *brachystemon,* Bak.
   8. " *filifolia,* Bak.
   9. " *undulata,* Herb.
   10. " *humilis, Herb.*
   11. " *appendiculata,* Bak.
   12. " *pancratioides,* Bak.
   13. " *lucida,* Herb.
   14. " *duparquetiana,* Bak.
   15. " *marginata,* Herb.
   16. " *Schlechteri,* Bak.
   17. " *Bowdeni,* W. Watson
   18. " *falcata,* Bak.
   19. " *Frithii,* L. Bolus.
   20. " *Masonorum,* L. Bolus.
   21. " *Ridleyi,* Phillips.
   22. " *Huttonii,* Schonl.
   23. " *angulata,* L. Bolus.
   25. " *Rehmanni,* L. Bolus.
   26. " *Krigei,* Barker.
   27. " *Peersii,* Barker.
   28. " *alta,* Barker.
   29. " *tulbaghensis,* Barker.
   30. " *Breachiae,* Barker.
   24. " *filamentosa,* Barker.

[1] Represented in South Africa but no information furnished due to an oversight on part of editor in not requesting it.

CRINEAE

6. CRINUM, Linn.
   1. *Crinum lineare*, Linn, f.
   2. " *variabile*, Herb.
   3. " *campanulatum*, Herb.
   4. " *imbricatum*, Bak.
   5. " *Moorei*, Hook. f.
   6. " *longifolium*, Thunb.
   7. " *MacOwani*, Bak.
   8. " *Bainesii*, Bak.
   9. " *crispum*, Phill.

7. AMMOCHARIS, Herb.
   1. *Ammocharis falcata*, Herb.
   2. " *coccinea*, Pax.
   3. " *Traveliana*
   4. " *Herrei*, Leighton.

8. CYRTANTHUS, Ait.
   1. *Cyrtanthus obliquus*, Ait.
   2. " *carneus*, Lindl.
   3. " *Elliotii*, Bak.
   4. " *Huttoni*, Bak.
   5. " *brachyscyphus*, Bak.
   6. " *parviflorus*, Bak.
   7. " *Flanagani*, Bak.
   8. " *stenanthus*, Bak.
   9. " *collinus*, Gawl.
   10. " *spiralis*, Burch.
   11. " *pallidus*, Sims.
   12. " *rectiflorus*, Bak.
   13. " *MacOwani*, Bak.
   14. *Cyrtanthus O'Brieni*, Bak.
   15. " *odorus*, Gawl.
   16. " *augustifolius*, Ait.
   17. " *striatus*, Herb.
   18. " *Tuckii*, Bak.
   19. " *lutescens*, Herb.
   20. " *Mackenii*, Hook. f.
   21. " *uniflorus*, Gawl.
   22. " *helictus*, Lehm.
   23. " *vittatus*, Desf.
   24. " *sanguineus*, Hook.
   25. " *Galpinii*, Bak.
   26. " *Junodii*, Beauw.
   27. " *leucanthus*, Schltr.
   28. " *epiphyticus*, Wood.
   29. " *Guthrieae*, L. Bolus.
   30. " *contractus*, N. E. Br.
   31. " *rotundilobus*, N. E. Br.
   32. " *Stayneri*, L. Bolus.
   33. " *flavus*, Barnes.
   34. " *Fergusoniae*, L. Bolus.
   35. " *inaequalis*, O'Brien.
   36. " *Balenii*, Phillips.

9. ANOIGANTHUS, Baker.[2]
   1. *Anoiganthus brevifolius*, Bak.

10. VALLOTA, Herb.
   1. *Vallota purpurea*, Herb.

ZEPHYRANTHEAE

11. APODOLIRION, Baker.
   1. *Apodolirian lanceolatum*, Benth
   2. " *Ettae*, Bak.
   3. " *Buchanani*, Bak.
   4. " *Bolusii*, Bak.
   5. " *MacOwani*, Bak.
   6. " *Mackenii*, Bak.

12. GETHYLLIS, Linn.
   1. *Gethyllis spiralis*, L. F.
   2. " *verticillata*, R. Br.
   3. " *villosa*, L. f.
   4. " *longistyla*, Bolus.
   5. " *pusilla*, Bak.
   6. " *afra*, L.
   7. " *britteniana*, Bak.
   8. " *ciliaris*, L. f.
   9. " *latifolia*, Masson.
   10. " *undulata*, Herb.
   11. " *Herrei*, L. Bolus.
   12. *Gethyllis lata*, L. Bolus.
   13. " *campanulata*, L. Bolus.
   14. " *grandiflora*, L. Bolus.
   15. " *linearis*, L. Bolus.
   16. " *unilateralis*, L. Bolus.
   17. " *multifolia*, L. Bolus.
   18. " *longituba*, L. Bolus.
   19. " *setosa*, Marl.
   20. " *languinosa*, Marl.
   21. " *verrucosa*, Marl.

[2]Not listed by Dr. Hutchinson.

HAEMANTHEAE

13. HESSEA, Herb.
1. *Hessea stellaris*, Herb.
2. " *crispa*, Herm.
3. " *Zeyheri*, Bak.
4. " *brachycypha*, Bak.
5. " *filifolia*, Benth.
6. " *spiralis*, Bak.
7. " *gemmata*, Benth.
8. " *Mathewsii*, Barker.
9. " *Leipoldtii*, L. Bolus.
10. " *Karooica*, Barker.
11. " *unguiculata*, Barker.
12. " *dregeana*, Kunth.

14. CARPOLYZA, Salisb.
1. *Carpolyza spiralis*, Salisb.

15. STRUMARIA, Jacq.
1. *Strumaria truncata*, Jacq.
2. " *linguaefolia*, Jacq.
3. " *angustifolia*, Jacq.
4. " *Watermeyeri*, L. Bolus.
5. " *rubella*, Jacq.
6. " *undulata*, Jacq.

16. BUPHANE, Herb.
1. *Buphane longipedicellata*, Pax.
2. " *disticha*, Herb.
3. " *ciliaris*, Herb.

17. CLIVIA, Lindl.
1. *Clivia nobilis*, Lindl.
2. " *Gardneri*, Hook.
3. " *miniata*, Regel.

18. HAEMANTHUS, Linn.
1. *Haemanthus Katharinae*, Bak.
2. " *puniceus*, L.
3. " *natalensis*, Pappe.
4. " *magnificus*, Herb.
5. " *Pumilio*, Jacq.
6. " *lanceaefolius*, Jacq.
7. " *carneus*, Gawl.
8. " *amarylloides*, Jacq.
9. " *montanus*, Bak.
10. " *candidus*, Bull.
11. " *albiflos*, Jacq.
12. " *albomaculatus*, Bak.
13. " *Baurii*, Bak.
14. " *Arnottii*, Bak.
15. " *deformis*, Hook.
16. " *Mackenii*, Bak.
17. " *Cooperi*, Bak.
18. " *hirsutus*, Bak.
19. " *incarnatus*, Burch.
20. " *undulatus*, Herb.
21. " *concolor*, Herb.
22. " *sanguineus*, Jacq.
23. " *Hookerianus*, Herb.
24. " *humillis*, Jacq.
25. " *rotundifolius*, Gawl.
26. " *callosus*, Burch.
27. " *moschatus*, Jacq.
28. " *coccineus*, L.
29. " *tigrinus*, Jacq.
30. " *hyalocarpus*, Jacq.
31. " *crassipes*, Jacq.
32. " *pubescens*, L. f.
33. " *sacculus*, Phillips
34. " *Ryderae*, Barnes.

IXIOLIRIONEAE—Not represented

EUCHARIDEAE

19. KLINGIA[3]

EUSTEPHIEAE—Not represented

HIPPEASTREAE—Not represented

NARCISSEAE—Not represented

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[3]Imperfectly known Genus reported by Dr. Hutchinson as represented in Namaqualand.

Dr. H. Pittier, Caracas, Venezuela

Hippeastrum equestre
Habitat, Los Mariches, near Petare and Caracas, Venezuela

AMARYLLIDACEAE OF BRITISH GUIANA

Hon. E. B. Martyn, *Government Botanist and Superintendent of Botanic Gardens, Georgetown, British Guiana*

The following named indigenous amaryllids are represented in our herbarium;

Crinum Commelyni Jacq.
C. erubescens Ait.
Hippeastrum equestre Herb.
H. solandriflorum Herb.
Hymenocallis caribaea Herb.
H. tubiflora Salisb.
Furcraea gigantea Vent.

In addition to these, Schomburgk's "Fauna and Flora of British Guiana" lists the following;

Amaryllis belladonna L.[4]
Bomarea edulis Herb.
B. fuscata Kl.
Crinum viridiflorum M. J. Roem.
C. guianense M. J. Roem.
Hippeastrum barbatum Herb.
Hippeastrum occidentale M. J. Roem.
Hymenocallis amoena Herb.
H. Dryandii M. J. Roem.
H. fragrans M. J. Roem.
H. guianensis Herb.
H. sloanei M. J. Roem.

Pulle's "Flora of Surinam" includes the following;

Crinum scabrum Sims.
Hymenocallis obtusata (Griesb.) Pulle.
Hypoxis decumbens L.

The only species of *Hippeastrum* readily available is *H. equestre*. The other species listed are rare on the coastlands or near Georgetown. As regards the species listed by Schomburgk, many of these were obtained inland and in the savannah areas where collections are seldom made.

BULBOUS AMARYLLIDACEAE OF VENEZUELA

Dr. H. Pittier, *Venezuela*

The following list includes the bulbous amaryllids reported as growing in Venezuela;

Bomarea bredemeyeriana (Willd.) Herb. Coast Range, Andes of Mérida.
B. polyantha Kraenzlin—Cerros de Avila (Coast Range).
B. hispida Baker—Andes of Mérida.
B. caraccensis Herb.—Vicinity of Caracas.
Hippeastrum equestre (H. puniceum Lam.) Herb.—Appears in spontaneous colonies in certain savannas of the lower belt.
H. solandriflorum Bot. Reg.—Abundant in certain savannas up to 1300m.
Hymenocallis caribaea (L.) Bot. Reg.—Island of Margarita.
H. moritziana Kunth—Reported from the vicinity of Caracas.
H. pedalis Bot. Reg.—Andes of Trujillo.
H. undulata Bot. Reg.—Lower belt, up to 1000m.; also cult.
Eucharis grandiflora Pl.—Andes and often cultivated.
Zephyranthes tubispatha (L'Hér.) Bot. Reg.—Temperate belt, scattered and often in cultivation.

[4]This apparently refers to plants under cultivation.

Crinum erubescens Ait.—Seldom seen in wild condition, but often in gardens.
C. graciliflorum Kunth.—In savannas near Caracas and also collected near Maracaibo by Moritz.
C. graciliflorum var. Fendleri Baker—Colonia Tovar (Coast Range).

As a rule, the amaryllids grow very scattered and are seldom met with. The only exception is *Hippeastrum solandriflorum* which is very abundant in some savannas. In the country around my home, a few miles from Caracas, we have *Hippeastrum equestre (puniceum* Lam.), of which I am sending a photograph for reproduction in the Year Book.

In the future, knowing that your Society is especially interested, I shall pay more attention to the amaryllids.

BULBOUS AMARYLLIDACEAE OF PERU

J. Francis Macbride
Field Museum, Chicago, Ill.

Distrepta vaginata Miers. Department of Lima at 400 meters. Plants with one to three blue flowers.

Zephyranthes Briquetii Macbride. Known only from Carumas, Department of Moquehua. Flowers white.

Zephyranthes flava (Herb.) Baker. Known only in cultivation from material sent from Lima in 1834. Flowers yellow.

Zephyranthes gracilis Herbert. Collected long ago by Ruiz at Puerto de Santa Maria. Flowers white (?).

Zephyranthes parvula Killip. Known only from the Department of Cuzco, at 3500 meters. Flowers pink. Called Pulla-pulla.

Zephyranthes tubiflora (L'Hér.) Schinz. Said to be common on the hills about Lima, and one of the most handsome flowers of the coastal hills during the green season. Flowers yellow.

Zephyranthes tubiflora var. flammea (R. & P.) Macbride. Region of Lima. Flowers flame-colored.

Cooperia albicans (Herb.) Sprague. Growing on sandhills in the Department of Arequipa, flowering in October. Flowers white.

Crocopsis fulgens Pax. In the Andes at 3300-4200 meters. A crocus-like plant, the solitary flower orange and black-dotted.

Chlidanthus fragrans Herbert. Flowers bright yellow. Known from the departments of Amazonas, Arequipa, and Tacna. Also in Ecuador and Argentina.

Crinum undulatum Hooker. Reported from the lowlands on the eastern side of the Andes. Also in Brazil.

Hymenocallis Amancaes (R. & P.) Nichols. Flowers yellow. A festival called Amancaes Day is celebrated at Lima when this plant is in bloom, covering the semi-desert hillsides of the vicinity with thousands of brilliant blossoms. The plant is known only from the Lima region, where it is called *Amancaes.*

Hymenocallis deflexa (Herb.) Baker. Known only in cultivation, a hybrid between *H. narcissiflora* and *H. longipetala.*

Hymenocallis longipetala (Lindl.) Macbride. Departments of Lima and Cuzco. Called Tamancay. Flowers white, as in the other species listed here except *H. Amancaes.*

Hymenocallis narcissiflora (Jacq.) Macbride. Said to be a native of Peru.

Hymenocallis nutans (Herb.) Baker. Perhaps of Peruvian origin.

Hymenocallis pedunculata (Herb.) Macbride. A native of Peru, the region not known.

Hymenocallis quitoensis Herbert. Collected in the Department of Tumbes. Also in Ecuador.

Hymenocallis ringens (R. & P.) Macbride. Probably Peruvian, but known only in cultivation.

Hymenocallis sublimis (Herb.) Macbride. Department of La Libertad.

Eucharis Bakeriana N. E. Brown. Lowlands of the Department of Loreto. Also in Colombia.

Eucharis Castelnaeana (Baill.) Macbride. Known only from Pampa del Sacramento, Department of Loreto.

Eucharis galanthoides (Klotzsch) Planch. & Linden. Described from Paita, Department of Piura.

Eucharis grandiflora Planch. & Linden. Frequent in the eastern foothills of the Andes. Also in Columbia. Called Amancay.

Eucharis narcissiflora Huber. Apparently frequent in the department of Junin and Loreto.

Eucharis Ulei Kraenzlin. Lowlands of the Department of Loreto. Also in adjacent Brazil.

Stenomesson aurantiacum (HBK.) Herbert. Departments of Lima, Cajamarca, and Cuzco, at high elevations. Also in Ecuador. Flowers yellow.

Stenomesson coccineum (R. & P.) Herbert. Department of Junin, Huánuco, Lima, Ancash, and Cuzco. Flowers bright or salmon or cinnamon red; rarely rose-colored (*S. breviflorum* Herb.).

Stenomesson croceum (Savigny) Herbert. Region of Lima. Flowers pale yellow.

Stenomesson Elwesii (Baker) Macbride. Known only in cultivation; similar to *S. viridiflorum*.

Stenomesson humile (Herb.) Baker. At high elevations, Junin, Cuzco, and Ancash. Flower orange-red.

Stenomesson incarum Kraenzlin. Department of Arequipa. Flowers red.

Stenomesson latifolium Herbert. Lima and Cuzco. Flowers yellow.

Stenomesson longifolium Kraenzlin. Departments of Lima and Arequipa. Flowers red.

Stenomesson luteum (Herb.) Baker. Known only from some uncertain locality in Peru. Flowers yellow.

Stenomesson Macleanicum (Herb.) Macbride. Department of Lima, at 3500 meters. Flowers yellow.

Stenomesson pauciflorum (Lindl.) Herbert. Introduced into cultivation from Peru. Flowers golden yellow.

Stenomesson pauciflorum var. curvidentatum (Herb.) Macbride. Introduced into cultivation from Peru in 1825.

Stenomesson Pearcei Baker. Departments of Cuzco, Junin, and Puno, at high elevations. Flowers yellow.

Stenomesson recurvatum (R. & P.) Baker. Region of Lima. Flowers reddish yellow.

Stenomesson suspensum Baker. Department of La Libertad. Flowers bright scarlet.

Stenomesson variegatum (R. & P.) Macbride. Departments of Amazonas and Cuzco. Flowers pale or bright red.

Stenomesson viridiflorum (R. & P.) Benth. & Hook. Department of Junin. Flowers emerald green.

Stenomesson vitellinum Lindley. Introduced into cultivation from Lima.

Hippeastrum Forgetii Worsley. Region of Cuzco.

Hippeastrum fuscum Kraenzlin. Department of Puno.

Hippeastrum Leopoldii (Moore) Dombrain. Collected somewhere in Peru by Pearce.

Hippeastrum miniatum (R. & P.) Herbert. Departments of Cuzco and Huánuco.

Hippeastrum pardinum (Hook. f.) Dombrain. Collected somewhere in Peru by Pearce.

Hippeastrum puniceum (Lam.) Urban. Departments of Puno, Loreto, and Junin. A species of wide distribution.

Hippeastrum reginae (L.) Herbert. Department of Junin.

Hippeastrum solandriflorum Herbert. Department of Cuzco. A species of wide distribution.

Hippeastrum vittatum (L'Hér.) Herbert. Said to be native of the Peruvian Andes.

Urceolina fulva Herbert. Type collected at Parahuanca. Flowers yellow.

Urceolina latifolia (R. & P.) Benth. & Hook. Department of Junin. Flowers yellow or reddish, tipped with green and white.

Urceolina microcrater Kraenzlin. Department of Huánuco, at 1200-1600 meters. Flowers yellow.

Urceolina peruviana (Presl) Macbride. Of rather wide distribution in the Andes, at high elevations. Flowers scarlet or reddish yellow.

Urceolina urceolata (R. & P.) Asch. & Graebn. Departments of Huánuco, Junin, and Cuzco. Flowers bright yellow and green.

Phaedranassa Carmioli Baker. Reported from Cuzco, at 3450 meters.

Phaedranassa megistophylla Kraenzlin. Department of Cajamarca at 500 meters. Flowers blue-green.

Phaedranassa viridiflora Baker. Department of Cajamarca. Flowers greenish yellow, with green tips.

Eucrosia eucrosioides (Herb.) Pax. A native of Peru, but the region not known. Flowers green, with scarlet limb.

Eustephia armifera Macbride. Department of Cuzco, at 3100 meters. Flowers blood-red outside, yellowish within.

Eustephia coccinea Cav. Departments of Cuzco, Huánuco, and Junin, at 2200-3400 meters. Flowers bright red, tipped with green.

BULBOUS AMARYLLIDACEAE KNOWN FROM COSTA RICA

Paul C. Standley
Associate Curator, Field Museum, Chicago, Ill.

Crinum cruentum Ker. Growing in wet places at low elevations. Also grown frequently in gardens.

Crinum erubescens Solander. Frequent in cultivation, also probably naturalized in some localities, as often is the case with this species in Central America.

Crinum longiflorum Herbert. Common in gardens, especially at low elevations, and probably naturalized in some parts of the *tierra caliente*.

Eucharis grandiflora Planchon. Vernacular name *Eucaristo*. Flowers white, fragrant, about 7 cm. long. Of Colombian origin, frequently planted in Costa Rican gardens.

Eucharis himeroessa Sandwith, ined. Of this unpublished species I have seen only a few flowers. It was collected at El Rodeo, Costa Rica, by Mr. C. H. Lankester, and has been cultivated in the Royal Botanic Gardens, Kew. The flowers are smaller than those of *E. grandiflora*. This is the only species of the genus that has been found wild north of Colombia.

Hippeastrum reginae Herbert. A common ornamental garden plant, native of South America.

Hymenocallis littoralis (Jacq.) Salisb. Frequent in wet or swampy places of the lowlands, often or usually growing on sea beaches.

Phaedranassa Carmioli Baker. This species was based upon plants grown in England by Wilson Saunders in 1867 from bulbs sent from Costa Rica by Julio Carmiol. It is illustrated in plate 8356 of *Curtis' Botanical Magazine*. Little seems to be known of the plant, but I found it in 1925 growing in a garden at Santa Maria de Dota, Costa Rica. It is by no means certain that it is a native of Costa Rica, the other species of the genus being South American. The plant is a very handsome one, with petioled lanceolate leaves. The flowers, in umbels, are tubular, pale red, the lobes of the perianth being green. The plant is well worthy of wide cultivation.

Polianthes tuberosa L. Vernacular name Nardo. Cultivated commonly in gardens, as in Central America generally. Native of Mexico. The cultivated plants always have double flowers.

Zephyranthes carinata (Spreng.) Herbert. Called Lágrimas de Maria ("tears of the Virgin"). Cultivated commonly in gardens, also naturalized in meadows and in grassland generally at middle elevations. Perhaps native.

Major A. Pam

Pamianthe peruviana

Major A. Pam

Hymenocallis quitoënsis

BULBOUS AMARYLLIDACEAE OF BRITISH HONDURAS

PAUL C. STANDLEY
Associate Curator, Field Museum, Chicago, Ill.

Crinum cruentum Ker. In cultivation; also apparently naturalized in some localities.

Hippeastrum puniceum (Lam.) Urban. Known locally as Amaryllis and Adonis. Cultivated in gardens and perhaps naturalized in some places.

Hymenocallis littoralis (Jacq.) Salisb. Growing in swamps and on seashores.

Polianthes tuberosa L. Grown commonly in gardens.

THE GENUS PAMIANTHE

The following catalog of the *Genus Pamianthe* was kindly furnished by the Gray Herbarium, Harvard University. The illustrations of *Pamianthe peruviana* and *P. quitoensis*[5] reproduced in this issue of Herbertia, were furnished by Major A. Pam. Your attention is also directed to the illustration of *P. peruviana* which appeared in the 1935 Year Book.

PAMIANTHE Stapf

Gard. Chron. ser. 3,93:106, Feb. 11, 1933.
Curtis's Bot. Mag. 146, tab. 9315. July 1, 1933.

Pamianthe peruviana Stapf. Peru
P. Andreana Stapf. *(Ismene Andreana* Baker)
P. quitoënsis Stapf. (Hymenocallis quitoënsis Herb.)[5]

AMARYLLIDS OF THE NETHERLANDS EAST INDIES

The following list of amaryllids native to the islands of Java, Amboina, and the remaining Netherlands East Indies has been prepared for *Herbertia* by the Director of the Royal Botanic Gardens,[6] at Buitenzorg, Java, one of the great Botanic Gardens of the tropics.

Crinum asiaticum, L.; indigenous to Java, Madoera, and Kangean.
Eurycles amboinensis, Loud.; Java, Kangean, and Amboina.
Eurycles alba, Backer; New Guinea.
Pancratium zeylanicum, L., Java.
Curculigo orchioides, Gaertn., Java, Madoera and other islands.
Curculigo capitata, O. K.; E. and W. Java, and some other islands.
Curculigo latifolia, Dryand.; West and Central Java.
Hypoxis aurea, Lour.; Central and East Java.

The director of the Buitenzorg Gardens adds that "nearly all the ornamental amaryllidaceae are cultivated in the mountain regions of Java, including hybrid *Hippeastrums.*"

[5]Word has just been received, July 1, 1936, from Major Pam to the effect that this species has set seeds which are green in color. The species must therefore be transferred back to the **Genus Hymenocallis.**—Hamilton P. Traub.
[6]Dr. K. W. Dammerman, Director; Mr. P. Dakkus, Curator.

THE AMARYLLIDACEAE OF TEXAS

V. L. Cory, *Range Botanist,*
Texas Agric. Expt. Station, Substa. 14, Sonora, Texas

Zones of distribution are geographically considered as follows: (1) The timber belt (East Texas); (2) The coastal prairie (Southeast Gulf Coast); (3) The Rio Grande plains (lying chiefly between the Rio Grande and the Edwards plateau); (4) The Prairies (Central Texas); (5) The Edwards plateau; (6) The Trans-Pecos (West of the Pecos River); (7) The Plains (The high plains and rolling plains of Northwestern Texas.).

The list is arranged according to Dr. Hutchinson's system,—

TRIBE 2. ALLIEAE

	Zones of Distribution
1 *Allium canadense* L.	1-2-4
2 *A. cernuum* Rath (*A. recurvatum* Rybd.) These may be distinct	6
3 *A. Coryi* M. E. Jones	6
4 *A. deserticola,* (M. E. Jones) Woot. & Stanndl.,	6
5 *A. Drummondi* Regel (*A. Helleri* Small)	4-5-7
6 *A. mobilense* Regel (*A. arenicola* Small; *A. microscordion* Small)	1-2-3-4-5-7
7 *A. mutabile* Michx.	1-3-4-5-7
8 *A. nevadense* S. Wats	4-5-6-7
9 *A. Nuttalli* S. Wats	3-4-5-6-7
10 *A. reticulatum* Fraser ex Don	6
11 *A. sceaposum* Benth	3-4-5
12 *A. stellatum* Fraser ex Ker	6-7
13 *Nothoscordum* bivalve (L.) Britton	1-2-3-4-5-6-7
14 *Brodiaea coerulea* (Scheele) Macbride	4-5-7
15 B. *uniflora* (Lindl.) Engler Possibly not established; cultivated	4
16 *Milla biflora* Cav.	6

TRIBE 6. CRINEAE

17 *Crinum americanum* L.	1

TRIBE 7. ZEPHYRANTHEAE

18 *Zephyranthes candida* Lindl.	2
19 *Z. chrysantha* Greenm. & Thompson (near Brownsville)	3
20 *Z. longifolia* Hemsl	6
21 *Z. pulchella* J. G. Smith (near Corpus Christi)	3
22 Z. *texana* Herb.	1-2-3-4
23 *Cooperia Drummondi* Herb.	4-5-7
24 *C. pedunculata* Herb.	1-4-5

TRIBE 10. EUCHARIDEAE

25 *Hymenocallis galvestonensis* Baker	2

Mr. Cory writes, under date of April 24, 1936,—"I wish to call particular attention to No. 3 in this list, not because it is named after me, but because it is one of the few yellow-flowered onions, and because it appears probable that it will

become a desirable species for growing under cultivation as an ornamental plant. . . . . Regarding No. 15, it seems probable that this species is all right for growing under cultivation in Florida, but to what extent it is being grown in Texas, I do not know. I have seen it only in yards at Gonzales, where it maintains itself but so far has not escaped from cultivation. . . . . I may say that I have never collected No. 16 which is said to grow in the mountains of western Texas. . . . Mr. Park is growing at San Antonio a *Zephyranthes* we collected last fall in Kinney County. This is a yellow-flowered species and it may be *Z. chrysantha.*"

AMARYLLIDACEAE OF CEYLON

T. H. Parsons, *Curator*

Royal Botanic Gardens, Paradeniya, Ceylon

Crinum L.

1. *Crinum asiaticum* L. Tolabo S. sandy sea coast of moist regions; common, sweet scented; also in India.

2. *C. defixum* Ker. Hin-tolabo S.; low country streams and wet places; common throughout India.

3. *C. latifolium* L. *var. zeylanicum.* Tolabo s.; damp places in low country; common throughout eastern tropics; a very variable species.

Pancratium L.

4. *Pancratium zeylanicum* L. Wal-lunu s.; low country in grassy places, common, fragrant; throughout tropical Asia; bulb used medicinally (recent correction,—"perianth-tube about 2 in., staminal cup broad").

5. *P. verecundum* Sol. Distribution as above; (recent correction,—"perianth-tube about 3 in.; staminal cup narrow").

6. *P. triflorum* Roxb. Distribution as above; (recent correction,—"perianth-tube about 6 in.; staminal cup broad").

TWO NEHRLING HYBRID CRINUMS

Wyndham Hayward, *Florida*

Two hybrid crinum varieties introduced some years ago by the late Henry Nehrling and now exceedingly rare have flowered at Lakemont Gardens in March of the present year.

One of the varieties is named *Mrs. James Hendry,* in honor of the wife of the outstanding nurseryman in Ft. Myers, Fla. A photographic reproduction of this variety is included among the plates in this issue. The flower has a delightful perfume and the coloring varies from a purple rose on the unopened buds to a pinkish white which fades to nearly white when the flower matures. The flowers are borne in a large umbel, and open several at a time, about three-fourths opening in two days. The plant is vigorous and grows in the full sun in rich soil. Although it is a slow propagator naturally, the cuttage method will overcome this difficulty.

The other variety is named *Sophia Nehrling* and is similar to *Mrs. James Hendry* except that the petals are more pointed, the cups of the flowers smaller,

Wyndham Hayward

Hybrid Crinum, Mrs. James Hendry

there are fewer flowers in the umbel, and the general appearance of the bloom cluster is apparently not as outstanding. The variety *Sophia Nehrling* was the first hybrid crinum variety introduced by Mr. Nehrling; *Mrs. James Hendry* was raised some years later.

CRINUMS WHITE QUEEN AND POWELLI ALBUM

WYNDHAM HAYWARD, *Florida*

Actual comparison of the flowers of the two pure white hybrid crinums, *White Queen* and *Powelli album,* made from authenticated specimens blooming in the writer's garden in Winter Park during May, 1936, shows considerable similarity between the two types and in addition several distinguishing characteristics. The origin of *Powelli album* is apparently not known, but it is without doubt the best known of the hybrids grown today.

The Standard Cyclopaedia of Horticulture does not list the year of introduction or the hybridizer's name under Crinum Powelli, and merely mentions the white variety *album.* It is one of the showiest and most satisfactory garden varieties, besides being quite hardy with winter protection farther north.

White Queen is a hybrid crinum offered the trade by Mr. W. H. Henderson of Fresno, California. The foliage is quite different from that of *Powelii,* being of the rotary type, while the leaves of *Powelli* stand out in two main directions, with only a slight rotary tendency. The bulb of *White Queen* is apparently somewhat larger at base and neck than *Powelli.*

Three outstanding differences in *White Queen* are noted as follows: the petals are strongly recurved at the tips, bending back on themselves until they touch and more. The tube of the flower is longer than that of *Powelli album.* The texture of the *White Queen* petals is more delicate and glistening than in the case of the *Powelii* blooms.

The recurved petals give the *White Queen* bloom umbel a charming character all its own. The tube of the flowers or "neck" is about an inch longer than that of *Powelli album,* the measurements being 4¼ inches for *White Queen* and 3 inches for *Powelli album* in the specimens examined. This length of tube gives the Henderson crinum flowers a more pendulous habit in the bloom cluster. The pedical length is about the same in both cases, being under an inch. The perfume of neither flower is particularly pleasant, but that of *Powelli* is slightly better than the other.

The *Powelli* flower petals are glossy and more porcelain-like in their texture than the other, but the *White Queen* petals are of a peculiar glistening white, like frosted glass, and sparkling under strong light in the evening, while the *Powelli* petal texture shines. There is less green in the throat of the Henderson crinum, and it also produces larger scapes and more flowers to the individual umbel.

The *Powelli* parentage is *C. longifolium* X C. *Moorei,* but the parentage of the Henderson crinum is not recorded. In broad noon daylight, the flowers of *Powelli* stand up with slightly better appearance, full warmth of the sun forcing the blooms of both varieties to droop. Few crinum blooms can stand the full blaze of the subtropical sun without suffering in appearance. The flowers are best viewed in the early morning, at evening, and under artificial light at night, when they really seem at their best.

Wyndham Hayward

Hymenocallis Floridana

AMERINDIAN LILIES (HYMENOCALLIS) IN FLORIDA

WYNDHAM HAYWARD, *Florida*

The *Hymenocallis* group is an outstanding example in the Amaryllis Family of a genus that is horticulturally interesting and highly ornamental, but which is at present suffering from undeserved neglect on the part of flower lovers and bulb fanciers.

Not more than two or three species out of the forty or so recorded are ever seen in ordinary cultivation in the United States, and perhaps half a dozen more types are rarely met with in unexpected places and collector's gardens. The *Hymenocallis* group is one of distinct character and beauty, and highly desirable for pot culture in the north and outdoors in warm climates.

Some of the species, in the Ismene section, are deciduous, and are grown in the north as are gladioli, being stored inside during the winter months. *Hymenocallis (Ismene) calathina* is the species commonly grown in this way. *H. Amancaes,* the only yellow-flowered species, can be handled similarly, as also the yellow-flowered hybrid between the two, *Sulphur Queen,* still very rare in America.

H. speciosa and *H. macrostephana,* both very rare in the United States, are described as being the finest horticultural types. They have leaves like the *Eucharis,* while most other *Hymenocallis* have strap leaves like those of hybrid amaryllis.

The *Hymenocallis* species have been popularly mis-named for many years "spider lilies". This is unworthy of their true beauty, which is equal to that of the nerines in their way, and the American Amaryllis Society, in its effort to better the situation, has adopted the title "Amerindian Lilies" for the group. It is hoped that this more pleasant-sounding name will become generally accepted and adopted. The name "Amerindian" is suitable as the species are strictly American with the possible exception of one, *H. senegalensis,* from West Africa, which is regarded as doubtful.

There is a rich field for the student and horticulturist in the *Hymenocallis* group, as there exists much confusion and mistaken information regarding nomenclature. There are also believed to be a number of unidentified species yet to be reported in various areas.

In Florida, Dr. Hamilton P. Traub[7] and the writer, besides Dr. H. Harold Hume, who has recently become interested in this genus, have devoted considerable attention in the past several years to the collecting of species of *Hymenocallis* from the wild, and to assemble a representative collection of the many types found growing in gardens.

Morton (page 80, 1935 Year Book) lists *Hymenocallis Collieri, floridana, keyensis, Kimballi, laciniata, Mexicana, Palmeri* and *tridentata,* as native to one part or another of Florida. Of these, the writer has collected only one species that has been definitely identified, *H. floridana* (Raf.) Morton, which Small lists as *H. rotatum,* Le Conte, in his Manual of the Southeastern Flora. Another dwarf species, believed to be *H. Palmeri,* has been collected and is under observation, but has not bloomed. Two more unidentified species have been collected. One of these, gathered in two places in Seminole county, has the most beautiful flower and cup of any *Hymenocallis* species yet noted in Florida.

What is probably *Hymenocallis keyensis,* (or *H. Caribea* and *H. Caymanensis*) and a number of closely allied types are common in old Florida gardens and presumably over the lower South. They have large, shiny strap leaves like a large amaryllis and form decorative foliage plants as they are mostly evergreen unless cut down by frost. They grow well in rich, well-drained soil, or in sand, and produce their fragrant white, showy umbels of blooms in the early summer. The flowers are marked by the characteristic *Hymenocallis* cup (the name means beautiful mem-

[7]Dr. Traub has the following in his collection,—One species collected for him by Mr. Heaton in Monroe County on the Florida Keys; one species from the Everglades, Collier County; one species from the West Coast collected by Dr. Hughes in Lee County; one species collected on the banks of the St. Johns River in Brevard County; one species from Mitchell Hammock, and one species found northwest of Oviedo, both in Seminole County, and one species from Benson Springs in Volusia County.

brane) which extends between the filaments. The variation between various species and garden types is frequently in the size and shape of the cup.

The illustration of a *Hymenocallis* plant in bloom appearing in this number of "Herbertia" was grown from bulbs obtained in Mitchell Hammock, a rich muck hollow near Oviedo, Florida. The bulbs were gathered in 1935 and the bloom appeared at Lakemont Gardens, Winter Park, Fla., in early June, 1936. The bulbs grew naturally in a nearly pure vegetable humus, and were replanted in rich lake-shore soil.

This species seems to set seed readily. It has a small bulb, the pot in the photograph being of five-inch size. The bulbs are about 1¼ inches diameter at maturity. The flower pictured was identified from an herbarium specimen by the United States National Museum, Smithsonian Institution, Washington, D. C., as *Hymenocallis Floridana* (Raf.) Morton. There are two flowers, with a petal spread of eight inches each, and a snow-white cup more than 2½ inches in diameter. The flower is a typical and striking example of the beauty of this group of amaryllids. The flowers opened on the night before the picture was taken, and remained in good condition for a few days. The foliage is like that of a small hybrid amaryllis. The perfume is strong and pleasant.

AMARYLLID ISSUE OF THE "MAYFLOWER MAGAZINE"

WYNDHAM HAYWARD, *Florida*

The interesting amaryllid number of the well known John Lewis Childs magazine of former years, the "Mayflower", dated August, 1904, has been brought to our attention by Mr. Cecil Houdyshel of LaVerne, Calif., who very courteously sent us the faded and delicate little pamphlet that he treasures.

For several years the writer had endeavored to obtain a copy of this issue of the "Mayflower", published at Floral Park, N. Y. by The Mayflower Publishing Company, of which the late John Lewis Childs was president. The Childs firm had an important part in the popularization and introduction of interesting amaryllids, as well as the famous Childs' hybrid amaryllis, more than 30 years ago, especially in the first decade of the 20th century. The issue devoted to amaryllids was very rare, however, and inquiries which were even brought to the attention of Mrs. Childs, widow of the flower specialist, gave no result, as she stated she did not know where a copy might be obtained.

The subject of "Amaryllids" in the magazine under discussion was treated by Walter Nathan Pike, concerning whom we have no additional information at this time. The article was divided into sections, five in number, and covering, about 20 pages of close type. There are a few drawings as illustrations. The main sections of the article are as follows: The Amaryllis Family; The Amaryllis and its Culture; The Crinum and its Culture; The Hippeastrum and its Culture; Other Amaryllids and their Culture. This last section covers *Brunsvigia, Clivia, Chlidanthus, Cooperia, Eucharis, Haemanthus, Hymenocallis, Ismene, Lycoris, Nerine, Phaedranassa, Sprekelia, Sternbergia, Vallota,* and *Zephyranthes.*

Among interesting items noted are the following:—"Many will doubtless be surprised to learn that the Belladonna Lily is perfectly hardy in Orange, N. J., without any winter covering or protection whatever"; "The only hybrid *(Crinum)* in general cultivation is *Crinum Powellii,* a cross between *C. longifolium* and *C. Moorei.*"

"Unfortunately the majority of these magnificent hybrids (Amaryllis) increase so slowly that they cannot be sold at prices sufficiently low to place them within the reach of flower lovers in general."

"It *(Hippeastrum equestre)* is to be found in almost every Florida dooryard, great clumps consisting of sometimes as many as 50 bulbs, that produce a perfectly marvelous display when in full flower in March and April. Although it grows there like a weed, and absolutely without care, at the North it is not so accommodating. Success with it as a pot plant depends on a soil made light with sand and in winter keeping it warm, with the soil neither too moist nor too dry."

"As the *Brunsvigias* succeed in the gardens of the Riviera in Southern France and Northern Italy, it is reasonable to suppose they would also flourish in the gardens of our own South, to which they would make a grand acquisition."

"Strong sunshine is injurious to these plants *(Clivias)* at any season of the year, therefore select a more or less shady situation for them; and as they are evergreen and have no true bulb, they must never be dried off sufficiently to cause the leaves to die."

"They *(Cooperias)* are equally desirable for pot culture or for the open ground and may be wintered in the pots or like *Gladiolus,* etc."

COLLECTING ZEPHYRANTHES ATAMASCO AND TREATIAE IN NORTHEASTERN FLORIDA

Mrs. W. E. MacArthur, *Florida*

For several years I have been studying and collecting bulbs and seeds of *Zephyranthes* found in this and other localities. The writings of Mr. H. H. Hume of Gainesville, Florida have been of inestimable value to me in this interesting study.

May, 1935 I gathered a fine lot of *Zephyranthes Treatiae* seed and many bulbs. Seeds were promptly sent to Natal, South Africa and a recent report tells of many sturdy *Treatiae* seedlings anxiously being watched for first bloom. Also, bulbs and seeds have been sent to New Jersey, North Carolina, Texas and Louisiana where they seem to be at home, and they have created a wholesome interest in themselves.

It would be reasonably safe to say that there is more acreage of *Zephyranthes Treatiae* in Duval County than any other County in Florida. I know of an inclosed pasture that is never burned-over, and every spring, with unfailing regularity, it is covered with myriads of these dainty Fairy Lilies, especially after a good rain. I have observed that in clearing these pine flatwoods for cultivation, the bulbs seem to disappear entirely just as does the common but valuable wire-grass *(Aristida stricta).*

It is almost impossible to locate *Zephyranthes Treatiae* after the blooming season is over, as the sparse foliage quickly disappears.

Recently I found Mrs. Mary Treat's "Home Studies in Nature" in a second-hand book shop, and it immediately became a prized possession. This book was written during the years of 1876 to 1886. In the Chapter "Life in Florida" she describes the delight of finding a wonderful large "Amaryllis atamasco" growing in the soft mucky soil along the banks of Governor's Creek near Green Cove Springs, Florida in January, 1876. Later she discovered a large area of similar beautiful lilies blooming in the low pine barren among the grass near the St. Johns River. Noticing particularly that the foliage was different from that of *Zephyranthes Atamasco* for the leaves were narrow, thick, shorter and of a different shade of green. Bulbs of these new lilies were sent to the Botanic Gardens at Harvard where they were pronounced a new species and named by Professor Sereno Watson, *Zephyranthes Treatiae.*

There are many fine colonies of *Zephyranthes atamasco* growing in secluded, almost impenetrable areas in this section. One fine colony of the loveliest whitest flowers flourished in the cool, shady, mucky shores of Fishweir Creek within the shadow of Jacksonville's skyline. Last December I paid them a visit expecting to see a few pearly spears only to find that drainage workers had deepened the Creek bed and the bulbs were buried in mud. Some of the bulbs had sent up a few leaves and upon digging for bulbs I discovered that they had formed another bulb up the neck as much as three inches above original bulb in an emergency effort to lift themselves out of excess mud. Many of these bulbs will decay before they can lift themselves to proper depths and it is unfortunate that many native colonies are destroyed in a similar manner.

I found some fine large white *Zephyranthes atamasco* growing in a cypress hammock in Nassau County near the highway under one of the largest Red Buckeye

(Continued on page 90)

CLASSIFICATION OF AMARYLLIS (HIPPEASTRUM) FLOWER TYPES

Revised for 1937 and 1938 shows: Hybrid amaryllis shall be placed tentatively into the (1) Grandiflora, and (2) Miniature groups on the basis of the characters indicated below,—

GRANDIFLORA GROUP

The Grandiflora group is tentatively divided into the following subgroups,—

A. Flowers distinctly drooping, tube long (over 3 inches long)
B. Tube very long (over 4 inches) *Solandriflorum Type A*
BB. Tube shorter (3 to 4 inches) *Solandriflorum Type B*
AA. Flowers slightly upright, horizontal or slightly drooping, tube short
C. Tube narrow, (1 to 3 inches)
D. flower compact, *Reginae Type A*
DD. flower pointed, *Reginae Type B*
CC. Tube open (to 1 inch)
E. flower compact, *Leopoldi Type A*
EE. flower pointed, *Leopoldi Type B*

NOTE,—For exhibition purposes there shall be two major classes, (1) Exhibition classes in which flower form and size standards are the important considerations, and (2) Decorative classes in which the use of the plant—landscape, rock garden, forcing, etc., shall be the important considerations.

MINIATURE GROUP

The Miniature group is tentatively divided into the following subgroups,—

A. Tube narrowly funnel-shaped, *Phychella Type*
AA. Tube openly funnel-shaped, *Habranthus Type*

CLASSES AND AWARDS (PRIZE SCHEDULE)

At the annual National Amaryllis Show, and at other exhibitions, as voted by the Board of Directors, the Society will award its First Class Certificate for meritorious new and standard varieties; its award of merit; and its first, second, third and fourth prize ribbons, in the classes indicated below. Any money prizes offered shall be authorized by action of the Board of Directors.

Each species or varietal exhibit shall consist of one or more potted flowering plants, or one or more flower scapes up to and including 1938; after which date three potted flowering plants or three flower scapes shall be required in each case.

SECTION A. AMARYLLIS (GENUS HIPPEASTRUM)

Class 1. Single entries of Hippeastrum species.
Class 2. Best collection of botanical species and varieties.
Class 3. Best collection of 10 or more Grandiflora varieties.
Class 4. Best collection of 5 to 10 Grandiflora varieties.
Class 5. Best collection of 10 Decorative varieties.
Class 6. Best collection of 5 or more Miniature varieties.
Class 7. Best display.
Class 10. Best bloom in Show.

Standard Grandiflora and Miniature Varieties

The score card, and prize schedule are reproduced on the following pages.

Score Card—Exhibition Type[8] *Hybrid Amaryllis (Hippeastrum)*

All flowers to be expanded in ½ or more direct sunlight.

Color Class No..... Exhibitor's No.....

Flower Type.....

Character to be Scored	Method of Rating	Possible Score
Color and texture	No flower of inferior color to be considered; the full 50 points to be deducted for major color defects; dark green in combination with medium and dark red is especially objectionable.	50
Form	Rating should be based on conformity to type.	15
Size	Except in the case of Solandriflorum types, the following shall rule (diameter across face): 6″ to 7″, allow 5 points; 7″ to 9″, allow 10 points; 9″ and above, allow 15 points.	15
Habit	For Solandriflorum types the drooping habit is normal; but for Reginae and Leopoldi types, horizontal and slightly erect carriage are to be favored, although slight drooping is allowable.	5
Number of flowers to scape	For less than 3 or more than 5 allow 2 points; for 3 to 5 allow 5 points.	5
Length of scape	The length should be considered in relation to size of flower; scapes too short or too long should be penalized	5
Character of scape	Scapes should not be so coarse as to be conspicuous, but should be sturdy enough to hold up flower well	3
Fragrance	Should not be too faint or too strong	2

[8]NOTE: No entry is to receive first prize unless a rating of a least 86 points is merited; second and third prizes may be awarded to entries rating from 76 points up. A Score Card for the Decorative Type is in preparation.

Classes of Grandiflora and Miniature Varieties (Prize Schedule)

Color Classification (Fischer Color Chart)	Standard Grandiflora Varieties							Standard Miniature Varieties	
	Solandriflorum Type A	Solandriflorum Type B	Reginae Type A	Reginae Type B	Leopoldi Type A	Leopoldi Type B	Decorative Types	Habranthus Type	Phychella Type
White without markings	101	151	201	251	301	351	401	451	501
White with slight pale red markings	102	152	202	252	302	352	402	452	502
White with lighter red markings	103	153	203	253	303	353	403	453	503
White with lighter red stripes, keels, stars, tips, etc	104	154	204	254	304	354	404	454	504
White with red stripe, keels, stars, tips, etc	105	155	205	255	305	355	405	455	505
Yellow without markings	106	156	206	256	306	356	406	456	506
Yellow with markings	107	157	207	257	307	357	407	457	507
Bronze without markings	108	158	208	258	308	358	408	458	508
Bronze with slight markings	109	159	209	259	309	359	409	459	509
Bronze with distinct markings	110	160	210	260	310	360	410	460	510
Orange without markings	111	161	211	261	311	361	411	461	511
Orange with slight markings	112	162	212	262	312	362	412	462	512
Orange with distinct markings	113	163	213	263	313	363	413	463	513
Pale red without markings	114	164	214	264	314	364	414	464	514
Pale red with slight markings	115	165	215	265	315	365	415	465	515
Pale red with distinct markings	116	166	216	266	316	366	416	466	516
Lighter red to light red without markings	117	167	217	267	317	367	417	467	517
Lighter red to light red with slight markings	118	168	218	268	318	368	418	468	518
Lighter red to light red with distinct markings	119	169	219	269	319	369	419	469	519
Red without markings	120	170	220	270	320	370	420	470	520
Red with slight markings	121	171	221	271	321	371	421	471	521
Red with distinct markings	122	172	222	272	322	372	422	472	522
Dark red	123	173	223	273	323	373	423	473	523
Darker red	124	174	224	274	324	374	424	474	524
Violet red	125	175	225	275	325	375	425	475	525
Rainbow and tri-color types, excluding green	126	176	226	276	326	376	426	476	526
Any other color	127	177	227	277	327	377	427	477	527
Best bloom of type	149	199	249	299	349	399	449	499	549

SECTION B. HEMEROCALLIDS (DAYLILIES)

Class 601 Best collection of Hemerocallis species.
Class 602 Best collection of hybrid Hemerocallis varieties.
Class 603 Best Display of hybrid Hemerocallis varieties.
Class 610 Best hybrid Hemerocallis bloom in show.
Class 621 Single entries of hybrid Hemerocallis varieties.

Class 651 Hosta

Class 661 Leucocrinum

Class 671 Hesperocallis

SECTION C. AMARYLLIDS (EXCEPT GENUS HIPPEASTRUM; SEE SECTION A, ABOVE)

Class 701 Best collection of Agapantheae
Class 702 Agapanthus
Class 703 Tulbaghia

Class 751 Best collection of Allieae
Class 752 Bloomeria
Class 753 Muilla
Class 754 Allium
Class 755 Nothoscordum
Class 756 Tristagma
Class 757 Steinmannia
Class 758 Brodiaea
Class 759 Diphalangium
Class 760 Milla
Class 761 Androstephium
Class 762 Behria
Class 763 Bessera
Class 764 Leucocoryne
Class 765 Stropholirion
Class 766 Brevoortia

Class 801 Best collection of Gilliesieae
Class 802 Erinna
Class 803 Solaria
Class 804 Speea
Class 805 Trichlora
Class 806 Miersia
Class 807 Gilliesia
Class 808 Gethyum
Class 809 Ancrumia

Class 851 Best collection of Galantheae
Class 852 Galanthus
Class 853 Lapiedra
Class 854 Leucoium

Class 901 Best collection of Amaryllidaea
Class 902 Amaryllis (Belladonna)
Class 903 Brunsvigia
Class 904 Ungernia
Class 905 Nerine

Class 951 Best collection of Crineae
Class 952 Chlidanthus
Class 953 Crinum
Class 954 Ammocharis
Class 955 Cyrtanthus
Class 956 Stenolirion
Class 957 Vallota

Class 1001 Best collection of Zephyranthae
Class 1002 Zephyranthes
Class 1003 Cooperia
Class 1004 Haylockia
Class 1005 Crocopsis
Class 1006 Apodolirion
Class 1007 Sternbergia
Class 1008 Gethyllis

Class 1051 Best collection of Haemantheae
Class 1052 Hessea
Class 1053 Carpolyza
Class 1054 Strumaria
Class 1055 Buphane
Class 1056 Griffinia
Class 1057 Clivia
Class 1058 Haemanthus
Class 1059 Choananthus

Class 1101 Best collection of Ixiolirion species

Class 1151 Best collection of Eucharideae
Class 1152 Hyline
Class 1153 Stenomesson
Class 1154 Pamianthe
Class 1155 Pancratium
Class 1156 Elisena
Class 1157 Ismene
Class 1158 Hymenocallis
Class 1159 Calostemma
Class 1160 Calliphruria
Class 1161 Eucharis
Class 1162 Stricklandia
Class 1163 Eurycles
Class 1164 Klingia

Class 1201 Best collection of Eustephieae
Class 1202 Urceolina
Class 1203 Hieronymiella
Class 1204 Eustephia
Class 1205 Eustephiopsis
Class 1206 Callipsyche
Class 1207 Eucrosia
Class 1208 Phaedranassa

Class 1251 Best collection of Hippeastreae (Except Genus Hippeastrum)
Class 1252 Placea
Class 1253 Sprekelia
Class 1254 Lycoris
Class 1255 Vagaria

Class 1401 Best collection of Narcisseae
Class 1402 Cryptostephanus
Class 1403 Tapeinanthus
Class 1404 Best collection of Narcissus species
Class 1405 Trumpet Narcissi
Class 1406 Incomparabilis Narcissi
Class 1407 Barrii (also Burbridgi) Narcissi
Class 1408 Leedsii Narcissi
Class 1409 Triandrus Narcissi
Class 1410 Cyclamineus Narcissi
Class 1411 Jonquilla Narcissi
Class 1412 Tazetta and Tazetta Hybrid Narcissi
Class 1413 Poeticus Narcissi
Class 1414 Double Narcissi

SECTION D. ALSTROMERIALES

Class 1501 Alstroemeriaceae
Class 1551 Petermanniaceae
Class 1601 Philesiaceae

(Continued from page 85)

trees *(Aesculus Pavia)* that I have ever seen in this section. They were not in colonies and they grew deep and were difficult to extract from muck.

There seems to be a general impression that burned-over woods brings the *Zephyranthes Treatiae* into bloom. I doubt this belief, but the blackened woods do make a wonderful setting for these lovely dainty lilies that suddenly gladden the landscape in May. It is certain that moisture plays an important factor in bringing the Rain Lilies into perfection as it does with other blooming plants.

Wyndham Hayward

Pure White Hybrid Hippeastrum, Edelweiss

REGISTRATION OF NEW VARIETIES

Descriptions of new varieties of *hybrid amaryllids, hemerocallids,* and *alstroemerids* for this section must reach the Secretary not later than May 1 to be included in the current Year Book (Herbertia). This information is published to avoid duplication in names, and to provide a place for the authentic recording of descriptions. Names should be as short as possible, one word is sufficient. It is suggested that in no case should more than two words be used.

Hybrid Amaryllids

Introduced by Mr. Frank Vasku, Winter Park, Fla. Hybrid Hippeastrums, No. 54, *Rouge,* leopoldi type B, deep red, FCC-36[9]; No. 87, *Bertha Vasku,* reginae type B, deep red, FCC-36.

Introduced by Dr. Hamilton P. Traub, Mira Flores, Orlando, Fla. Hybrid Hippeastrum, No. 69, *Marina,* leopoldi type B, white with light pink markings, 10½" diameter.

Introduced by Mr. I. W. Heaton, Orlando, Fla. Hybrid Hippeastrums, No. S1126, *Orlando Salmon,* leopoldi type A, light salmon, slightly darker at throat, uniform rounded petals; received the award for the best bloom at the 1936 National Show; No. 1524S, *Red Sunset,* leopoldi type A, a blood red compact bloom, very uniform rounded petals, open face slightly veined with darker keel; award of merit for best bloom of compact leopoldi type at 1936 National Show.

Introduced by Mr. Wyndham Hayward, Lakemont Gardens, Winter Park, Florida. Hybrid Hippeastrum, No. 167, *Edelweiss,* intermediate between Leopoldi types A. and B., pure white, of good size, 7 in. in diameter, broad petals and excellent shape.

R. H. S. HYBRID AMARYLLIS AWARDS

Two varieties of hybrid Amaryllis (Hippeastrum) were given the official Award of Merit of the Royal Horticultural Society in England during April, 1936, according to published data in the June issue, Journal of the R. H. S. as follows:

"Hippeastrum *Carolyn* A. M. April 7, 1936. From Mrs. Walter Burns, North Mymms Park, Hatfield; a very handsome rich blood-red variety with large flowers; the segments of the perianth are very firm and of good substance.

"Hippeastrum *Clive Cookson* A. M. April 21, 1936. From Clive Cookson, Esq. (gr. Mr. W. J. Stables), Hexham; a very handsome variety with large glowing vermilion flowers deepening to blood-red at the center; the segments are broad and reflexed; the open flowers are of perfect form and measure slightly over 7 inches across at the widest part."

NEW DAYLILIES

Dr. A. B. Stout, Director of the Laboratories, New York Botanical Garden, has favored us with the following descriptions, including illustrations, of two new outstanding hybrid Daylilies which are to be introduced in the near future.—Ed.

The Linda Daylily

In respect to the ensemble of coloring, the flowers of the Linda Daylily are somewhat bicolored, pale-fulvous, and eyed. The throat is a shade of yellow approaching apricot yellow with greenish tinges at its base; the sepals are more clearly yellowish with almost no traces of fulvous; the outer half of the petals is delicately overcast with pale fulvous and there is a conspicuous eye zone of Brazil red bisected by a strip of pale fulvous that extends along the midvein toward the throat. The open flowers have a spread of about 4½ or 5 inches, and they are spreading rather than recurving. A well-known plant usually stands between 3 and 4 feet tall and the scapes are much branched and upstanding. The season of bloom at New York is in early July.

The ancestry of the Linda Daylily includes the species *Hemerocallis Thunbergii, H. citrina,* and two different seedlings of *H. flava* which came from the wild in central China.

The above is the first printed description and mention of this daylily.

—A. B. Stout.

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[9]FCC is the abbreviation for First Class Certificate from the American Amaryllis Society, the figures following refer to the year of the award.

New York Botanical Garden

Flower of Linda Daylily

Natural size

New York Botanical Garden

Flower of Wolof Daylily
Natural size

The Wolof Daylily

The Wolof Daylily has flowers of dark brownish-red-fulvous coloring, the stature of the plant is robust (from 3 to 4 feet), and the season of bloom at New York is in July. A more precise designation of the flower coloring according to Ridgway's "Color Standards and Nomenclature" is as follows:—The throat is clear

New York Botanical Garden

The Wolof Daylily

orange near the shade of light cadmium; the sepals are between Morocco red and garnet brown without either a mid-zone or a central stripe; the petals have a mid-zone near garnet brown or maroon, which is somewhat darker than the sepals; the blade outside this zone is near Morocco red with darker veins; the stripe that extends through each petal tapers and is not sharply defined along its margins. The back of

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Massachusetts Horticultural Society

Hippeastrum reticulatum striatifolium

4. GENETICS AND BREEDING

INHERITANCE IN HIPPEASTRUM RETICULATUM-STYLOSUM CROSSES

SYDNEY PERCY LANCASTER, *Secretary,*
Royal Agricultural & Horticultural Society of India, Calcutta

Hippeastrum reticulatum was introduced into India prior to 1879 as I find mention of the variety in a price list of our Society for that year though a list of 1874 fails to give the name. When the variety *Mrs. Garfield* was introduced I have been unable to trace as our sources of reference in this respect are meagre. I have however read in some catalogue of English Nurserymen of 1880-86 that there were a number of *reticulatum* hybrids raised but only *Mrs. Garfield* survived. In William Bull's catalogue of 1882-3 I see that *reticulatum* is offered at 5 shillings and a variety *Pirloti* at 10/6 and 15 shillings. I wonder whether the Hippeastrum *Mrs. Garfield* obtained from a friend in Sussex, England last year is the variety *Pirloti* for it is quite distinct from our *Mrs. Garfield.* In this connection I think it right to call attention to Bailey's Cyclopedia where on page 1493 he gives the colour of *reticulatum* as bright mauve or purple red whereas it is a distinct pink. However it is not about *reticulatum* I wish to write this note but in connection with the progeny raised from *H. reticulatum* pollinated by *H. stylosum* and vice versa.

H. reticulatum and *Mrs. Garfield* both flower during our wet weather, i.e., July-September but *stylosum* and other varieties in March-April. In 1932 an out of season spike of *stylosum* appeared in July and all four flowers were pollinated by *reticulatum* and the twin flowers of *reticulatum* were fertilised by *stylosum* pollen. The *reticulatum* pods gave only three round Canna-like seeds but from the three *stylosum* pods that ripened I obtained 61 plump seeds and a large number of papery ones. In due time all 64 seedlings showed above ground and surprised me by displaying a thin white midrib. Today I have the sixty four bulbs but many have not made much growth, most bulbs being the size of a hazel nut or smaller but five or six are an inch and a half in diameter. The variation in length of leaf runs from 10 to 13 inches with an average width of an inch and a half, the midrib is represented as a thin line or striping to a width of an eighth inch. The *reticulatum* trio have darker foliage and the stripe is whiter than the others and the base on the reverse flushed wine red as in *reticulatum.*

Two bulbs flowered last August, both pink though there was a difference in shade between pure *reticulatum* and the hybrids but the netting was present, one was twin flowered and the second bore four blooms which were more or less like *stylosum* in shape. I am looking forward to the remaining bulbs flowering and hope there will be sufficient variation from normal to warrant the experiment.

Note the measurements of foliage of the following:—

stylosum, length 15″-18″, width 1½″
reticulatum, 12″, width 2½″, stripe ¼″
Mrs. Garfield, 15″-16″, width 2″, stripe ⅜″
Pirloti (?), 14″, width 3½″, stripe ½″ to ¾″
hybrids, 10″-13″, width 1½″ stripe from a thin line 1/32″ to several stripes.

THE CULTIVATED VARIETIES OF POLYANTHUS AND RELATED NARCISSI

GORDON W. GIBSON, *F. L. S.*,
Isles of Scilly Experimental Station

The number of cultivated varieties of *N. Tazetta* has decreased considerably since Baker wrote in his monograph "The Narcissus" in 1875—"These natural varieties have been largely augmented by the Dutch florists who raise numerous seedling forms . . . So long ago as 1800 between two and three hundred garden forms were cultivated." It is remarkable therefore, that the modern hybridist who has added so many wonderful flowers to the other classes, should have neglected the Polyanthus Group entirely and that there are no new varieties available. Let us hope that the late Dr. David Griffith's appeal in the Amaryllis Society's Year Book for 1935, may be successful in arousing an interest so that we may look forward to new treasures in the future.

N. Tazetta—(Polyanthus Narcissus)

var. papyraceus grandiflorus—Paper White.
"Chinese Sacred Lily"—single & double forms.
Grand Soleil d'Or.
Grand Primo, and *Scilly White.*
Grand Monarque.
var. compressa.
var. gloriosus.
Avalanche.

Most of these varieties are well known to all daffodil enthusiasts. Of the lesser known *Scilly White* is an attractive free growing variety rather like *Grand Primo.* Its origin is lost in antiquity, but it has certainly been growing in Scilly for 200 years. The plant is of very easy culture indoors and out, and is less stiff than *Grand Primo* with a whiter flower and paler citron cup. The distinctions are slight, and being softer it is not too good as a market flower. *Tazetta compressa* is an old variety, useful for the garden. The flower is a rather discoloured white with a bright lemon cup. The scape is many flowered with each flower in the truss looking straight at you. *Gloriosus* is a strongly scented white and bright orange flower. Its form and substance are not good but the plant is quite distinct, and like most polyanthus varieties it forces well. It will grow under cooler conditions than are tolerated by most true *Tazetta* varieties. *Avalanche* is a very robust garden variety with similar colouring to *Grand Monarque.* The leaves are broad, so that an amateur gardener's enquiry why so many leeks were being grown may be excused. *Her Majesty* is sometimes listed, but the perianth is not so white as that of *Gloriosus* which is to be preferred.

N. xpoetaz—(N. Tazetta x *N. poeticus.)*

Laurens Koster
Helios
Early Perfection
Admiration. A. M. 1914. (R. H. S.)
Scarlet Gem. A. M. 1914.
Cragford
Medusa. F. C. C. 1926. (R. H. S.)
Glorious. F. C. C. 1926. A. M. 1928.
St. Agnes. A. M. 1926. F. C. C. (Haarlem) 1927.
King Craft. A. M. 1925.
Red Guard. A. M. 1923. F. C. C. (Haarlem) 1927.
Cheerfulness. A. M. 1923.

The first four are of Dutch origin and are pre-eminently forcers. Of these *Laurens Koster* is the most widely grown. It is very easily managed and is as useful for the amateur's pots, as it is to the market grower.

Early Perfection is a white and yellow forcing variety of poor form and only grown for this purpose. *Helios* (poetaz) is primrose yellow with a deeper yellow frilled cup; inclined to be rather thick and short in stem. *Admiration* has a finer flower than *Orange Cup*, and is a larger plant. The petals are sulphur yellow with an orange-scarlet edge to the cup. All the above may be readily obtained at low prices.

Scarlet Gem is a decided acquisition, and has conspicuous *Tazetta* characteristics. It is an excellent pot plant and will be more widely grown as it becomes cheaper. It is one of the late P. D. Williams productions, the flowers are yellow with a bright orange-red cup. *Cragford* is white with orange-red cup and was considered by the raiser, P. D. Williams, to possess outstanding forcing qualities. The perianth is not too good and the stock is still small, but it is the earliest red and white variety we have at present. *Medusa* was one of the first of the white poetaz with an almost blood-red eye. Highly decorative but with an objectionably long pedical, the variety is soft but has the merit of being cheap to buy and should be grown by all. *Glorious* is an outstanding variety with two to four blooms on a stem, and almost as large as a "Poet" with pure white perianth and an orange-scarlet eye. It was raised by J. C. Williams and is generally considered the best poetaz extant. The flowers are carried well above the leaves which have a rather drooping habit. *St. Agnes* is one of the many superb poetaz varieties which P. D. Williams has given us. It is similar in colouring to *Glorious*, but of more erect growth. *King Craft* is the largest poetaz variety so far exhibited. It is a most robust plant of rapid increase with ivory-white overlapping perianth, and a bright orange-red eye. *Red Guard* is a remarkable flower raised by the late Mrs. R. O. Backhouse—deepest golden yellow with a small deep red cup. The colour from the crown radiates into the petals. It may be bought for two or three shillings a bulb. *Xenophon* A. M. 1922 is another of Mrs. Backhouse's raising that should be mentioned. It shows fine yellow and red colour contrasts. *Halvose* is also a flower that pleases many. Raised by P. D. Williams, this is a yellow and orange-red poetaz with a scarlet sheen in the petals. *Cheerfulness* is a most desirable and distinct plant, bearing three or four large neat double blooms on a stem. It is a double form of *Elvira* with creamy-white petals, and white and yellow centre. The variety is being grown for the flower market in increasing quantities each year.

N. triandrus x *N. Tazetta*

Silver Chimes is a most fascinating hybrid, and a very satisfactory pot plant. Guy Wilson states that he has grown it in a cold green-house for three years in succession in the same large pots which were then transferred to the show bench. Out of doors even in the south-west of England it is inclined to come rather too short.

There are other desirable varieties such as *N. Tazetta var. canaliculatus*. This is a dainty sub-species from Mentone with many flowers on a stem, and is suitable for a sunny situation in the rock garden. Lack of space precludes mention of other varieties for the present.

THE HORTICULTURAL CLONES OF DAYLILIES AND THEIR EVALUATION

Dr. A. B. Stout, *Director of the Laboratories, The New York Botanical Garden*

A survey of the known species of daylilies *(Hemerocallis)* was presented in the Year Book of the American Amaryllis Society for 1935, and hence this article will attempt to survey and to some extent evaluate the horticultural clones in this group of plants.

The development of the daylilies as garden plants, quite as in other groups of horticultural plants, involves the discovery of wild types which are brought into cultivation; the selection of chance variations or hybrid seedlings which may appear and attract attention; and the deliberate effort to obtain new types by hybridization and selective breeding. It is to be noted that the daylilies, both of the species and of the derived sorts, are propagated vegetatively by division and that the production of new daylilies consists in obtaining seedlings of merit which are then multiplied by division to give horticultural clones.

The wild types of daylilies already described include but thirteen distinct species several of which have only recently been known. In addition certain wild types have recently come from the Orient which may later be designated as species. Although the species are not numerous they do provide excellent material for hybridization and selective breeding for they display a wide diversity in stature, habit of growth, season of flowering, and in the color, size, and form of the flowers. In stature there is a range from about a foot in height to seven feet tall. The flowering season in the vicinity of New York extends from early May until heavy freezes in October. The colors of the flowers include yellow and orange in clear colors and orange in combinations with fulvous red. It is certain that other wild types remain in the Orient to be discovered, introduced into culture and used in hybridizations in the future improvement of the group.

Almost no horticultural development of the daylilies has occurred in the Orient. One interesting type with double flowers, of which there are two rather distinct clones, has been long and widely cultivated in the Orient. Certain daylilies have been cultivated in China for the flowers which are used as a food that is deservedly regarded as a delicacy. But only a few of the hybrid daylilies now grown as garden clones originated in the Orient.

In Europe the production of horticultural daylilies began about 1890. At that date several types *(Hemerocallis flava, H. minor, H. Middendorffii, H. Dumortierii,* and *H. fulva* clone Europa) were being grown. The first four of these flowered about the same time early in spring and a few accidental hybrids between these types as parents appeared. It occurred to Mr. George Yeld, who is still living in England, that these types of daylilies might be good subjects for hybridization and breeding. The first of his hybrids to be made is *Apricot* which was first exhibited in 1892. Some of these early hybrids as *Estmere, Apricot, Tangerine, Gold Dust* and *Sovereign* (the last two are of unrecorded origin) are excellent garden subjects that will probably never be surpassed for their own respective classes. These clones are semi-dwarf; they bloom in May and early June; the flower colors are yellow or orange; and they exhibit considerable diversity in habit of growth.

In the decade between 1890 and 1900 three new species and two clonal types of daylilies either came from the Orient or were definitely described for the first time. These include the yellow-flowered *Hemerocallis Thunbergii,* the orange-fulvous *H. aurantiaca,* the night blooming *H. citrina,* the *H. fulva* clone *Maculata,* and the clone which was named *"H. aurantiaca major."* All of these flower in early July. Evidently one of the first of the hybrids from this group, and presumably the first hybrid *Hemerocallis* produced in America, was the *Florham* Daylily reported in 1899 as a seedling obtained by crossing *H. aurantiaca Major* by *H. Thunbergii.* In England the *Luteola* Daylily was mentioned in 1900. Willy Müller, in Naples, Italy, used *H. citrina* and certain fulvous types in breeding and several of his hybrids were mentioned as early as 1903. His *Parthenope* (1903) and *Sir Michael Foster* (1904), from *H. aurantiaca Major* and *H. citrina,* bloom in late June and early July and were distinct additions to the group of garden daylilies.

Other seedlings continued to appear, especially in the early-summer-blooming group, either as chance hybrids or as products of breeding endeavor until in 1925 about 100 such individuals had been named as horticultural clones. In the decade since 1925 (1925-1936) much attention has been paid to the growing of seedlings and in some cases there has been deliberate and extensive breeding. As a result about 150 more clones were added to the list of horticultural daylilies. On Jan. 1, 1936, the writer had record of 229 daylilies that had been named as horticultural clones and about 50 of these had appeared since 1934. In addition eight clones were announced as new for culture between Jan. 1, 1936 and May 2. With very few exceptions the clones introduced during the past decade have been produced in England and in

the United States and mostly the "breeding" has been done by the nurserymen, Mr. Thomas Perry, Mr. C. Betscher and Mrs. Thomas Nesmith, and by persons concerned only in the breeding as Mr. George Yeld and the writer. Various other persons have contributed one or more varieties each.

How shall we evaluate the clones of daylilies that have now been named for garden culture? Many are of no special merit and need not be considered for culture and this statement applies to a number of the clones named during the past two years. In the development of any group of garden plants certain seedlings are likely to be named and introduced by persons who know too few types and who have few seedlings from which to make selections. This has been and still is the case for daylilies. Some of the daylilies which would otherwise be rated high are very similar to each other. Also various daylilies which were "good" a few years ago are now excelled by more recent introductions. Thus the time has arrived when gardeners and nurserymen may well exercise critical evaluation of the various daylilies. The writer will not attempt to designate here what he considers to be the thirty best clones of those now named. The selection of such a group by any one will depend much on personal tastes and preferences. Also the value of such an evaluation will depend on the acquaintance which one has with the varieties in existence. Frequently one sees in print the statement that a certain daylily is the "best" one in existence and also lists of the "best daylilies" appear from time to time. In several instances of this sort it was determined that the rating was based on knowledge of only a few varieties which include almost none of the more recent and excellent clones. But in making these evaluations it is to be recognized that the group has become so diverse that there are rather distinct classes of daylilies and that one may select, of these now named for the trade, at least as many as thirty clones which are excellent and decidedly different.

The writer has already (in the volume DAYLILIES) indicated the main horticultural classes of daylilies in respect to such important features as (1) habits of flowering, (2) the color of flowers, (3) the stature and habits of growth and (4) season of flowering but a brief summary may be here given.

The dwarf class in which plants are not more than one foot tall. Of this stature there is a clone of *Hemerocallis Dumortierii* and also certain plants of the *H. minor*. Most of the so-called "gracilis" and "graminea" in the trade are semi-dwarf and the flowers are poor. The *H. nana* is evidently a dwarf scarcely a foot tall which grows wild in southwestern China but thus far this species seems not to thrive in culture. Surely its culture should be possible in some part of the United States. Special effort is being made to obtain dwarf plants in seedlings that are hardy. *H. nana* has been hybridized with a dwarf clone of *H. Dumortierii* and selections have been made for low stature in the *H. minor*. Some of the seedlings already obtained promise to be of value in cultivation.

Several clones described as "dwarf" are decidedly not of such a class. The clone *"Dwarf Yellow"* grows to a height of 32 inches. Certain of the author's hybrids which measured dwarf for several years slowly grew to a taller stature. But dwarf clones with attractive flowers of diverse colors are certain for the near future.

The semi-dwarf class may be designated as having a stature for one to two feet tall. Plants of this size exist in the *H. minor*, the *H. Middendorffii*, and the *H. Dumortierii*. Of the older clones *Gold Dust, Tangerine, Sovereign* and *Apricot* are often not more than two feet tall, but in rich soil well-established plants will exceed this height. The Summer Multiflora Hybrids stand about two feet tall. *Perry's Pigmy, Sir William* and *Sunkist* are described as not over two feet tall.

Of the *semi-robust class*, from two to three feet tall, there are various daylilies that are excellent and of a wide range in flower coloring, season of flowering and habits of growth.

A robust class may be considered as comprising clones from three to five feet tall. There will be found such species as *H. Thunbergii, H. aurantiaca* and various clones of the widely variable species *H. fulva*. A large number of horticultural clones are robust in stature.

A *giant class* with scapes rising more than five feet include several wild types thus far unnamed, certain plants of *H. exaltata*, and certain seedlings now under observation.

In respect to flower colors the main classes of the wild species are *yellow, orange,* and *fulvous.* But in the numerous hybrid clones the range of colors has been extended into almost every possible shade of yellow and orange in clear colors and in combinations with shades of fulvous and red. The greater number of the clones already named, and especially of the older ones in the trade, have flowers in yellow or orange shades of color, and although there is considerable duplication yet there is chance for the selection of a considerable number of excellent clones that differ in certain characters.

Of the older recognized species of *Hemerocallis* only two, *H. fulva* and *H. aurantiaca,* have the fulvous red coloring in the face of the open flower. Seedlings with fulvous colorings began to appear as early as 1899 under the names *Pioneer, Fulcitrina,* etc., but no progress was made in obtaining outstanding plants with fulvous colors until recent years. Many of the fulvous colored daylilies that are now being offered in the trade are dull in color and of little merit. In several of the excellent varieties the fulvous coloring is faint and not a conspicuous feature, as in *Ajax, Wau-Bun, Aureole* and *Vesta. Sirius* has rich orange flowers with a faint fulvous overcast. The *George Yeld* Daylily has large flowers with a moderate flush of fulvous. The *Margaret Perry* Daylily has a throat of yellowish orange that extends in a narrow medium stripe through the fulvous colored petals and sepals. Several other fulvous colored daylilies have been distributed by Mr. Amos Perry of which *Dawn, Shekinah, Sunkist, Imperator, Viscountess Byng,* and *Byng of Vimy* may be mentioned.

The writer has reared many thousand seedlings of the fulvous group. As a rule outstanding patterns of color have only been obtained after several generations of selective breeding. Of the seedlings named in this class mention may be made of the following: *Bijou* has small flowers of a sprightly shade of fulvous red. *Cinnabar* has a somewhat richer coloring than the *H. aurantiaca. Rajah* has a conspicuous zone of garnet brown with blades of English red and a throat of orange. *Bagdad* has shades of orange, fulvous red and madder brown. *Mikado* has flowers in which there is a large mahogany red spot in each petal and these provide a pattern of bold contrasts and *Jubilee* also has conspicuous eye blotches but the ground color of the rest of the flower is paler. *Vulcan* has dark rich maroon shades of color. *Nada* is semi-dwarf and the flower color is morocco red. The *Theron* Daylily is a distinctly new type of daylily; the throat is pale yellow orange but outside of this the entire flower is a dark shade that approaches mahogany red with the eye zone of slightly darker coloring. A rather distinct class of color includes many shades of rosy pink of which *Charmaine* is a selection.

The extension of the flowering period of daylilies throughout August, September and even later at New York has been possible by the use of a new species, *Hemerocallis multiflora,* in hybridization. Also this species has numerous flowers of small size which is a somewhat new quality for daylilies.

An extensive program in breeding of daylilies has been in progress at The New York Botanical Garden for about twenty years. The known species were all obtained and also wild plants were received from the Orient among which several new species and new types of older species were found. These have been hybridized in almost every possible combination. Selective breeding especially for certain types of flower colors has been continued for as many as seven generations. More than 50,000 seedlings have been grown from which about 500 have been selected as plants of special merit. These are being critically studied and only the ones that are judged most excellent and distinctive are being named for horticultural uses. The selections now being propagated for further tests and comparisons include especially (1) early flowering plants in a wide range of red colorings, size of flower, and statures, (2) dwarf plants, and (3) numerous excellent plants flowering throughout August and September.

The most complete collection of species, horticultural clones, and seedlings in existence has been assembled at The New York Botanical Garden. Here are representatives of the known species, various wild types thus far unnamed, typical F_1 hybrids of many combinations between species, and all the horticultural clones that it has been possible readily to obtain. Special effort is made to obtain the new clones as soon as they are offered to the trade either in Europe or in America.

There are also several thousand seedlings of recent breeding which include many distinctly new types of horticultural interest and which indicate what the daylilies of the immediate future will be like. There are always numerous plants in flower at any time from early May until late in autumn. Gardeners and nurserymen may visit this public display collection to observe and to compare the various daylilies and to make their own decisions regarding the relative merits of the selections that seem most desirable for culture.

Recently popular interest in daylilies has greatly increased. Nurserymen in various sections are attempting to obtain the newer daylilies and to develop stock of them. Named seedlings are appearing in increasing frequency from an increasing number of sources. Possibly there will soon be need for establishing trial gardens for testing the new clones of daylilies and for rating them according to class. There is also a distinct need for their evaluation in different parts of the United States whence climatic conditions are decidedly different.

The Garden Club of America has recently adopted a plan for a very comprehensive five-year study of the daylilies. Collections of the horticultural clones will be assembled in various gardens in different sections of the United States for critical comparison and evaluation. The results of such studies and tests will no doubt be of value in acquainting the general gardening public with the merits of the daylilies.

The list of named daylilies is already a long one and it seems certain that many more clones will appear in the future. No one gardener can grow or will want all the clonal varieties that are or will be listed by nurserymen. The descriptions in catalogs and elsewhere are not always adequate and fully satisfactory to the buyer. For example, one clone recently described as attractive proves to be merely a plant typical of the old well-known *Hemerocallis Middendorffii.* But in time the better clones will become widely grown and hence known to a large number of discriminating gardeners and it is their evaluations that will finally determine what varieties are most excellent.

STORAGE OF POLLEN OF HYBRID AMARYLLIS

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Interest was directed to the subject of longevity of pollen of hybrid *Amaryllis* in July, 1935, when samples of pollen in gelatin capsules stored in a dark glass bottle with tight screw cap, with anhydrous calcium chloride as the drying agent, were sent me by Mr. Wyndham Hayward. Of thirteen lots, stored in February and March, 1935, one showed a low percentage of pollen grains able to produce good tubes, another a few feeble tubes, while the rest did not germinate.

Pfundt (2) has reported for three members of the family Amaryllidaceae, *Galanthus nivalis, Leucojum vernum,* and *Agave densiflora,* that the longevity of the pollen was increased over that in air-dry condition by storage in desiccators over sulphuric acid (humidity about 1 per cent) and even more in an atmosphere with 30 per cent humidity. Holman and Brubaker (1) gathered together all previous data, including six additional forms in this family, of which two (species of *Lycoris)* were found to live longer in the most favorable humidity than when air-dry. On an average, of all Amaryllidaceae tested in both conditions, pollen remained viable for an interval more than twice as long in the most advantageous humidity as in dry storage.

The results of experiments on storage conditions for the pollen of hybrid *Amaryllis* indicate that it too responds to constant humidities, especially favorably when in lower temperatures. The best results were secured when pollen was stored in humidities of 35, 50, or 65 per cent at 10° C. (50° F.). Of these, the intermediate

humidity appeared the most favorable, with germination percentages between 50 and 74 for different lots of pollen after four months storage. Less satisfactory results were obtained after this interval in calcium chloride desiccators at the same temperature, and in containers with 35 and 50 per cent humidity at room temperature. Pollen stored over calcium chloride or sulphuric acid at room temperatures gave low percentage germination after two months and none in three months.

Pollen was also stored in gelatin capsules in cold rooms with temperatures of—10°, and 1° C. (14°, and 34° F.). In comparison with the desiccator series at 5° C., the percentage in the capsule set at the last temperature was lower after two months' storage, indicating that the control of humidity was an important factor in determining the length of life. Satisfactory germination occurred in the other temperature, even after four months, with percentages ranging from 32 to 67 in different samples.

For ease of manipulation, storage over anhydrous calcium chloride at 10° C. may appeal to the grower, even though germination is less. Where long storage and higher germination are important, the container for the intermediate humidity may be made up by using a desiccator with an upper portion separated by a wire netting from the basal portion in which a solution consisting of one volume of concentrated sulphuric acid to two volumes of water is placed. Care is necessary in handling this acid solution, and especially in making sure that it does not come in contact with the pollen samples, which may conveniently be placed in glass vials upon half of a small glass petri dish. Experiments are in progress on other materials which may be used satisfactorily in desiccators for pollen storage.

All germination tests were made in hanging drops of a nutrient medium in a moist chamber, with counts made of pollen grains germinating and failing to germinate in a representative number of fields under the microscope. No check by means of pollination of flowers and setting of seed has been tried.

A fuller account of the experiments on pollen and data on *Amaryllis* and *Lilium* is to be published in a spring number of the Contributions from Boyce Thompson Institute.

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A CONVENIENT DESICCATOR FOR STORING POLLEN

HAMILTON P. TRAUB, *Florida*

In the past the effective pursuit of the amaryllid breeding program has been hampered to a great extent on account of the lack of the desired kind of pollen at the particular time when needed. In practically all cases crosses were only made when flowering periods overlapped. Recently attempts have been made to rise above this handicap by storing pollen for future use.

A number of workers, beginning in 1886, have published facts about the longevity of hemerocallis and amaryllid pollen. This information is tabulated together with data concerning other plants in the valuable paper by Holman and Brubaker *(1)*, who have also added original data. The data concerning hemerocallis and amaryllids are given in Table 1, below.

TABLE I. Longevity of Hemerocallis and Amaryllid Pollen

(From Holman and Brubaker)

Species	Reported by	Longevity in days	
		Air dry	at most favorable humidity
Hemerocallis flava	Rittinghaus	76	
Hemerocallis fulva	Pfundt	42	76
Haemanthus puniceus	Molisch	30	
Lycoris aurea	Tokugawa	21	75
Lycoris radiata	Tokugawa	9	62
Narcissus poeticus	Molisch	72	
Narcissus pseudo-narcissus	Mangin	28	
Brodiaea capitata	Holman and Brubaker	10	38
Brodiaea grandiflora	Holman and Brubaker	55	111

The method for pollen storage first used by the writer, which his friends also took up, was not entirely satisfactory. It consisted of storing the amaryllid pollen in an enclosed space over anhydrous calcium chloride. The chemical was placed in the bottom of the bottle or a half pint mason jar, some cotton was then placed over this and the pollen which had been collected in gelatine capsules was placed on the cotton. The container was then tightly closed. Over anhydrous calcium chloride, the relative humidity will remain at the zero point. This method was brought to the writer's attention some years ago when Dr. Thomas Bregger[1] sent pollen of *Rubus rosaefolius* to him from Puerto Rico. For the storage of amaryllid pollen this method was better than storage at room temperature and humidity conditions, but was far from satisfactory. Attempts were next made to store pollen at lower temperatures and humidities. In the customary electric refrigerator a temperature around 10° C. (50° F.) may be secured. If this is not available the pollen may be stored in the basement or cellar where a temperature somewhat near 20° C. (68° F.) may be had. The humidity conditions were regulated by means of saturated salt solutions in an inclosed space *(3)*. These were found superior to various concentrations of sulfuric acid *(4, 2)* on account of possible burns if the same should come in contact with the hands, and theoretically these sulfuric acid solutions would change slightly each time the container was opened. The latter was the least important of the objections in this case since a slight variation in relative humidity would make little or no difference.

The saturated salt solutions were poured into the bottom of half pint mason jars to the height of about ¼ inch, and a pyrex beaker which just fitted into the mouth was placed over the solution. The pyrex beaker fitted quite securely into the mouth so that there was only slight movement, and the possibility of splashing the salt solution was reduced to a minimum. The pollen which had been collected in gelatine capsules was placed in the pyrex beaker, and the container was then securely sealed with a spring clamp which is a feature of the type of mason jar used.

The salt solutions used, and the relative humidities maintained at the temperatures indicated, are given in Table 2.

TABLE 2. Method for maintaining constant humidity by means of saturated salt solutions (Data from International Critical Tables)

Saturated salt solution	Humidity in enclosed space	
	Temperature	per cent Humidity
$ZnCl_2 . 1\frac{1}{2}H_2O$	20 C. (68 F.)	10
$LiCl . H_2O$	20 C. (68 F.)	15
$CaCl_2 . 6H_2O$	10 C. (50 F.)	38
	20 C. (68 F.)	32.3
$MgCl_2 . 6H_2O$	10 C. (50 F.)	35
	20 C. (68 F.)	32.5

[1]Now Sugarcane Physiologist, Florida Agricultural Experiment Station, Everglades Station, Belle Glade, Fla.

The best results were secured when pollen was stored at 35-38 per cent relative humidity and a temperature of 10 C. (50 F.). The results were judged from seeds secured from actual pollinations made with stored pollen. No attempt was made to determine the maximum longevity of the pollen.[2]

The most useful size of gelatine capsule for our needs was No. 000, manufactured by Eli Lilly & Co., Indianapolis, Ind. Nos. 1 and 3 were also used when smaller sizes were desirable.

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HISTORY OF HIPPECORIS GARFIELDII

ROBERT T. VAN TRESS, *Horticulturist,*
Garfield Park Conservatory, Chicago, Ill.

Hippecoris Garfieldii is the result of a cross I made in 1932 at the Garfield Park Conservatory between a red *Hippeastrum* hybrid and *Lycoris aurea.* The object in view was to create a hardier form of the amaryllis since *Lycoris* may be grown outside as far north as Ohio. This cross was made reciprocally and seedlings of both crosses started to bloom 19 months from date of sowing.

A complete record was kept during their second blooming season on all the flowers produced by these bulbs—number of scapes produced, number of flowers in an umbel, duration of blooming period, height of flower, color, and size. The *Fischer Color Chart,* approved by the American Amaryllis Society was used in determining the colors. From 68 bulbs of *Hippeastrum vittatum* hybrid* *x Lycoris aurea* 40 or 59% produced 3 or more flower-scapes with an average of 4 flowers each at an average height of 30½ inches. There were 7 bulbs that produced 4 scapes each, resulting in a total of 16 flowers per plant. These blooming periods came at fairly regular intervals—namely during January, February, July and August. However, there were some flowers visible from December 8th until the first part of September with the exception of a few weeks in April. The colors varied from lighter orange red through light orange red to dark orange red. The dominance of the pistillate parent (a red amaryllis) was indicated by the size, color and kind of seed produced.

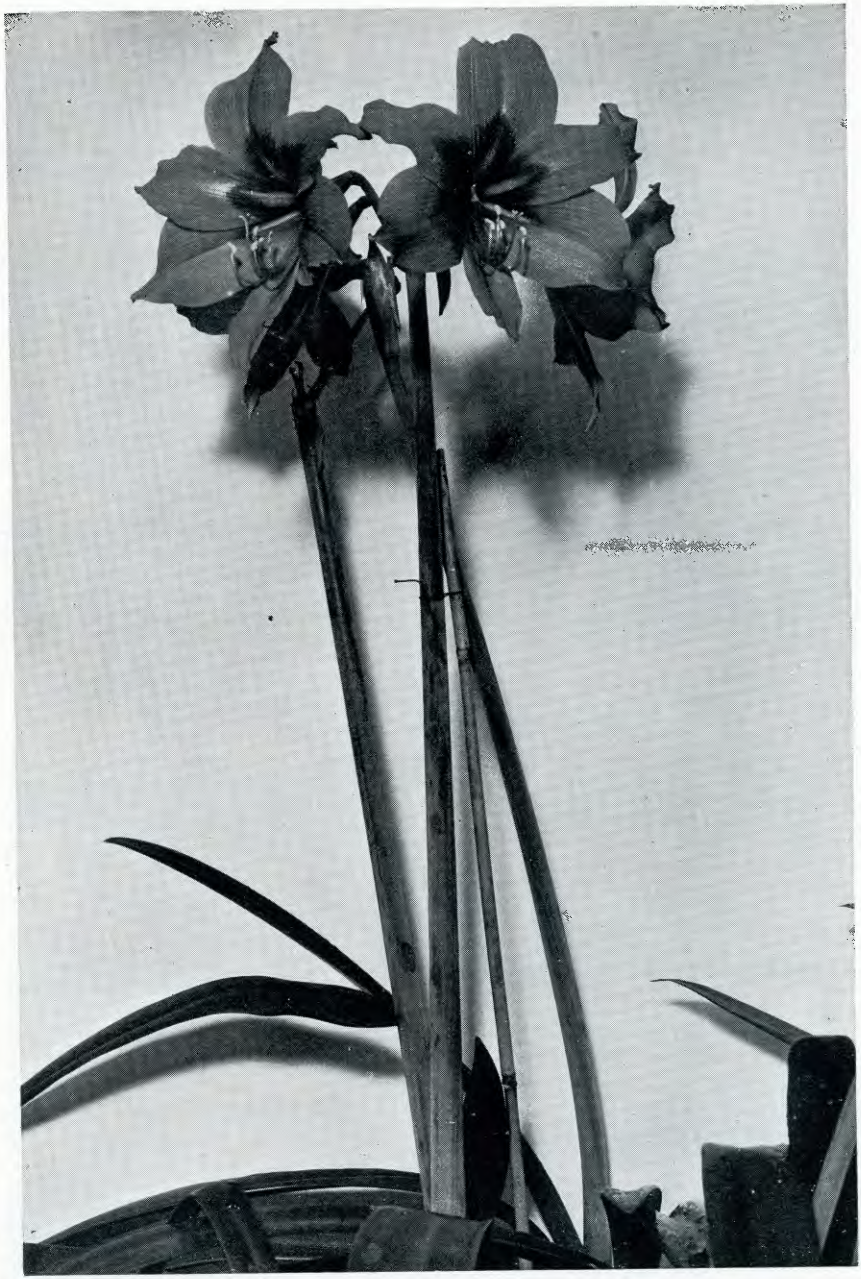
50 bulbs of *Lycoris aurea** *x Hippeastrum vittatum* hybrid produced only 14% with 3 flower-scapes, the average number of flowers being only 3 and the average height 28 inches. These plants were uniformly less vigorous and the flowers much lighter in color varying from orange to light orange red and being smaller in size. The dominance of *Lycoris aurea* was apparent in the color and size but none of the botanical characters such as round seeds which seems unusual.

Seedling #30 of the *Hippeastrum vittatum* hybrid x *Lycoris aurea* was selected as the type plant, being the most perfect in shape and a clear orange red with a little pale orange at the throat. It bloomed first from January 10th to 23rd with 4 flowers; January 31st to February 10th it produced 4 flowers; June 15th to 23rd with 3 flowers, and September 1st to 10th with 4 more. (These dates show the day from which the first flower was fully opened until last flower showed indications of wilting.)

I selected 11 more bulbs of this cross which met the standards set by the type plant and 13 more differing only in having more of the pale orange at the throat.

[2]After this paper was already prepared, the very valuable paper by Norma E. Pfeiffer, **"Storage of Pollen of Hybrid Amaryllis"** was received for **Herbertia,** and which precedes this article.

* Seed parent is given first, followed by pollen parent.



Garfield Park Conservatory

"Hippecoris Garfieldii"

Only offsets from these bulbs will be disseminated as the new bigeneric hybrid *Hippecoris Garfieldii.*

Mr. August Koch, Chief Horticulturist of the Chicago Park District, thinks the chief value of the new hybrid is in establishing a break in the amaryllis which should prove of value in future hybridizing. The free-blooming habit is the chief characteristic since they were in bloom nearly continuously for 8 months. The vigorous habit, upright foliage and vitality of the plant is noteworthy. However outdoor trials will be necessary before its value can be established. Due to its better facilities for carrying out these trials the American Amaryllis Society was selected and given full authority to disseminate when sufficient bulbs are available.

EDITORIAL NOTE. Hippecoris Garfieldii bulbs potted in the early winter in Florida almost immediately formed roots and produced abundant foliage. Some of the larger bulbs produced flowers in the early spring. These were of the Decorative Type and very beautiful. The easy forcing habit is really a valuable character for the breeder to consider, and for that reason the Society will propagate by stem cuttage so that stock may be made available to all members interested.—Hamilton P. Traub.

COOPERANTHES

SYDNEY PERCY LANCASTER, *Secretary,*
Royal Agricultural & Horticultural Society of India, Calcutta

I was still an apprentice under my father when he died in 1904 and on running through his Bulb Book I came across some notes about hybrids raised between *Cooperia* and *Zephyranthes* which he had named *Coozephyr.* The actual plants were never found and I do not understand how only three seedlings of these crosses flowered, perhaps the rest would have bloomed in 1905-06 as the cross was made in 1902-03. These were my father's three:—

Coozephyr rosea—Cooperia Drummondii x *Zephyranthes carinata*
C. Lancastrae—C. Oberwettri x *Z. robusta*
C. Sunset—C. Drummondii x *Z. Andersoni*

The Zephyranthes in every case being the seed parent.

In 1905 I tried my hand at crossing these two genera, actually with a desire to obtain coloured *Cooperia* which would open in the afternoon. I might here say that though many of the hybrids show rather a swollen bud at night-fall all open in the morning.

These are what flowered in 1907,—

Cooperia Drummondii x *Zephyranthes robusta;* named *bella*
Cooperia Oberwettri x *Z. Tretiae;* named *blanda*

Again ill luck dogged my footsteps and through the carelessness of the mali (gardener) I lost—the plants were actually distributed to some unknown party—my hybrids.

The year 1909 saw me with a further attempt and in 1911 four flowered and commenced the long series of hybrids from which my collection has come.

Alipore Beauty (C. Oberwettri x *Z robusta)*
Mary (Z. robusta x *C. Drummondii)*
Percy (Z. citrina x *C. Drummondii)*
Sydney (C. Drummondii x *Z. citrina)*

The Royal Horticultural Society (London) very kindly published a short note on these hybrids in Vol. 38 (page 531) of their Journal and renamed the bigeneric cross *Cooperanthes.*

In those early years I gave no thought to genetics and Mendelian laws and certainly could not have kept correct tab on my crosses. The first results were so fascinating that I crossed right and left using any *Zephyranthes* on any *Cooperanthes* with the result that a very mixed progeny is the result of self pollination now.

When I first joined the Society (1902) we had a very good collection of Lilies, my father went in for cross breeding amaryllis on a large scale and had a wonderful collection of *Crinums*, etc. In *Cooperia* we had *Drummondii* and *Oberwettri (pedunculata)*. In Zephyranthes the following,—

Andersoni (texana ?), copper and yellow, flowers small
sulphurea (citrina), yellow, flowers small
candida, white, flowers small
carinata (Wrightii ?), lilacy-pink, flowers medium
robusta (Lindleyana ?), deep rose red, flowers large
rosea, deep pink, flowers small
verecunda, white, flowers erect, flowers medium
Treatiae, white flushed pink like *candida*, flowers small

The difference between *Cooperia* and *Zephyranthes* is not very great. The former open in the afternoon and have white primrose scented flowers, small in size and erect in growth. The stigmatic surface is slightly trifid but a swollen blob with the anthers pressed to the style just below the stigma, the perianth tube is long and narrow. In *Drummondii* the foliage is covered with a bloom.

Zephyranthes on the other hand open in the morning, have foliage varying from an eighth to a quarter inch or more in width and of various lengths. The flowers are slightly nodding, more or less funnel shaped, (except in *verecunda)*, the stigma is trifid and the anthers are on long filaments away from the style.

I did not have to wait for a second generation before I obtained results for even in the first generation *Alipore Beauty* was *Z. robusta* in size and general appearance; *Mary*, a *Cooperia*, and *Percy*, intermediate. I have therefore placed all such as resemble *Z robusta* in size in the *R class;* such as are erect and like *Cooperia* in the *C class* and those intermediate between these two in *CR class*. A miniature has put in an appearance, like a small *Cooperia;* and a class having sometimes one and on occasion two basal lobes, each petal being sagittate. This gives the flower a fuller appearance. This *Eared* type is to be found in both *R and C classes*.

Originally the shades of colour were white, pinks and yellows, then combinations between the pinks and yellows became possible and some lovely orange and salmon shades have come about. The bulbs vary in size and shape, some are globular and others barrel shaped, the majority increase rapidly by offsets but I have found the finer colours refuse to increase their kind and these invariably get attacked by a fungus disease. The bulbs if planted just below the surface gradually work their way down to the right level, in the majority of cases going 6 inches below ground level, the contractile roots in a couple of years pull the bulbs down.

In addition to the great variety of colour found in the *Cooperanthes* there is the wonderful trait of a flush of flower coming away within thirty-six hours of a shower of rain. From March onwards we can count on these bursts of flower and even during the Monsoon if there should be a few dry days and then a downpour the *Cooperanthes* will be up.

Some years back I attempted crosses between *Cooperanthes* and *Cyrtanthus, Albuca*, etc. The only success I got was a batch of *Cyrtanthus* fertilised by an out of season *Cooperanthes*. These bulbs grew for a year or two but never made any size, increasing by offsets till they died out.

Looking up my Bulb Book I find that the *Cooperanthes* which I have growing in lines down some of my propagating frames number,—Yellows 193, Pinks 160, Orange 65, White 42 and Ajax type 35. These large numbers, would be greatly reduced if a check were made for the best of each class but, where they are now, each provides a patch of colour without interfering with anybody.

The whites are either pure white or tinged with a soft rose or cream fading to white. These are the best six: *Emperor, Ida, Clara, White Queen, Peter Pan* and *Satyr*.

In pink the shades range from a soft rose to a deep carmine red, these six are excellent: *Alipore Beauty, Prince of Wales, Jupiter, Enchantress, His Majesty* and *Mary*.

Yellows have come from *Andersoni* and *citrina* and the shades range from a deep yellow to a pale cream. The best six are these: *Queen Mary, Star of Alipore, Gold-*

finch, Rheingold, Canary Bird. We now come to the Orange shades which unite the pinks and yellow series. My best are *Goliath, Dog Star, Ballet Girl, Autumn Tints, Lancasteri* and *Hereward.*

One great fault with all the *Cooperanthes* is the very fugitive nature of the colours, early in the morning you could not wish to see finer shades of pink, yellow and orange but by nine o'clock the sun has bleached the majority to a white.

Z verecunda fertilised by *sulphurea* gave me a pale yellow that later was identified as *Ajax* obtained from a Dutch source. I have for years tried to combine pink shades with *verecunda* and its hybrids but with no effect. This variety is extremely shy of seeding and though I have 35 *Ajax* seedlings named, these differ in size and shade to a large extent. I hardly think it wise to include any names in this article which is about *Cooperanthes.* One reason too that prevents much being done with *verecunda* and *Ajax* is that this type of *Zephyranthes* flower late in the season when the best flushes of both *Zephyranthes* and *Cooperanthes* are over and owing to the moist climate of Bengal pollen cannot be kept for any time.

Among the *Zephyranthes, sulphurea* bears seed freely, and on occasion *carinata.* I have seen a seed pod on both *rosea* and *candida* but the seeds were not fertile and *robusta* never seeds on the plains. It is different on the hills where all these bear seed.

THE CONSTITUTION OF AMARYLLIDS

WYNDHAM HAYWARD, *Florida*

One of the most important factors in the success that a grower may achieve with various types and varieties of amaryllids, and the one most generally overlooked or disregarded, is that of the constitution or inherent vigor or weakness of the plant.

Hybrid amaryllis seedlings are particularly subject to variation in this regard. This is apparently due to growing them under pampered greenhouse conditions which are foreign to those under which the species developed. For instance, seedlings raised in the open field under the full sun in Florida undergo a very rigorous natural selection process wherein only the "fittest" survive—those having the most vigorous constitution.

It is not unusual for a Florida amaryllis grower raising his seedlings in the open field in full sun to lose from 15 to 35 per cent of his seedlings in the course of the three or four years usually required to bring the bulb crop to blooming size. Under shade this percentage is somewhat lower.

In the greenhouses of Europe, especially in England and Holland, and lately in the United States, extensive breeding work and the raising of thousands of seedlings of hybrid amaryllis have been carried out. Usually these breeding experiments have been carried out with special emphasis on such characters as color, shape and size of blooms, with little attention paid to the inherent vigor of the bulbs produced. Many more seedlings are raised to blooming size that are of weak constitution than would be the case under outdoor sub-tropical conditions.

It is the observation of the writer that the best types of blooms in shape, color and size, are all too frequently borne on bulbs of less vigorous types. Many of the best bulbs from the bloom quality standpoint are constitutionally very weak.

This unfortunately leads to difficulties in rooting, blooming and setting seed on bulbs of this character, when transplanted, especially if dried off and cured for commercial sales. One of the important items for breeders to stress in the future creation of hybrid amaryllis strains will be the selection of vigorous types, at the same time, retaining the best colors, types and size of the good flowers we have today.

As might be understood, when breeding for specific characters, as in the quest for pure whites, which is an important and romantic page in the history of amaryllis breeding, many times the hybridizer undoubtedly had to use a flower type for male or female parent, that was by no means ideal or desirable from the standpoint of bulb constitution and vigor. It is particularly in the pure whites that this lack of vigor in the bulb is noticeable. The writer has never seen an absolutely pure white (excepting light green) of good shape, size and texture which came from what could be described as a robust bulb.

The reds seem to make the most vigorous bulbs, even under greenhouse conditions. Bulbs of pure whites imported from Holland, and others obtained in this country, sometimes refuse to become established with a good root system the first season under best cultural conditions in Florida. Frequently they bloom, but do not have strength to set seed, and the bulb is badly wasted away by its effort of blooming without an established root system, sometimes to such an extent that it will not bloom again the next spring.

Outdoor grown bulbs, from the "survival of the fittest" process in nature explained above, which operates through the hot sun, drought, blight, insects, etc., are much to be preferred over greenhouse bulbs for vigor in most cases, although a certain percentage of greenhouse bulbs are of equal vigor with the best of the outdoor kinds as is natural.

The largest and most vigorous of the outdoor grown bulbs are usually of poorly shaped and inferior types of flowers in hybrid Amaryllis although this is not invariably true. There are many cases of choice bulbs purchased from greenhouse collections, and planted in outdoor gardens or under field conditions in Florida, with no success, the bulbs refusing to grow a good root system, and sometimes even failing to bloom at all, but wasting away with every season until they vanish completely, despite the best of cultural care. This seldom happens with outdoor-grown and vigorous types of the bulbs when planted under the same conditions.

Other bulbs having a difficult constitution are: some of the *Hippeastrum* species, notably, *H. reticulatum var. striatifolium; H. equestre* (under greenhouse conditions); *H. rutilum* and varieties, *Nerine curvifolia, var. Fothergilli major* and certain hybrid nerines; certain *Hymenocallis* species; a few *Zephyranthes;* the double variety of *Hippeastrum equestre* (a very difficult item to handle successfully). Of course it should be understood that all the above, under conditions which just suit them, perform wonderfully, and behave in every way satisfactorily, and these special requirements are usually simple and self-explanatory. Nevertheless, they react differently in their way from other amaryllids, and are usually rather baffling to all but experienced horticulturists.

AMARYLLID POLLEN GATHERING INSECT

Hamilton P. Traub, *Florida*

The amaryllid breeder is confronted with a real problem in outwitting a pollen gathering insect, *Halictus (Chloralictus) reticulatus* Robertson.[3] It seems to be particularly fond of Hemerocallis and Zephyranthes pollen, but apparently collects pollen of all the other amaryllids when available. It does not become a problem until about May and June so that the early flowering amaryllids are safe from this pest. The insect begins very early in the day and during the summer one must collect the pollen at 5 A. M. or earlier from any open flowers to keep it from them. Even flowers which are only slightly open are entered and the pollen may be all stolen before the flower is fully open. These insects may perform the function of transferring pollen to the stigma in some instances, but this apparently is only accidental since most amaryllids in the writers collection will not set seeds during the summer unless artificially pollinated.

The method of collecting pollen by the insect is quite interesting. The head is used to pry into the anther cavities or locules even before these normally begin to open; either one or both fore legs are used to pick up the pollen grains which are then passed swiftly to the second leg or pairs of legs which transfer it to the crooks of the hind pair of legs where it is collected in masses by a firming down action of the middle pair of legs.

Their work is so efficient that by 8 o'clock or earlier in the morning all the pollen is gone except in cases of stray pollen grains which may have fallen on the lower inside of the tube or segments. This may sometimes be sufficient for use to effect pollination, but as a rule the hybridizer looks in vain for the needed pollen.

[3]The insect was identified by Miss Grace Sandhouse of the Division of Fruit Insects, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agric.

The method used by the writer to outwit the insect, is to gather the anthers just before the flower opens. The anthers are collected in a size No. 2 gelatine capsule and are then stored in an improvised desiccator[4] for future use.

BURBANK AMARYLLID CATALOG, 1909

WYNDHAM HAYWARD, *Florida*

Through the kindness of Mr. J. B. Pettit, postmaster for many years and veteran amaryllis fancier at Fruitland, Ontario, Canada, we have received a copy of the late Luther Burbank's "First and Last Amaryllis Bulletin", dated August, 1909, and which is entitled "A Brief Descriptive List of the New Burbank Giant Amaryllis." The booklet, of some 16 pages, is illustrated with three interesting plates. The first plate shows a typical Burbank amaryllis, which can be described as pretty fair, but no better. The second plate shows sample blooms of the "lighter shades" growing in the open field. The third plate shows "A new Hybrid Amaryllis—Martinique," which the booklet sets forth to be a "remarkable new hybrid of the Sprekelia Formosissima or Jacobean Lily with the Amaryllis (Hippeastrum) Vittata."

Because of the rarity and interest of this catalogue, I reproduce below the rest of the text under this plate of a purported *Sprekelia-Hippeastrum* hybrid, one of the most unique hybrids which have been produced among the bulbous plants. The flowers are fiery crimson like those of the Jacobean Lily, but very much larger, being nine inches in diameter, but even more remarkable are the long, curious twisted petals which give the flowers a strange appearance, not found anywhere else among the Amaryllideae. Leaves pale green, upright, strap shape, 1 inch wide, 18 to 20 inches long. Flowers fiery crimson on slender stems 1½ to 2 feet long. Usually two flowers to each stem.

"I have now produced 58 large bulbs and 57 small ones, of this new hybrid. Price for the whole stock without reserve, $350.

"Seed capsules are produced abundantly, but rarely a viable seed. Have so far secured twelve from which are now growing twelve seedling bulbs, which are now large enough to bloom next season. Price of the twelve, $240."

The address given on the catalogue is "Burbank's Experiment Farms, Santa Rosa, Cal., U. S. A." The phraseology indicates that Mr. Burbank was endeavoring to sell out all his amaryllis at that time, or at least his entire stock listed.

"Thirty Years ago my work commenced on the Hippeastrums or Amaryllis," Mr. Burbank writes in the introduction, "as they are more commonly called, and though I have sold from time to time the more ordinary kinds of my seedlings, having quite large flowers, to the seedsmen and florists, yet have kept the very best varieties for increase and to name and introduce later, and now have a good stock of each of these distinct new varieties; the cream of the hundreds of thousands which have been raised during all these years.

"This rare collection is now for the first time offered, each variety with complete control including all the bulbs in existence. In other words, the varieties are sold very much as a patent is, the purchaser has absolute control of the varieties purchased," . . . "This will be the last opportunity ever offered to purchase this collection or any part of it. Nearly everybody knows of it, but no one possesses a single bulb of any variety of this whole collection . . . "

There are just 136 "brief but accurate descriptions of the new Amaryllis" in the list. Of some there are as many as 120; 163 and 227 bulbs offered. Prices range for the complete lots of the different varieties, from $5.00 for 3 bulbs up to $240 for 120 bulbs. There is great difference in the prices as regards the quality of the individual bulbs. Most of the flowers are described as being 7 to 8 or 8 inches across. A few 8 to 9 inches and a number 5 or 6. No names of the varieties are given except *"Martinique,"* the hybrid between *Sprekelia* and *Hippeastrum.*

The membership of the Society is greatly indebted to Mr. Pettit for preserving this interesting catalog and allowing us to review it for the Year Book. It is first

[4]Traub, Hamilton P. Convenient Dessicator for Storing Amaryllid Pollen. **Herbertia,** 1936.

hand data on an interesting period in American amaryllis history more than a quarter of a century ago.

The following are two average descriptions of varieties from the folder: No. 92 "Broad, flat, regular petals. Tips of petals scarlet, each petal heavily banded and flaked with white, and veined and shaded crimson. Enormous flower, handsome. 4 flowers to a stalk. Flowers 9 inches across. Height 20 inches. 9 bulbs $60.00." No. 120 "Whitest of all my seedlings, pure white throughout, with faintest greenish tinge. Some petals lightly lined crimson. Light green foliage, remarkably large and strong. 2 flowers to a stalk. Flowers 5 to 5½ or sometimes 6 inches across. 4 bulbs. $35.00."

(NEW YORK FLOWER SHOW—Continued from page 44)

The results in the other two usual Amaryllis classes were:

(a) *Amaryllis, 12 plants in flower, one bulb in a pot,—*
First: Mrs. John M. Schiff, Oyster Bay, L. I., N. Y.
Second: Mr. Samuel Salvage, Glen Head, L. I., N. Y.

(Exhibitors in class of 12 plants cannot enter in class for 6 plants in pots.)

(b) *Amaryllis, 6 plants, one bulb in a pot,—*
First: Mr. J. P. Morgan, Glen Cove, L. I., N. Y.
Second: Miss Marie L. Constable, Mamaroneck, N. Y.

In the classes for clivia plants, Mrs. Henry Morgan Tilford of Tuxedo Park, N. Y., and Mrs. W. R. Coe, of Oyster Bay, N. Y., divided honors.

John Scheepers, Inc., of New York exhibited a notable collection of hybrid Amaryllis in the commercial displays, including a group of excellent pale salmon flowers, and several pure whites. There was also an unusual orchid-colored type. Part of the Scheepers display was set up in the form of a shadow Box, with striking effectiveness.

The following brief quotations regarding the 1936 Amaryllid displays at the New York show are from horticultural papers:

The Florists Exchange: "Among the many trade exhibits one that stood out emphatically was a large shadow box or more than a score of Amaryllis plants arranged by John Scheepers, Inc., of New York and Brookville, Long Island." . . .

Also . . . "We missed the gigantic Harrisi Lilies of other years, but the Amaryllis made up for them. New York never before saw so many really choice Amaryllis—*Evidently the Amaryllis Society's work is bearing fruit*—as one visitor remarked 'after seeing these I feel like throwing mine away'."

Gardeners Chronicle (N. Y.) . . . "Amaryllis has at last come into its own at the New York Show and gorgeous types were exhibited by Mrs. John M. Schiff, F. Kirkham, Gardener, which won easily."

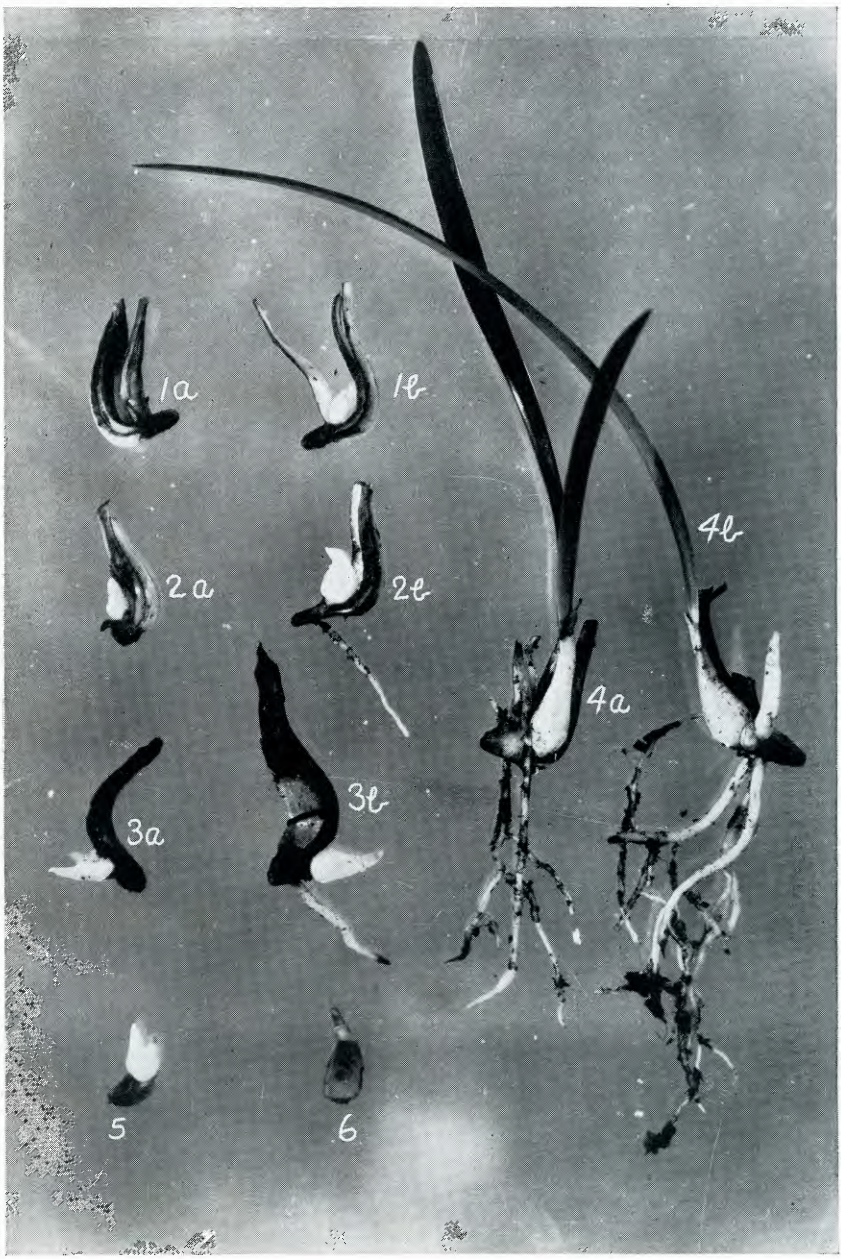
(NEW DAYLILIES—Continued from page 95)

both the sepals and the petals is somewhat tinged with red. The general color effect is noticeably different from that of Theron and Vulcan, which are also of the dark red class, and all of these are much darker than Rajah. The flower is medium full, medium large (from 4 to 5 inches in spread), the petals and sepals are broadly recurving, and the form and color is well maintained during the day. The somewhat robust foliage and the erect, much branched scapes give a good habit of growth and the plant is fully hardy at New York.

This daylily has in its ancestry the species *Hemerocallis Thunbergii, H. aurantiaca,* and a certain plant of *H. fulva* from the wild and it was obtained after several generations of selective breeding. The name Wolof refers to a native tribe in Africa and is here applied to suggest that the plant in question is one of the dark-colored type of daylily.

The above is the first mention and description of this particular daylily to appear in print.

—A. B. Stout.



Chas. T. O'Rork, Jr.

Growth Responses following stem cuttage of hybrid amaryllis

For explanation see text

5. PHYSIOLOGY OF REPRODUCTION

AMARYLLID PROPAGATION BY TERMINAL BUD DESTRUCTION[1]

I. W. HEATON, *Florida*

There is among the Amaryllids a group of plants, which can be propagated by destroying the terminal bud. This group includes *Agapanthus, Clivias* and *Hemerocallis*. From a commercial standpoint it may not be profitable to propagate *Agapanthus* vegetatively, but more uniform types could be produced in this way than by the closest roguing. In *Clivias* with great seedling variation and value depending on type, propagation of these plants will pay large dividends. For Hemerocallis this would only apply to new varieties where rapid increases are needed.

The principle of this method is destruction of the terminal bud without damage to foliage. The details of the method are varied to suit the type of plant.

Agapanthus may be propagated any time except just prior to flowering, at which period the side buds are already formed and no increase is obtainable. *Clivias* must be treated just before the flowering period, prior to flush of growth. Hemerocallis respond best just following the flowering season.

Method of Bud Destruction. For *Agapanthus* and *Clivias* use a No. 2 steel knitting needle or a straight piece of No. 12 wire. Heat only the tip to a dull red, insert into the axis of the leaves, pushing it quickly in a vertical line with the stem until the needle has burned completely through the plant. It is important that this operation be done quickly to prevent damage to tissue beyond the bud cells. Hemerocallis require a little different treatment on account of the length and diameter of the stem. A short piece of No. 022 steel wire heated as above is inserted slightly above the leaf base, pressed through the stem from side to side at an angle of 45 degrees to intersect the bud. This treatment does not disturb either the foliage or the roots and throws the entire energy of the plant into offshoots, as no further growth can be made from the terminal bud. It is analogous to topping a plant to induce branching.

Results. Agapanthus produced 16 buds from one plant in five months, and would have made more but I had cut away all of the old base with the new plants. The top was still alive on only a slender section of stem. *Clivia* produced five new plants in the same period; while *Hemerocallis* made eight, both the latter plants are still alive and in the case of the Clivia more offsets are forming.

GROWTH RESPONSES FOLLOWING STEM CUTTAGE OF AMARYLLIDS

HAMILTON P. TRAUB, *Florida*

At the request of several correspondents two points which were not considered in detail in former papers on the stem cuttage method of propagating amaryllids are briefly discussed. These concern the nature of the sprouting medium and the type of growth responses secured after stem cuttage.

The most commonly used sprouting medium is a mixture of granulated German peat and coarse sand in equal proportion. *(1, 2, 4, 5)*. This mixture is fairly

[1]See also Hayward, "Naturalizing of **Eucharis** and **Clivia.**" Year Book American Amaryllis Society, 2:136. 1935.

satisfactory if proper drainage is provided and the cuttings are not kept too wet. Usually the stem cuttings from the upper part of the bulb decay in this medium. Pure, coarse sand if not kept too moist is equal to the above *(3)*. Recently the writer has used a mixture of granulated German peat, coarse sand and broken rock, ¼" mesh, in equal proportions. With good drainage, this medium has given best results so far. This mixture apparently provides the necessary aeration, and the mechanical bruising of the rock seems to stimulate growth responses. The neutralizing effect of the carbonate rock has a tendency to keep the medium at the proper effective acidity, which should be near the neutral point, pH 6.5 to 7, for best results.

The stem cuttings are planted with the upper end of the fractional leaf scales slightly out of the medium. Excepting in the case of such genera as *Narcissus*, in which the leaf scale fractions attached to the stem fraction elongate and turn green soon after planting in the fall *(3)* photosynthetic activity probably is not of much importance from his source.

The growth responses vary with the plant material, the time of cutting and the sprouting conditions. In this brief paper we will consider only a typical case of a hybrid amaryllis *(Hippeastrum)* bulb, 2½" in diameter, cut into 96 stem fractions. The bulb is first cut into 16 parts vertically and each of these is then cut into 6 parts horizontally. Larger bulbs may be cut into a proportionally larger number of stem cuttings.

After planting, any developing bulblets apparently draw for nourishment on the reserves of not only the leaf scale fractions but also on the stem fraction giving it an advantage over the method of leaf scale incubation *(2)* in which case there is only a small fraction of the stem attached to the leaf scale fraction.

The fractions from the bottom of the bulb usually show the most rapid response, Figs. 3a and 3b, and there is early root development from the stem fraction as previously pointed out *(3)*. Bulblets usually develop beneath the leaf scale.

The fractions from the intermediate region of the bulb, Figs. 1a, 1b, and 2b, show fairly rapid response. As a rule the bulblets develop between the leaf scale fractions. In Fig. 1a, the tiny bulblet is just prying the scales apart; in Fig. 1b, the bulblet has enlarged and the scales are spread apart. In Fig. 2b, the bulblet has formed above the leaf scales which is unusual, and the first root from the stem fraction is also shown.

The fractions from the top of the stem or bud are the most difficult to sprout and many of these will perish unless great care is taken in cutting the bulb at the proper time when the stored food reserves are at a maximum, and providing the proper effective acidity, pH, of the sprouting medium, and the best of drainage and soil aeration. In Fig. 2a is shown the type of growth response in this case which lags behind that of the other fractions. The bulblet usually forms above the leaf scales as shown in this Figure.

At times, especially when the bulb is cut too soon after flowering before the bulb is fully matured, the scale leaf fractions will die off, leaving only stem fractions. These will sprout as a rule in many cases although tardily, as shown in Fig. 5.

In rare cases a piece of leaf scale will become detached from the stem fraction, and if a small amount of meristematic stem tissues adheres to it, a tiny bulblet or two may form under favorable conditions, as shown in Fig. 6. This response is very much slower than in the case of the stem cuttings, and is equivalent to Miss Luyten's method of bulb scale incubation *(2)*, however, under her recommended treatment these tiny bulblets grow somewhat faster than under the ordinary lath-greenhouse conditions used in Florida.

The growth responses flowing stem cuttage in amaryllids after several months, are shown in Figs. 4a and 4b. It will be noted that the root development is primarily from the stem fraction, and only later do roots grow from the base of the new bulblet. This type of rooting will explain the superiority of the method of stem cuttage over others. The bulblet gets off to an early start from an ample food supply stored in the leaf scales and stem fraction, and then the root system is developed at an early stage in the life of the bulblet which then forms relatively large leaves which function in carbon assimilation. Under proper treatment bulbs from July cuttings, properly fertilized in the propagation flats and transplanted early the following spring, will bloom in 22 months in the case of spring flowering varieties.

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NOTES ON THE VEGETATIVE PROPAGATION OF AMARYLLIDS

I. W. Heaton, *Florida*

The groundwork for an effective program of vegetative propagation of amaryllids has been laid by various workers in previous contributions. In 1926 Miss Luyten published on the subject of the vegetative propagation of *Hippeastrums* by the method of leaf scale incubation *(3)* and this work was verified in 1927 by the Missouri Botanic Garden *(5)*. In 1933 Traub published an article on the propagation of *Hippeastrum* by stem cuttage *(6)*, and this was followed in 1934 with an additional article by the same worker in which he extended the method to other amaryllid Genera, *(7)* and a paper by Heaton on *Hippeastrum* propagation by stem cuttage *(1)*. In 1935 Miss Luyten published a comprehensive article on the method of propagation by leaf scale incubation *(4)*, and in the same year appeared an additional article by Traub *(8)* who gave final results for his *Hippeastrum* stem cuttage experiments and data for the vegetative propagation of *Haemanthus, Crinum, Hymenocallis, Narcissus,* and *Crinodonna (Amarcrinum)*. A short note by Heaton *(2)* also appeared in 1935. In the present paper the method of stem cuttage is reported for still other Genera of amaryllids,—*Vallota, Eucharis, Habranthus, Lycoris, Nerine* and *Sprekelia,* and the work of Traub *(7, 8)* on *Amarcrinum (Crinodonna), Crinum,* and *Haemanthus* is verified.

Table showing results with various amaryllid species and hybrids.

Species or hybrid	Size of bulb Diam. "	Date of propagation	Date of transplanting	No. of Divisions	Size of bulblets Diam. "	Percentage sprouted*
Hippeastrum hybrids	3"	Sept. 1	Jan. 1	64	½"	85
Amarcrinum Howardi	5"	do	Mar. 15	80	¾"	91
Crinum giganteum	4"	do	Mar. 1	60	¾"	80
Crinum Ellen Bosanquet	5"	do	do	80	¾"–1"	72
Eucharis grandiflora	2"	do	Jan. 1	32	⅜"	150
Haemanthus multiflorus	2½"	Apr. 1	Aug. 1	16	⅜"	120
Habranthus advenum	2"	Sept. 1	Jan. 1	16	½"	100
Lycoris aurea	2"	do	do	8	½"	100
Lycoris squamigera	2"	May 1	Sept. 1	16	¾"	90
Nerine sarniensis	1½"	Sept. 1	Jan. 1	16	⅜"	120
Nerine Bowdeni	1½"	do	do	16	⅜"	75
Nerine fothergilli major	1½"	do	do	16	½"	60
Sprekelia formosissima	1¼"	May 1	Sept. 1	16	⅜"	80
Vallota sp.	1¼"	Dec. 1	June 1	8	½"	133

*Where percentage given is greater than 100 per cent, the excess is due to multiple sprouting on some stem fractions.

It is of interest to note that the method of leaf scale incutation depends on a leaf scale segment from a scooped bulb while the stem cuttage method is based on the use of a part of the basal stem with leaf scale segments attached. The former

method is dependent on greenhouse sprouting conditions while the latter requires only ordinary lath-shade conditions in Florida. The first sign of growth occurs in three to four weeks, when the basal stem puts forth a fibrous root. These roots are similar to those of mature bulbs and reach six to twelve inches in length in four months. In six weeks the new bulbs can be seen forming at the junction of the leaf segments and attached to the basal stem portion as pointed out by Traub *(6)* in 1933. Bulblet development is very rapid since they are not dependent upon food in the leaf segment but are supported by the roots from the stem long before any roots appear from the base of the newly formed bulblet. This fact makes it possible to plant ½" bulbs in the field in January from cuttings made in August and September.

In the accompanying table are summarized the data for hybrid amaryllis *(Hippeastrum)* and also for the other Genera,—*Vallota, Amarcrinum (Crinodonna) Howardii, Crinum giganteum,* hybrid *Crinum Ellen Bosanquet, Eucharis grandiflora, Haemanthus multiflorus, Lycoris aurea, Lycoris squamigera, Nerine sarniensis, Nerine Bowdeni, Nerine Fothergilli major,* and *Sprekelia formosissima.*

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PROPAGATION OF ZEPHYRANTHES ROSEA BY UNDER- AND OVER-FEEDING

Hamilton P. Traub and A. E. Hughes,
Florida

When *Zephyranthes rosea* bulbs were naturalized in high hammock woodland in Orange County, Florida, it was noticed that the increase by offsets was slow in contrast to the rapid increase secured under intensive garden culture and under pot culture with alternate drying and wetting. In order to secure data on this subject the following experiment was carried out.

The general plan of the experiment consisted of planting the controls in the open in rich gray-black podsolic soil developed under a dense growth of oaks *(1,2),* and subjecting one of the two treated lots of bulbs to (a) under-feeding, and the other to (b) over-feeding.

Effect of Underfeeding. The bulbs were planted in 4" clay pots in a soil medium composed of 1/3 broken rock, ¼" mesh; 1/3 coarse Lake Eustis sand, and 1/3 Orlando fine sand. This mixture is low in plant foods. No attempt was made to water the bulbs so that they received moisture only from rains, and were subject to alternate drying out and wetting. Under these conditions they did not bloom but vegetated as shown in Figs. 1a and 1b. After two months slender bulblets were formed in a ring around the parent bulbs, the total averaging 9 bulblets per parent bulb as shown in Table 1.

During the same period no increase took place in the case of the controls, Figs. 2a and 2b, naturalized in woodland. After 4 months a slight increase is noticed and after 12 months the six bulbs have increased to 10. It was realized that if the

Chas. T. O'Rork, Jr.

Vegetative propagation of Zephyranthes Rosea by systematic under- and over-feeding.

For explanation see text.

slender under-fed bulblets were again planted under the conditions indicated above, the next progeny offsets would be still more slender and for this reason the attempt to propagate by under-feeding was discontinued.

Bulbs kept in soil media saturated with water also gave better increases in a two months period than those naturalized in woodland, where no increase took place in the same period,—

Soil medium kept saturated with water	Number of bulbs at start	Number of bulbs at end of two months
Broken rock, ¼″ mesh	6	10
Coarse Lake Eustis sand	6	13
Orlando fine sand	6	10

Effect of Over-feeding. The bulbs were planted in Orlando fine sandy loam, high in finely divided organic matter and containing an abundance of plant nutrients derived mainly from poultry fertilizer. This soil type packs readily when watered liberally, and aeration apparently is not of the best under these conditions. The bulbs, however, when grown in this soil medium in half shade produced an abundance of foliage as shown in Figs. 3a and 3b, as contrasted with meagre foliage in the controls, Figs. 4a and 4b. They bloomed profusely during the latter part of June and the beginning of July.

By August 12, blooming had ceased and the bulbs were removed from the soil, washed and dried on a screen. Each bulb had produced on an average of over 7 new bulblets, as shown in Figs. 3a and 3b, and in Table 1. These bulblets were removed, and all mother bulbs together with the progeny, were planted back in the same soil medium. This process was repeated on Oct. 11, Mar. 29, and July 19.

In Figs. 5a and 5b are shown offset mother bulbs which have grown for a period of two months and have again produced their quota of offsets. It will be noticed that these are somewhat smaller than those shown in Figs. 3a and 3b, but they are more plump than those shown in Figs. 1a and 1b, secured by under-feeding. Due apparently to the very rich soil medium the progeny from offset mother bulbs grow to this medium plump size no matter how long the process of replanting after separation is repeated.

TABLE 1. Showing increase in number of **Zephyranthes rosea** bulbs by the methods of under-feeding, and over-feeding with periodic separation of bulblets.

Treatment	Number of Bulbs June 10	Total number of bulbs on the dates indicated: Aug. 12	Oct. 11	Mar. 29	June 10*	July 19
Controls—bulbs naturalized in woodland	6	6	8	8	10	10
Bulbs under-fed	6	54	This part of experiment discontinued			
Bulbs over-fed	6	53	116	332	732	945

*Interpolated from graph.

An inspection of Table 1 shows that the increases secured by the method of over-feeding amounted to 116 after 4 months, 332 after 9 months, 732 after 12 months, and 945 after 13 months from an initial start of 6 bulbs. This is an increase of 12,100 percent over a twelve months period, as shown in Table 2. In this Table are shown also the number of increase on the basis of one bulb, and the rate of increase for varying periods during the year.

TABLE 2. Effect of over-feeding on increase of **Z. rosea;** showing the number of increase on the basis of one initial bulb, the percentages of increase on various dates, and the rate of increase for varying periods during the year, when all offset producing mother bulbs are considered.

	June 10	Aug. 12	Oct. 11	Mar. 29	June 10	July 19
Number of increase on basis of one initial bulb.....	1	7.8	18.3	54.1	121.0	157.8
Per cent increase over the one initial bulb	—	780	1830	5410	12100	15750
Bi-monthly rate of increase when all bulbs producing offsets are considered....	—	7.8	1.2	0.76	0.9	0.9

The bi-monthly rate of increase was more than 7 bulbs for each of the six original bulbs for the first two months, but after this period, the rate fell considerably for the remaining time of the experiment. This is easily explained from the fact that large bulbs were used at the beginning, but after the first two months the bulblet progeny were used also thus cutting down the average size of the parents for the remaining time of the experiment. The rate remained fairly constant after March averaging slightly less than one bulb increase for each bi-monthly period.

When the time factor and the grand total of the progeny from one bulb is contrasted with that of less than 1 per cent in the case of bulbs naturalized in woodland, the great superiority of this method of propagating *Zephyranthes rosea* is fully realized. The bulbs in woodland would naturally increase to large colonies after several years. Under good garden culture the increase is quite satisfactory but could hardly compare with the outstanding total of 157 plump bulbs from one original bulb in one year.

It is interesting to note that in the case of bulbs under-fed no blooms were produced. When bulbs were over-fed, the pre-formed flower buds expanded and profuse flowering took place, but in July of the second year only about 50 per cent of the mother bulbs and a very few of the progeny flowered, showing that a certain balance of nutrients within the tissues of the plant is required for fruit (flower) bud formation as has been reported for other plants *(3)*

Conclusions. When rapid increase of *Zephyranthes rosea* is desired for purposes of naturalizing, or in commercial propagation, the method of systematic over-feeding is to be recommended, which gave at the rate of a total of 157 plump bulbs for each original bulb over a twelve months period. The method of systematic under-feeding gives similar results but the bulblets are much smaller and the process would soon come to an end from under-nourishment of the mother bulbs if the experiment were carried out over a period of more than a few months.

The method may be applicable to other types of amaryllids with growth habits similar to that of *Z. rosea,* but it will probably not apply to types having distinct dormant or resting periods. The principle that high feeding during the growing period is conducive to vigorous vegetative reproduction will however hold even in the latter case.

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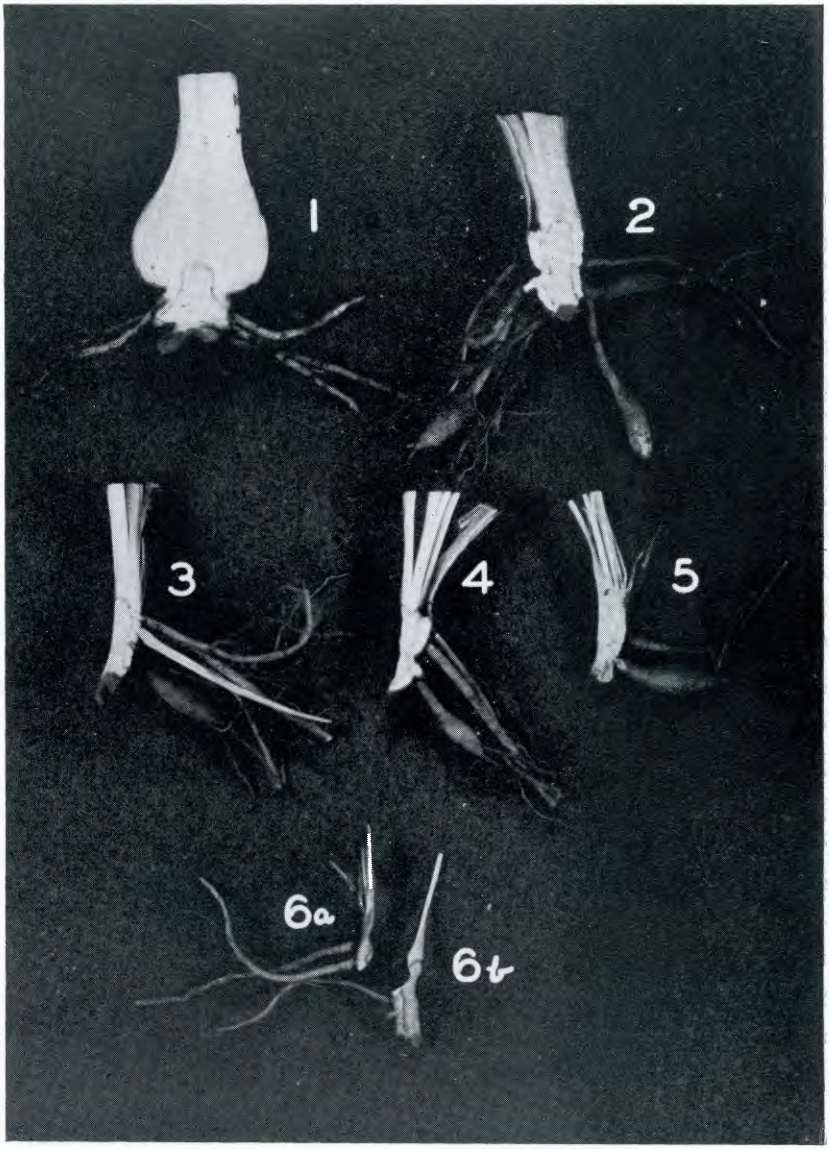

Chas. T. O'Rork, Jr.

Propagation of Hemerocallis by crown cuttage

For explanation see text. The region where roots originate has been marked so that comparison may be made.

PROPAGATION OF HEMEROCALLIS (DAYLILIES) BY CROWN CUTTAGE

HAMILTON P. TRAUB, *Florida*

During the present season the writer has extended his stem cuttage experiments to include hemerocallis or daylilies. The anatomy of the crown of the rhizome[1] *(2)* in Hemerocallis is so strikingly similar to that of the typical amaryllid bulb that the same general technic can be used for both *(5, 6, 7, 8)*.

The unit for stem cuttage of hemerocallis is the crown *(3, 4)*, which has been described as "a part of a rhizome with a large bud" *(1)*. In Figs. 1 and 2, the crown of the hemerocallis rhizome and the amaryllis bulb are compared in vertical section. Figs. 3, 4 and 5 show ¼, 1/8 and 1/16 hemerocallis crown fractions secured by vertical cuttage; and Figs. 6a and 6b show 1/32 fractions secured by horizontal cuttage of one 1/16 fraction.

In the initial experiments medium sized crowns were used so that there was no opportunity of determining the maximum number of divisions that may be secured. The varieties included in the experiment were the clons *Mikado* (Stout), *Margaret Parry* (Perry), *Chrome Orange* (Mead) and *Fulva Europa,* all kindly furnished by Mr. Wyndham Hayward. The growth responses following crown cuttage are similar to those of Narcissi *(6)*. The leaf fractions on the stem or crown piece elongate, where they do not die back, soon after planting, and some sprouts appear early but most of them a considerable time later. The ¼ and ⅛ fractions sprout most readily; 1/16 and 1/32 fractions are apt to rot unless the environmental conditions are just right. A more complete report with sprouting percentages will be included in a later issue of Herbertia.

The method is also being tried out with *agapanthus* and *clivia.*

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SIMPLE INCISION METHOD OF LYCORIS PROPAGATION

WYNDHAM HAYWARD, *Florida*

A year's experiment under actual garden conditions has proved the efficacy of a new and simple method for the faster propagation of *Lycoris squamigera* bulbs. This method requires no special equipment and no exacting conditions of moisture and temperature. Cuttage is used.

Two dozen *Lycoris squamigera* bulbs were incised or "mutilated" in September, 1935, in the experiment. The bulbs were cut upward from the base three or four times, deep enough into the tissue to cut clearly past the basal stem at the bottom of the bulb. The bulbs were then planted back in the ground immediately, exactly as if they had been sound bulbs.

The cuts were made so that if they had been continued upward and entirely through the bulb, the bulb would have been sliced into four or more pieces on the central axis of the bulb. All cuts were made across this axis, the knife being rotated for each successive cut.

[1]"A subterranean stem producing roots below and leaves or shoots above." Practical Standard Dictionary of the English Language. F. H. Vizetelly. Funk and Wagnalls Co. N. L. and London. 1930.

One normal bulb was planted with the cut bulbs, and it bloomed on schedule in late June, 1936. The incised bulbs were dug up and examined at that time. Two of the mutilated bulbs had rotted away completely, but the remaining gave uniformly even increases of three to seven bulbs, in most cases four, five and six. One bulb produced eight small bulbs.

The new bulbs were small, about ⅜ to ½ inch in diameter, but perfectly healthy and with sound root systems. They have been planted back again for the coming growing season, and it is expected that blooming size bulbs can be obtained from them in one year more of growth.

The ground used in planting these bulbs for the experiment was ordinary thin, sandy high hammock loam, quite dry in the winter months, although in the season of 1935-36 there was an unusually heavy rainfall. The bulbs were not watered artificially more than two or three times in the winter, and they had absolutely no fertilizer applied before or during the experiment. The soil in which they were grown is normally quite fertile in nature. The results obtained are more than three times as fast as *L. squamigera* propagation by natural multiplication and division.

A pH METHOD FOR AMARYLLIS SOIL DETERMINATIONS

Mrs. George M. Bahrt, *Florida*

E. R. Squibb & Sons, of New York, have put out a sensitive paper known as Nitrazine which is being used for medical determinations. The method employed requires so little work and technic, that it was substituted for the more expensive soil pH methods for amaryllis soils, with reasonable success.

For the tests, the soil samples are carefully taken with a clean knife or trowel, from at least six different places in the bed and to a depth of 6 inches. Unless the bed is spotted and certain areas are to be tested separately the samples are thoroughly mixed and the leaves and roots removed without touching the soil with the hands. 4 ounces or 113.396 grams of this soil is weighed out on oil paper and put into a pint milk bottle that has been washed and rinsed with distilled water. (Water obtainable at auto filling stations). To this soil ½ pint or 236.59 cc. of distilled water is added. The bottle is then corked with a number 8 rubber stopper and is thoroughly shaken at 5 minute intervals for 15 minutes and then allowed to settle for 15 minutes. The stopper is then removed, and a glass rod is placed into the solution without touching the soil. The moistened rod is rubbed over the Nitrazine paper and allowed to stand for 60 seconds and then is compared with the color chart provided by Squibb and Sons. Each color indicates a degree of acidity or basicity and thus the pH is determined. For sandy soils the color for a pH of 6.0 is grayer and for 7.0 and 7.5 is of a duller blue than is indicated on the chart, but in spite of this slight difference there is no mistaking the reading. It is always well to make duplicate tests whatever method is employed. This method is accurate enough for amaryllis soils and requires little technic and is very inexpensive.

NOTES

1. For loamy soils shake at 5 minute intervals for ½ hour and allow to settle for ½ hour.
2. The ratio used is 1 of soil to 2.09 of distilled water. Authorities on pH's have used ratios from 1-1 to 1-25.

6. AMARYLLID CULTURE

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

LEUCOCORYNE IXIOIDES ODORATA

A. C. Splinter, *Florida*

Leucocoryne ixioides odorata is a most beautiful novelty introduced a few years ago from Chile, South America. The flowers are a beautiful sky-blue with a white star-like center, borne in umbels on a thin and wiry stem, which reaches a height of 12 to 14 inches thus making it valuable as a cut flower. The blooms possess a delicious fragrance and will last at least ten days in water after being cut. The color plate reproduced in this issue of *Herbertia* will convey some idea of the unsurpassed beauty and charm of this most welcome newcomer.

Its cultural requirements do not present any difficulties for it requires practically the same treatment and attention as is accorded Freesias. The bulbs should be planted during October or November in a soil mixture similar to that used for Petunias and Geraniums. It should be a rich mixture, but of a light and sandy nature. Clay or any other soils that "bake" must be strictly avoided. Trials have shown that best results were secured when the bulbs were started in small sized pots. Three bulbs should be planted in each 3″ pot, and when the roots have filled the pots the plants should be shifted into pans or so-called azalea pots.

After planting, the pots should be thoroughly watered and placed so that further watering is not necessary until the bulbs begin to sprout. Thereafter it is important to limit the watering to such an extent that the soil appears always just evenly moist. Never should the pots become soaked for such a condition will soon start the bulbs to rot and will lead to their total loss.

The flowers begin to appear in the early part of February, and since full sized bulbs produce successively several flower scapes, the period of flowering is not less than six weeks for a group of plants started at the same time.

After flowering, the plants should be kept more on the dry side until the leaves turn yellow. Then the bulbs must be removed from the pots and stored in air dry granulated German peat in which they will keep perfectly until the next season.

The high price of the bulbs so far has practically limited *Leucocoryne ixioides odorata* to pot culture, but the day will come when outdoor plantings of several thousand bulbs will be made as a general procedure in Florida gardens. There is need of a study for large scale production of this species. Others who have had experience with it should report and in this way the foundation will be laid for further progress in this direction.

AN ALLIEAE QUARTET—BESSERA ELEGANS, MILLA BIFLORA, LEUCOCORYNE IXIOIDES ODORATA AND BRODIAEA CAPITATA

W. M. James, *California*

Bessera elegans and *Milla biflora* are from Mexico. *M. biflora* is found rarely as far north as Arizona. As they both bloom in the summer and require the same culture, I will discuss them together. *B. elegans* has dainty, pendant, bell-shaped flowers in a very interesting, irregular whorl-like umbel on the tip of a graceful wiry stem 18 to 24 inches tall. The color is a bright orange red outside, creamy white with orange stripe inside and purplish stamens. *M. biflora* has snowy, wax-like hex-

agonal-shaped buds and flowers, which open flat about 2 inches in diameter and with petals not quite separated at the base. A faint stripe of soft apple green runs from tip to base on the outside of the petals. It has a pleasant lily-like fragrance. The stems are wiry, 12 to 18 inches tall, bearing 2 to 7 flowers each. Both plants have only a few long narrow leaves more or less prostrate and produce several stems from each corm. They cut well, are very interesting in flower arrangement and make a striking addition to the garden. They should be planted 4 to 6 inches deep in full sun in a medium sandy loam for best results. Good drainage is absolutely essential. They like plenty of water after growth starts until blooming time. I find in our location it is best to take the water off when the flower stems are about 6 inches high. One or two trials indicate that they can stand a good deal of moisture during the winter when they are dormant. However I doubt if they will stand many degrees of frost and think that they should be dug except in the milder climates.

The corms look very much alike except that those of *M. biflora* are a little flatter. They vary in size from ½ to 1 inch in diameter. *M. biflora* sets seed very heavily and does not make many cormlets. *B. elegans* does not set seed so heavily and makes from 10 to 20 cormlets. The seed germinates readily in about 30 days and blooms in 3 years.

There is only one difficulty that I know of. Both are especially susceptible to *Pencilium sp.*, especially during storage. This is the common blue mold that we are familiar with on lemons and it soon makes the corm a soft, watery mass. I have found dry heat the best control and use a small electric heater with a fan attached. The corms are stored in shallow trays with wire bottoms. These trays are placed in a tight compartment that can be opened a little at the top and bottom to allow circulation of air; 24 to 36 hours at 90 to 100 degrees Fahrenheit kills the mold and drys the corms. If the dormant sprout on top of the corm is not injured, it will grow and produce a new corm, even though ¾ of the old corm has been destroyed. Shallow storage with plenty of dry, circulating air is probably the best precaution. The corms are watery and bruise easily. The mold generally starts very soon after the skin of the corm is broken unless it is quickly dried. Outside of this one item, I have found these two plants very easy to grow and handle.

Leucocoryne ixioides odorata is from the foothills some 200 miles from Santiago, Chile and apparently is not very widely distributed. It has a loose umbel of fairly large flowers carried gracefully on a wiry stem 12 to 18 inches tall. The color varies from a light to a dark blue on the outer part of the petal and shades to a white in the center with large golden yellow stamens. It has a strong, pleasant nutty fragrance and lasts from 2 to 4 weeks as a cut flower. The foliage is 2 or 3 slender leaves nearly prostrate. Records show that several attempts have been made to establish this plant in cultivation in the past. It always failed until the last one, probably because the bulbs were coddled too much and kept too warm. I understand that it grows about 12 inches deep on hillsides of hard, gravelly soil in South America. Seedlings bloom in 3 years for us and go down 12 to 15 inches deep. Bulbs that have flowered do very nicely in a medium sandy loam in full sun planted 4 to 6 inches deep. I imagine drainage is rather important. So far seed seems the best method of propagation. I plant the seed in beds in the open and leave it until it flowers. Bulbs 4 years old have divided a little.

I know of no special difficulties with this bulb except for rumors that some of them have failed to come up. I think this is due to wrong handling. In its native home it frequently doesn't bloom for 2 or 3 years at a time because of insufficient rainfall. This shows it is accustomed to long rest periods under warm conditions. And it is fairly cool when it does bloom. I am quite sure too high temperatures are the main cause for failure of the bulb to come up. Night temperatures of 40 to 50 degrees Fahrenheit are probably the best under glass. I doubt if it will stand many degrees of frost when grown in the open.

Brodiaea capitata is probably one of California's most widely distributed bulbous plants. It grows from sea level to nearly tree line in the mountains and in the hot, interior valleys. I know of no especial effort to bring it into our gardens, probably because it is so widely distributed. And yet it is one of the easiest plants I know of to grow and the flowers improve so much in size and number under cultivation that you would hardly recognize it as a common wild flower. The violet blue flowers are born in a close cluster on the end of a slender stem 12 to 18 inches

high, cut well and are very attractive. Occasionally the stems are 3 feet high when growing under low shrubs. It has only 1 or 2 long narrow leaves that lie nearly prostrate. It is propagated easily by seeds, forming corms which bloom in 3 years, and slowly by cormlets.

It does best planted 4 to 6 inches deep in a medium sandy loam, either in full sun or in partial shade, but will do well in any kind of soil, provided there is good drainage. That, and a definite rest period after flowering are the only things it is fussy about. It is hardy under all except the lowest temperatures. In Santa Barbara it starts flowering 6 weeks after being planted and continues 3 or 4 months. It does equally well under glass provided night temperatures are 50 degrees Fahrenheit or under. Incidentally, rodents are especially fond of the corms.

CRINUM CULTURE IN MISSOURI

AL. G. ULRICH, *Missouri*

The name *Crinum* is derived from the Greek word *Krinon,* meaning lily. The *Crinum* species are a magnificent class of plants. Though not members of the Lily Family, few of the *Liliums* rival them in stateliness of bloom. The writer became interested in the *Amaryllideae* through receiving several bulbs of *Hippeastrum equestre* and *Crinum kirkii* and *C. fimbriatulum* from a friend in Florida. This was the beginning of his *Crinum* collection, now numbering about 28 species and over 30 hybrids, eight of the latter being his own originations. The flowers are mostly white, or a mixture of rose, red and white. The genus as a whole is found mostly in Asia, Africa, Australia and South America, a single species being native to Florida. Several species extend to the Cape of Good Hope.

Growing crinums in St. Louis is somewhat a different undertaking than in Florida under sub-tropical conditions. It takes longer to produce a blooming-sized bulb under Missouri growing conditions, and a conservatory or greenhouse is absolutely necessary to grow these plants in the north. Tropical crinums do not require the conditions you might expect, since the temperature may be as low as 50° to 55° F. at night. During the day in my greenhouse the temperature increases to 75° or 80° F. and then proper ventilation is necessary.

The true evergreen types that grow all winter, like *C. amabile, C. augustum, C. pedunculatum,* and *C. Asiaticum,* must never be allowed to dry out. Also others like *C. kirkii, C. erubescens, C. sanderianum, C. zeylanicum, C. fimbriatulum, C. scabrum* and some of the hybrids, though they lose their leaves in winter, must receive a certain amount of water to keep in good condition. *C. giganteum* and *C. laurentii,* while not growing in winter, will keep their leaves during that time, and must be given evergreen treatment. In fact, *C. yemense* and *C. abyssinicum* are the only true species, in my recollection, which may be dried out completely during winter. These are grown out of doors during the summer, harvested after the first frost, and stored in the bulb cellar in perfectly dry soil.

The majority of crinums during the winter are given the following treatment. Their pots are set in large sized pans, filled with sand, and watered from below. This gives the best results, since overhead spraying often causes rot in the crown of the bulb. For greater humidity, pans of water are kept on the hot water pipes.

In summer the pots are plunged in soil outside up to the rim, for they demand a plentiful supply of water during their growing period, dislike the sun, and are partial to semi-shade. After crinums grow in pots for several years, nothing but a knotted mass of roots and very little soil is left; then they should be repotted in the next-larger size container. They require good drainage, a loamy soil, and a good portion of dairy fertilizer, with some sand. An addition of crushed charcoal will have a tendency to keep the soil sweet.

Insects do not trouble them until they are brought into the conservatory in the fall, when their worst enemies are thrip and mealy bug. Thrip are controlled by spraying and fumigating with nicotine. A solution of denatured alcohol and water, applied with a brush, eliminates the mealy bug.

The seeds are planted in small pots singly, or six or more in bulb pans. Some crinum seeds germinate in a short time, while others require four months or more. After seeds germinate, the seedlings are grown for about a year in the seed pans or pots and are then shifted to one size larger pot every time they are transplanted, until blooming-sized bulbs are produced. This sometimes takes four years or more under my growing conditions, since transplanting checks their growth to a certain extent.

EVERGREEN TYPES—

1. *C. amabile*—A most showy and beautiful crinum; immense leaves, recurved at the outer extremeties, highly impressive. Two to three flower scapes each year. The outside of the expanded flower is purplish crimson, the inside rosy white; 20 to 30 flowers in an umbel, wonderfully fragrant, opening in succession. It can be truthfully said that hardly any plant can compete with a bulb of *C. amabile* in full bloom. Increases slowly by offsets.

2. *C. augustum*—Leaves more obtuse than *C. amabile*. This is decidedly the most colorful species of the whole genus. The flowers are very fragrant, the scape and buds being deep purplish red or claret purple; 12 to 20 flowers in an umbel, crimson purple outside, rosy white inside. A very rare species.

3. *C. pedunculatum*—an Australian species, very rare and difficult to obtain. Flowers deliciously fragrant and of better substance than those of *C. asiaticum;* 20 to 30 in an umbel, white with red stamens. The bulb attains a large size, sometimes weighing as much as thirty pounds. The largest of the genus.

4. *C. asiaticum var. sinicum*—Very large and vigorous growing plant. Crosses easily with other species, and has been used frequently for hybridizing purposes. This is the *C. asiaticum* found growing in many Florida gardens. It usually multiplies by splitting in two parts of equal size, and is easily grown in large pots or tubs. Its appearance is decidedly tropical.

5. *C. giganteum*—One of the best late summer and winter bloomers, a good grower and bloomer. If grown in pots with a good rich soil and a plentiful supply of water, never allowing it to dry off, it will give a satisfactory account of itself. The flowers are of good substance, lasting quite a while in perfect condition, very fragrant and expanding as they age. The foliage is also ornamental.

6. *C. laurentii*:—a native of the African Congo, a species very near to *C. giganteum*. Flowers four in an umbel, white. I have grown this for several years, but up to the present time have not flowered it.

NON-EVERGREEN TYPES—

7. *C. americanum*—It grows naturally in marshes, river-swamps and wet places in Florida. Mr. Bosanquet raised one hybrid, so he informed me, which bloomed somewhat like *C. fimbriatulum*, but larger, and the leaves were drooping instead of being upright. The writer has never been able to do anything with this crinum, owing to its peculiar requirements. It multiplies by underground runners or stolons. It simply refuses to grow in pots.

8. *C. Moorei*—This is one of the best and most satisfactory of all crinums for pot culture. In some locations in Florida and some other Southern States it does not do very well when grown in dry sandy soil. It requires a loamy soil heavily enriched with rotten dairy fertilizer, and it should be planted in small pots. It multiplies rapidly by offsets, and sets seeds readily. The seedlings vary somewhat from the parent type, and at times show "white" leaves; these albinos, however, usually die in a short time. It has pale pink flowers. There is also a white variety. A long bulb neck is one of its chief characteristics.

9. *C. Macowanii*—is similar to the above, but has a longer and more slender neck, and the leaves seem to start at one point in a short spiral form. This species has no doubt been confused at times with *C. Moorei*. The latter is variable from seed and this possibly accounts for the differences in the bi-generic hybrid "Amarcrinum" raised by Mr. Howard and "Crinodonna" by Dr. Attilio Ragionieri.

The writer crossed *C. Moorei* x *C. longifolium* (parents of the hybrid *Powelli)* at different times, and succeeded in growing from seedlings which were distinct from the pink and white *C. Powelli* varieties.

10. *C. longifolium*—It is hardy in this latitude with slight protection. It is a wonderful grower and seeder, the seeds germinating where they fall. It is an abundant bloomer, and I have used it a great deal in hybridizing. There are two varieties, pink and white, the latter being by far the better flower. This crinum was used extensively by Herbert and his contemporaries; of the twenty-three hybrid crinums listed in Kunth's *"Enumeratio"* the majority are of *C. longifolium (capense)* parentage.

11. *C. scabrum*—This is a very distinct species. The leaves are closely veined; the edge is scabrous and deeply and regularly undulated. The writer has experimented considerably with this species, using *C. scabrum* as seed parent and *C. zeylanicum* as pollen parent as a rule, but some times reversing the process. The foliage of hybrids in the first case resemble *C. scabrum,* while in the second case they resemble *C. zeylanicum.* The flowers are alike, showing no variation.

12. *C. zeylanicum*—This is a beautiful flowering bulb, sold as *C. Kirkii* by many dealers. The pollen used on *C. longifolium* produced a hybrid with foliage resembling the seed parent, and flowers on the order of *C. zeylanicum,* but the stripe on the segments was paler than that of the pollen parent.

13. *C. kirkii*—The flowers are 12 to 15 in number, pure white, with a very distinct broad crimson stripe down the center of the segments. Easily recognized by its short peduncle. Very interesting, and quite distinct from *C. zeylanicum* with which it is frequently confused in dealers' minds. My original bulb was lost, and I have been trying unsuccessfully to replace it. *C. zeylanicum* has been substituted. I have two crinums received under the name of *C. Kirkii,* but until they bloom I cannot be positive as to their identity.

14. *C. yemense*—This is an Arabian species, color white, sometimes pale pink in the bud; sets seed readily, the writer using it with such species as *C. Abyssinicum, C. zeylanicum, C. scabrum* and *C. Moorei.* The cross with *C. zeylanicum* resulted in two variations of color, the stripe on one of the hybrids being much paler than the other. *C. yemense* crossed with *C. Abyssinicum,* after seedlings attained a fair size, were planted in the open, resulting in a better and stronger growth. They may be taken up in the fall after frost and stored in the bulb cellar in dry soil.

15. *C. Abyssinicum*—This is a species from Ethiopa, with distinct foliage, suberect, of a decided blue-green. The flowers are satin-white, very fragrant, and rather a shy seeder. I had quite a supply of this species at one time, but at present my stock is rather low. This also applies to *C. yemense,* both of which seem to be non-existent in this country.

16. *C. erubescens*—This is a native of the American tropics, where it grows in very rich swampy soil. It adapts itself readily to pot culture however. An exquisite species of great beauty and fragrance. There are as many as seven varieties. I have never used this species in hybridizing, since it blooms at a time when other Crinums are not in flower.

17. *C. kunthianum*—A species from Colombia, flowers pure white, very fragrant. A variety *Nicaraguaense,* is more robust, flowers fragrant, of a deep purplish red on the outside, showing a faint rosy stripe in the center of each segment when fully expanded. A good grower and multiplier.

18. *C. pratense*—The name suggests meadow-loving; flowers 6 to 12 in an umbel, pure white. Has never set seed for me, and is a poor bloomer.

19. *C. fimbriatulum*—Near *C. scabrum;* Flowers 3 to 7 in an umbel, fragrant, with a distinct band of red down the center of the petals. The crinum under this name offered by growers is an entirely different species, though it is one of the most beautiful and floriferous of crinums. Does not set seed; the late Henry Nehrling thought it might be a hybrid of Herbert's time.

20. *C. campanulatum*—The bulb is small; leaves deeply channeled, so as to appear cylindrical; four flowered, red, streaked with green, and red near the base, becoming rose colored as it ages. Discovered in shallow grassy ponds in East Cape Colony in Africa. Flowers strongly fragrant. I have never been able to grow this Crinum successfully, due to its peculiar growing conditions. Although they flowered several times, the writer lost all of his bulbs. A very distinct species, and the one offered in the southern states is not the true type, being much larger. I am under the impression that it is *C. latifolium.*

21. *C. sanderianum*—Near *C. scabrum* but smaller in bulb and leaf. Three to four flowers in an umbel, nodding, turning one way, with a conspicuous red keel. A recent addition to my collection, and very distinct.

22. *C. caryanum*—Flowers 6 or more, very fragrant; white, reflexing, stained on the outside near the extremity with red. Hardly any difference between the form of this flower and those of *C. americanum,* it is closely allied to *C. speciosum,* another recent addition to my collection.

23. *C. lineare*—A very handsome plant; flowers white, suffused with different rose shades, sweet-scented, blooms in September. A rare species, and shy bloomer.

24. *C. graciliflorum*—Flowers 6 to 8 in an umbel, reflexing, white. A very distinct plant, of which there are several varieties. Makes a good pot plant, requiring a rich soil.

In conclusion, it might be said that the larger crinums, such as *C. amabile, augustum, C. pedunculatum* and *C. asiaticum* will not appeal particularly to the amateur gardener unless he is a collector or hybridizer. They are too large in size and hard to manage. The smaller species, hybrids and hardy kinds are preferred by the amateur gardener. *C. Powelli,* for example, is as hardy in this latitude as its parent *C. longifolium,* which survives our winters with protection. The pink form is a poor color and rather a second-rate flower; but the white is very good. By hand pollination of the latter, I obtained one seed, which was planted and nursed with the utmost care. It never germinated.

Those species and hybrids, hardy like *C. Poweli,* or which may be grown like gladioli in the North, planted in the open in spring and dug in the fall, (stored in soil and kept dry during the winter), will undoubtedly become popular. The amateur has no facilities for growing crinums in the window garden for want of space, while conservatories and greenhouses are scarce and expensive to maintain. Many of the species like *C. amabile, C. augustum, C. kunthianum, C. pratense, C. fimbriatulum* and *C. lineare* do not set seed. Others like *C. asiaticum, C. pedunculatum, C. giganteum, C. americanum, C. erubescens, C. Kirkii, C. Abyssinicum, C. sanderianum, C. graciliflorum, C. Moorei* and *C. Macowanii* are fairly good seed bearers, and may be used as either seed or pollen parents. The hybridizers' selections of seed parents are naturally confined to these latter species.

So far the writer has not had any success in using the pollen of hybrids in crossing. Often the seeds look promising, but in most cases the pods are empty. *C. longifolium,* on account of its hardiness, profuse blooming habits and wonderful seed-bearing qualities seems to be the logical choice with which to experiment. The writer has on numerous occasions had partial success, and some of the seed would germinate, but the results were disappointing. If hybrid *Crinums* could be used like the hybrid *Hippeastrums,* our labors would not be limited to the species.

DAFFODILS IN KENTUCKY

Mrs. William Lyman Carter, *Kentucky*

Narcissi have been cultivated and loved, wherever man has made a garden. Theophrastus, a very celebrated Greek teacher of botany and philosophy, mentioned Narcissi in his writings about 300 B. C. Mohammed wrote "He that hath two cakes of bread, let him sell one of them for some flowers of Narcissus, for bread is food for the body but Narcissi are food for the soul."

Narcissus, Daffodil and Jonquil—What is the difference? The most popular of all the old herbalists, John Gerard, born in 1545, answered the question as follows,—"Generally all the kinds are comprehended under the name Narcissus, and in English Daffodilly." While Dr. John Parkinson, who was born in London, England, 1567, during the later part of his life, evidently had grown tired of this age old question being asked of him every spring, and one day he impatiently replied,—"Many idle and ignorant gardeners, do call some of the Daffodils, Narcissus, when all that know any Latin, know that Narcissus is the Latin name, and Daffodil the English of one and the same thing." Unquestionably the answer is clear enough. Mr. John

C. Wister of Philadelphia, one of America's greatest authorities on bulbs, in his book "Bulbs for American Gardens" calls them Daffodils.

In the Spring of 1894 seven beds were spaded up, and made ready for my flower garden, although anticipating a "Bundle from Heaven", our first "Blessed Event", and fully realizing the big expense to be incurred, I wondered and pondered how I could buy the Daffodil bulbs, so alluringly beautiful, pictured in John Lewis Child's flower catalogue. The unspeakable joy and satisfaction that the eighteen bulbs, three of a kind, gave me, none but an enthusiast flower lover can realize. That was many years ago. Son reared his son and daughters, in the same little home made box cradle, he crooned and cried in, while I planted my first Daffodilly's! he was a high spirited, mischievous, lovable little lad, many the times, blossoms from these bulbs carried to teacher, or schoolmate, made peace for him; early in life, he learned to "say it with flowers."

Please keep in mind that Americans were highly satisfied with the above mentioned bulbs, along with the many other varieties of that period of daffodil development, and we did not become bulb conscious until a few years before the Government Quarantine, known as No. 27. Suddenly it dawned, all too late on the public in general, what the British and Dutch growers were doing for daffodil flower lovers the world over. It was then, that commercial bulb growing seemed to spring up over night in America. The most important of these firms are located on Long Island, coastal Virginia and the Puget Sound districts.

Quarantine 27 never did alarm or trouble me in the least, and mind you 7 years ago, the time of transferring our home in the city to this country spot, 5 bushels of dried off bulbs, including tulips, hyacinths, fritillarias, crocus, galanthus, scillas, muscari, leucojum, calochortus, camassias, and other kinds were successfully replanted. A peck or more of the older daffodils were naturalized in the grass, in the newly planted, small fruit orchard, and in spite of the heavy sod of blue grass, they have been highly satisfactory.

Always I have made a practice of lifting a plant or bulb as soon as it seems to be going wrong, and long before I ever heard of eelworm, many bulbs with yellowish foliage were dug up and put on the rubbish pile and burned. Perhaps this is the reason there are so few pests in my garden. I have not been afraid of an infestation of foreign pests, which to my mind, has been greatly exaggerated, as some of these pests have been in this country, in many sections the past forty or more years. The fact remains however, that the bulb flies and eelworms are a menace to our bulb gardens, and commercial bulb interest.

My list of the fine kinds of imported hybrid daffodils planted the past ten years, especially the ones planted five years ago in a special bed for new ones, obtained from friends with permits, is as follows,—

Yellow Trumpets—*Van Waverens' Giant, Glory of Leiden, King Alfred, Olympia, Guinea Gold,* and *Golden Emperor.*

Tall White Trumpets—*Alice Knight, Eskimo, Loveliness, W. P. Milner, White Emperor* and *Mrs. E. H. Krelage.*

Bicolor Trumpets—*Spring Glory, Weirsdale Perfection, Herod, Glory of Sassenhein, Victoria,* and the lovely pink daffodil, *Rosary.*

Incomparablis Yellows—*Homespun, Helois, Princess Mary, Croesus,* and *Autocrat.*

Bicolor Incomparablis—*Lucifer, Will Scarlet, John Evelyn,* and *Whitewell.*

Barrii Yellow—*Bonfire, Conspicuous, Diana Kasner,* and *Bath's Flame.*

Barrii White—*Red Beacon, White Star, Miss Willmott, Sea Gull, Firetail,* and *Hera.*

The Giant Leedsii—*Her Grace, Puritan Maiden, Lord Kitchener, Laughing Waters,* and *White Lady.*

Poets—*Ornatus, Recurvus, Horace, Dactyl,* and *Edwina.*

The Poetaz—*Laurens Koster, Dante, Klondyke, Elvira,* and *Helois.*

Double Daffodil—*Primrose* and *Orange Phoenix; Alba Plena Odoratus,* sweet scented, and never fails to bloom in my garden.

Jonquils,—*Orange Queen, Campernelle,* both double and single varieties, and the lovely *Buttercup.*

Growing in the rock garden are Triandus Hybrids—*Viscount Northcliffe, Queen of Spain,* and *Mrs. J. M. Franklin.*

Species—Gracilis, Minimus which grows as high as five and six inches; *Cyclcamieus* is a good doer and fine bloomer, increases fast for me.

Bulbocodium citrinus, B. conspicuus and *B. monophyllus* are impossible to grow in my garden, owing to the lime in the soil I think. Sixteen years ago I tried the old "Hoop-Petticoat," *B. citrinus.* All twelve of the bulbs bloomed the first year, oddly attractive. The next year only four of the bulbs appeared above ground, with no blooms, and I never saw them afterwards. Four years ago I planted all three kinds; all have "passed out," too much lime in our soil, I think. With the exception of these, every one, and more that I have not mentioned, grow, bloom and increase rapidly. It is such a joy to surprise some good friend, with a gift of a dozen tall growing, glorious blooming daffodil bulbs from my own garden.

LYCORIS RADIATA

W. M. James, *California*

This is a native of Japan and China. The bright red funnel shaped flowers have wavy segments, resemble nerine flowers somewhat and appear in the fall before the leaves. It is free blooming and easily grown.

It will do well in any soil and should be covered only to the neck when planted. The leaves grow all winter and will not stand much frost. It should have a dry rest period during the summer and makes fine clumps if left undisturbed for several years.

I have examined several plantings and am quite sure that nearly all the stock in this country being sold as *Nerine sarniensis* is really *Lycoris radiata.* The leaves of all the lycoris have a very definite keel. None of the leaves of some 15 nerines I have examined show any indication of a keel. Leaves of *N. sarniensis* from seed imported from South Africa resemble the other nerine leaves and do not resemble the leaves of the plant being sold as *N. sarniensis.* The petals of the flowers of the true *N. sarniensis* are more reflexed than are those of *L. radiata,* and the latter splits and increases much faster than most of the nerines. The nerines split very little and increase mostly by offsets. The only thing I have not checked are the seeds. True *N. sarniensis* seeds are green colored, while those of *L. radiata* are black. I will be very glad to cooperate with any one who wishes to check this further. Both plants are desirable, but *L. radiata* propagates much faster than *N. sarniensis* and should be in a different price range.

In four species of *Lycoris* which I have, the dry, outer covering is dark brown, very thin and breaks readily, either horizontally or vertically. The nerine species and hybrids which I am growing have a very different outer covering. It is light brown to white in color, much thicker than that of the lycoris and has fine, tough cotton-like fibres. These fibres are also in the live scales and are so tough that they often push through a bulb ahead of a sharp knife when the bulb is cut in half. All of the dormant bulbs I have seen of the so-called *Nerine sarniensis* on the market at present resembled the bulbs of the other species of *Lycoris* which I have and showed none of the fibres which seem to be so characteristic of the nerines.

NERINE SARNIENSIS AND LYCORIS RADIATA

Wyndham Hayward, *Florida*

An apparent confusion of plant nomenclature in regard to bulbs of *Nerine sarniensis,* a popular fall-blooming item much grown in greenhouses in the north and in Southern gardens in the United States has been revealed by preliminary investigation. The studies to date indicate that thousands of bulbs in the trade and in private culture passing as *Nerine sarniensis* are actually *Lycoris radiata.*

Nerine sarniensis is a South African member of the Amaryllis Family, while *Lycoris radiata,* which is somewhat similar in habit and flower, comes from Japan. Careful comparison of flowers of the supposed *Nerine sarniensis* blooming in Florida, with the original illustrations of this species and that of *Lycoris radiata* leaves no doubt but that the bulbs are truly the *Lycoris,* and are masquerading under a wrong identity. A further report on this subject will be made at a later date. Mr. W. M. James of California also reports his suspicions of the error.

THE CULTURE OF LYCORIS AUREA

JOHN R. HEIST, *Florida*

Just how *Lycoris aurea* found its way to St. Augustine gardens will probably always be in doubt. However, there can be no doubt that it found conditions much to its liking.

It has very distinctive habits and reverses the usual order of things, flowering in late summer and early fall, making its growth and increase in winter, losing its foliage with the first warm weather of spring and remaining entirely dormant during the hot rainy summer months.

Lycoris aurea thrives in our sandy loam like a native, flowering equally well in full sun or shade but making much more handsome foliage when grown in shade. Because it dislikes being transplanted it is usually seen naturalized in borders where the clumps increase in size annually. Old clumps produce up to a dozen or more bloom stalks and make an impressive sight.

Generally speaking the *Lycoris aurea* found in St. Augustine are not cultivated and fertilized regularly as are other bulbs and garden flowers but are left to more or less shift for themselves. This they are perfectly capable of doing for they are found and thrive in the door yards of the modest homes as well as in the well ordered gardens.

The writer growing *Lycoris aurea* for increase uses bone meal liberally when planting during the dormant period and gives the beds a top dressing of dairy fertilizer when the foliage appears in the fall. Clumps are divided every third year. They make their foliage and growth in the coldest months and it is necessary that the foliage matures to insure production of bloom. They have however proven more hardy than most amaryllids. In the December 1934 cold spell they went through a temperature of 24 degrees with foliage unharmed and the following September bloomed profusely.

CYRTANTHUS AND HAEMANTHUS IN NATAL, SOUTH AFRICA

MRS. J. W. ARCHBELL, *Natal, Union of South Africa*

In our favoured climate, where the winter is the most delightful season of the year, and the coast of Natal is the playground for the rest of South Africa, there is very little change in the weather when spring comes, but the plants feel it sooner than we dull human beings. Thus some of the bulbous plants serve as harbingers of spring.

In Miss Mary Ritchie's delightful little book, "The Drama of the Year", the various South African amaryllids are described as they flower, each in its order, month after month, beginning in the early spring (August), with the dainty *Cyrtanthus McKenii,* the Ifafa Lily, and ending in the autumn and winter with the aloes, some of which are as small and dainty as any *Cyrtanthus* while others are giant varieties 6 to 10 ft. high.

From Miss Ritchie's interesting articles in one of our newspapers, we secure information about our South African plants. Particularly interesting are the *Cyrtanthus,* surely among the most fairy-like members of the large Amaryllis Family. The white species was found by Mr. McKen, the first Curator of the Natal Botanic

Miss K. C. Stanford

Cyrtanthus sanguineus

Gardens, Durban, in 1869, on the shady banks of the rivers in the Ifafa district. He sent the bulbs to Kew Gardens, where they were described by the famous botanist, Joseph Hooker, and named *Cyrtanthus McKenii*. *Cyrtanthus* species in various colors were found in other districts in Natal. There is *C. O'Brieni*, a brilliant red; *C. interscens*, deep yellow, and a charming peach-blossom pink. There are also many pretty hybrids. All flower in August and September, and some again in July. They have narrow dark green foliage, and the tubular flowers are borne pendant on the umbel. The number range from 6 to 9 or 12 to the umbel, and they have a pleasant odor.

Cyrtanthus angustifolius, or the Fire Lily, springs up after the grass fires in August. They are a striking sight on the black hills, as the flowers are much larger than the Ifafa Lily, and are of a clear red, carried on 12 inch stems. Many gardeners have attempted to cultivate them, but with little or no success. In the uplands of Natal there is a yellow variety.

A little later, usually in October, *C. obliquus* flowers. It is very handsome, having broad strap leaves, and 6 to 8 large flowers, red with wide green tips. The flowers are borne on 18 inch stems.

In December and January, sometimes as late as February and March, the Inanda Lily, *C. sanguineus*, comes to gladden our eyes. It is the most beautiful of all the Cyrtanthus group. The exquisite colour of the flowers has been compared to the brilliance of the sunrise. They are larger than those of the Ifafa Lily, and the tube is shorter and more open. The shape is almost that of the hybrid amaryllis. There are from 1 to 2, at most 4 flowers on the slender stem. It was interesting to read in the article on Amaryllidaceae in Kenya Colony in the 1935 Year Book that this species is also native there. In Natal it responds well to cultivation and flowers freely. *C. Calpeni* is very much like it, but more delicate and fragile.

There are said to be many species of *Haemanthus* in South Africa. The best known in Natal are *H. natalensis* and *H. Katherinae*. The former is one of the "Heralds of Spring". It is called the Snake Lily, for no apparent reason. It forms a very handsome head of red and yellow flowers of rather still brush-like form. This shoots up before the fresh leaves, and later on the scarlet fruits are also very striking. I read with interest in the 1935 Year Book about *H. multiflorus* in Kenya Colony, and appreciated the striking picture of it as grown in Florida in the United States of America. It resembles the Natal *Haemanthus Katherinae*. The bulbs of the latter go partly dormant in our winter (June and July), and then about August, the leaves shoot up. They develop gradually by mid-summer into a fine plant, almost like a small banana clump. Often there are six handsome leaves. In December or January, one of the most beautiful South African lilies shows itself on strong 30 inch stems above the green leaves. First the white bracts are conspicuous like a snow-ball, then they gradually wither back. The flowers grow quickly and before long there is a great glowing ball, more coral red than scarlet which is quite a foot in diameter. The sight is long-to-be-remembered when seen in the deep shade of the forest where they thrive best.

NERINE FILIFOLIA

W. M. James, *California*

This *Nerine* species is a real find for gardens in milder climates. The thread-like leaves are evergreen, 6 to 8 inches tall and are a pretty shade of light green. The dark pink flowers are widely funnel shaped with narrow wavy segments slightly reflexed near the tip and the pistils and stamens longer than the segments. It blooms in the fall with 6 to 10 flowers in an umbel on wiry stems 12 to 15 inches tall and is very good for cutting.

It seems to be indifferent as to culture. Bulbs which were watered once last summer flowered about the same time and as well as those which were planted by the edge of a lawn and were watered once or twice a week all summer. However the foliage on those by the lawn was much better than that of the others. The bulbs are small and soon make nice clumps, and when planted should be covered

only to the neck. I have moved them every month in the year, but have not been able to pick out which bulbs are certain to flower. It apparently does best after it is established and should be left undisturbed as long as possible.

CULTURE OF SNOWDROPS (GALANTHUS NIVALIS)

Miss Mary E. Davis, *Rhode Island*

In Southern New England, the snowdrop is the earliest appearing flower, one variety showing its first blooms in January, often lifting its head above the snow if this is not too deep.

The buds appear first, but the two long leaves may be picked at the same time with the opening flower. The plant grows from three to six inches high and thrives in any good garden soil. The Snowdrop seems to prefer locations facing the South.

We have had snowdrops bloom year after year without disturbing the bulbs, but it is said that it is best to divide clumps after three years, or whenever they seem to become crowded. We plant the bulbs in late October, that some root growth may be made and the bulbs become established before winter.

ZEPHYRANTHES IN FLORIDA

E. L. Brasol, *Florida*

If the North can boast of its Lilies of the Valley and Crocus, the South may be equally proud of the Zephyr Lily, one of the loveliest little flowers to have around the home in a porch box, in the rockery, along the walk, or massed in a favorite corner in the garden.

Both the native species and the imported kinds are hardy, do not require any care or special attention for years after being planted. When left to themselves they will bloom when their time comes and will then delight the grower.

Two varieties are more commonly grown here, the large flowered pink *Carinata* and the white *Candida*. Rather rare is the large flowered *Robusta*. They all bloom after a rainy spell, hence the popular name—Rain Lilies.

The quite rare and lovely yellow *Citrina* behaves in the same manner and therefore is very welcome. Some years ago two bulbs of this variety were found by the author of this article in a long neglected garden. These are now propagated for general use.

The two native varieties, the delightfully sweet-scented *Atamasco* and *Treatiae* grow on low acid soils of the flatwoods. Unless planted in acid soil they will not bloom under cultural conditions.

Zephyranthes do better under direct rays of the sun, but will bloom well in semi-shade and even in shady locations, thus being of double value for landscape arrangements.

In general *Zephyranthes* are little known as yet, for most of them are still rare. However, they are rapidly becoming more popular and no Southern garden, or Northern window garden or conservatory is complete without them.

AMARYLLIS AS A HOBBY

J. B. Pettit, *Ontario, Canada*

Some thirty years ago when passing a seed store in one of our large Canadian cities, an excellent specimen of *Hippeastrum Johnsoni* was noticed as part of the window decoration. This was a well grown plant with two tall spikes, each bearing four large flowers or buds. The flowers on one spike were about at their prime and one bud on the other spike just opening with the others ready. While this specimen was not supposed to be for sale it at once came into my possession along with some large dormant bulbs. I listened attentively to growing instructions given by the clerk and have found in the years that have passed that he knew what he was talking about. This was my first experience with the amaryllids. I have been working with them ever since.

In Canada the amaryllis is not grown to any great extent. There are different reasons for this. When we consider climatic conditions prevailing we at once understand that all specimens must be grown indoors. They cannot be cultivated in the garden or field here as in some sections of the United States. In the window garden, I have heard it contended that the amaryllis takes too much space and—"if they ever bloom"—the flowers last but a few days, and consequently isn't worth while. However, I believe the main reason the amaryllis is so seldom seen is that so few people seem to get them to bloom the second time. Most people make one of the two prevalent errors. When blooming is past, either the pot is set aside and the plant given little or no attention, or the other extreme is followed and the plant kept growing continuously with no rest period allowed. Those who have had any degree of success with amaryllis know what either course means.

It is next to impossible to get any choice named sorts in seed and bulb stores in Canada. The general run of seedlings in commerce is quite inferior. About ten years ago I procured some seeds from the United States from which some very good seedlings have come. Nothing to rave about, however. There are some good colors and shapes and from 6″ to 7″ in diameter. Some bulblets were also secured which gave splendid colors and 8″ to 10″ diameter blooms.

A neighbor, who has a small greenhouse and nursery, five years ago imported 100 mixed seedlings from a bulb grower in Holland. I saw many of these when in bloom and a great percentage were very fine indeed.

During the past year I had the pleasure of visiting the Ontario College of Agriculture at Guelph, Ontario, where the amaryllis collection was in bloom. There were from 40 to 50 seedlings in bloom, but on the whole I considered them quite inferior. Not a single outstanding specimen was noticed. These were grown from supposedly choice seed.

One gets great pleasure from working with this flower and watching the development from the time the bud pokes its nose from the bulb to the perfect open bloom. And then one has something not seen in every window garden.

AMARYLLIDS IN PENNSYLVANIA

John F. Ruckman, *Pennsylvania*

Too little is known about the northern range of hardiness of many tropical and subtropical plants and under what special conditions they can be grown beyond their normal range. For several years I have been experimenting with doubtfully hardy material and in many cases the results have been most gratifying. Given certain situations and certain methods of planting many tender plants can be grown in colder regions than is generally supposed.

Here, thirty miles north of Philadelphia, our climate is about half way between that of New York and Philadelphia—we are beyond the often mentioned "hardy to Philadelphia" zone. Mostly 5° F. or 6° F. or possibly zero F. is as cold as we get,

but the last three winters have been unusually severe with 12° F. below zero and a week of sub zero weather this past winter and 19° F. below in the winter of 1933-34. Many supposedly hardy perennials and shrubs were badly damaged or killed outright but four amaryllids came through unscathed.

Amaryllis belladonna, in the "hardy to Philadelphia" class, was planted at the foot of a south-facing six foot retaining wall not far from a spring which may have had some slight warming influence on the soil. It was planted deep with the neck of the bulb about an inch below the surface. The hole was dug some two inches deeper than was necessary to accommodate the bulb. In the bottom was put an inch of well aged poultry fertilizer and then an inch of sharp sand and the bulb set on this. In filling the hole sand was poured in around the bulb so that nothing but sand touched it at any point—it had at least an inch of sand around it in all directions. This I consider rather important in the case of tender bulbs in cold climates; kept reasonably dry they will tolerate much lower temperatures. The blanket of sand keeps the fall rains from starting the bulb into a premature growth, thus prolonging its period of dormancy through the cold weather. The roots strike down through the sand for needed moisture but rotting of the bulb by contact with the damp earth while not in active growth is prevented. When the ground freezes in November *Amaryllis belladonna* is covered first with two inches of fine grass stiff enough not to mat, and then with four inches of leaves. This particular bulb sulked for a full year after planting. Set out in March it showed no sign of life, leaf nor bloom till the following March when the foliage thrust up through its mulch.

That *Lycoris squamigera* should prove hardy was perhaps not so surprising as its extreme willingness to grow and bloom. Set out in March in the same location as *Amaryllis belladonna* and in exactly the same manner it sent up foliage within a few weeks and bloomed on schedule in August. The following spring it started to multiply.

Crinum capense rosea was planted at the base of a five foot south east facing retaining wall. It also was set in sand but was not planted as deeply as the others, some two inches of the neck of the bulb being above ground. As there was considerable undamaged foliage on it even after the ground froze, eight inch boards were stood on edge forming a box around it; this was filled with half and half grass and leaves. Such foliage as protruded above the covering was of course frozen back but new leaves started growing in the middle of March and have not been harmed by several heavy frosts since then.

Habranthus planted last May is only now, a year later, showing its first sign of life—a sparse reluctant looking foliage. However, bulbs of the same lot potted up and kept watered in the house all winter started their first foliage only a week or so ahead of those left in the open ground. Apparently it resents transplanting but the bulb at least would seem to be quite well able to endure low temperatures. Just how it will do in the long run remains to be seen as I understand it normally sends up foliage in the fall which stays green all winter; that would be quite an accomplishment in this climate though I have known *Triteleia Coerulea* to do it.

In the spring of 1932 I planted a packet of mixed *Alstroemeria* seed in an open ground seed bed. As they showed no sign of germination by late fall of that year they were given up as a total loss and iris seed sown on top of them. I did not know then, as I have since learned, that *Alstroemeria* seed germinates much better fall planted and allowed to freeze in the ground. But in the spring of 1933, a year after sowing, one strange seedling came up among the irises. Never having seen an *Alstroemeria* I could not be sure of its identity but I had my suspicions. It was left with the iris seedlings and came through the 19° below zero of the winter of 1933-34 with no protection but two inches of dry grass. Through the summer of 1934 the plant was a poor affair of two weedy stalks and was nearly discarded more than once. But in the spring of 1935 it came up as a fine clump of six or eight vigorous stalks and bloomed in June confirming at last my suspicion that it might be an *Alstroemeria.* Having come from a packet of mixed seed I do not know the species; probably it is *A. aurantiaca flava.* It bloomed eighteen inches high with three to five up-facing two inch cadmium yellow lilies on each stalk; some were plain yellow and some very lightly spotted with brown. It was in continuous bloom for six weeks and was a gorgeous sight. As I wanted it to set seed—which it did freely—I left it in the seed bed all summer and, having little faith in fall planting, left it there until this spring.

It came through another hard winter with the same slight grass protection. When I transplanted it into the garden recently the clump was fully three feet in diameter, twice as large as it was last year. The seed bed where it has grown is anything but a protected spot. Far from the warmth of retaining walls or spring it is on the north side of a clump of shrubbery and is swept by north and west winds. The soil is plain field soil, unenriched and with no special provision made for drainage. That this particular *Alstroemeria* has done so well there through two such severe winters with such meagre protection would seem to prove that it at least is reasonably hardy in this latitude. Certainly it is a very choice thing and worth much more care than it seems to demand.

Zephyranthes carinata has survived mild winters in the open but as it performs so well and is so easily handled given gladiolus treatment or grown in large pots that I never leave it out intentionally. *Cooperia pedunculata* and *Zephyranthes Ajax* bloom all summer here and set seeds freely, the former with gladiolus treatment, the latter in pots. *Z. carinata* occasionally sets seed grown in pots in semi-shade. *Z. texana, Z. atamasco, Z. rosea,* and *Z. candida* however, do not seem altogether happy, blooming sparingly if at all. I think possibly the outdoor growing season, from May 1 to October 15 approximately, may be too short for them and I have no facilities for keeping many of them growing inside. *Sprekelia, Childanthus* and such *Hymenocallis* and *Pancratiums* as I have tried have been very reluctant. However in their case I think the fault was mine for I have seen beautifully grown specimens of *Sprekelia* and *Ismene calathina* in this region and hope eventually to succeed with them.

Of the amaryllids treated exclusively as pot plants *Clivia miniata* does beautifully and strangely enough *Agapanthus* does not, but here again I think the fault is mine. *Vallota purpurea,* one of the handsomest of all the amaryllids, is easily handled and should be much more grown. *Eucharis* and *Nerine sarniensis* seem to grow nicely but as yet my bulbs are too young to bloom. The nerine's habit of winter growth and summer dormancy is rather troublesome in this climate unless one has a greenhouse.

I keep *Hippeastrum Johnsoni, H. equestre* and hybrid *Amaryllis* evergreen, resting them from four to six weeks in the fall in a light cellar but water them enough to keep the foliage in good condition; they are so much handsomer bloomed with foliage. They are given manure water once a week from December until mid-April and kept very pot-bound. I never repot until they seem in danger of breaking the pot or heaving themselves out. One clump of *H. equestre* bloomed happily for thirty years without repotting. When the weather has settled they are set outdoors in half shade and mulched with manure or hoof shavings are put in the bottom of the pot and the bulb slipped back without disturbing the soil or roots. With this treatment many bulbs both of *H. equestre* and the hybrids bloom twice a year, in early spring and again in midsummer. The summer blooming is usually somewhat lighter, never but one stalk to a bulb though the same bulb will bear two stalks at its winter blooming. This might be thought to weaken the bulb but I can not see that it does; my bulbs constantly increase in size and in number of blooms. Possibly the rather heavy feeding compensates for this, though it is just as well to omit the summer feeding for *H. equestre.*

GARDEN COMPOSTS[1]

The Gardeners' Chronicle (London, May 2, 1936) says editorially: " . . . Messrs. W. J. C. Lawrence and J. Newell have been putting the problem of potting soils to a careful thorough-going test and have discovered that even the methods used by the best of gardeners are susceptible of very great improvement . . . The perfect compost must evidently be free from pests and diseases which attack young plants. The ordinary ingredients used in making composts are not. Therefore they must be made free from pests and plant parasites by sterilisation. Sterilisation—partial sterilisation—of soil is easy enough . . . But may not partial sterilisation damage the ingredients? Loam, leaf mould or moss peat and sand together, it may be with bal-

[1]Daily Digest, Off. of Inf., U. S. Dept. Agric., LXI, May 25, 1936.

last for drainage, are the ordinary components of a compost. Do they affect one another adversely as a result of changes brought about by sterilisation at 212 degrees F.? They do. Therefore, it must be good practice to sterilise the ingredients separately . . . The perfect compost should contain enough of all the essential plant foods that roots need if growth is to be satisfactory . . . Partial sterilisation of soil is stated to let loose locked-up stores of nitrogen . . . Experiments described recently in these pages show that the chief deficiency in composts is phosphoric acid . . . The quantity required to make seedlings go on growing in the compost without check is very small, say, three-quarters of an ounce of superphosphate to a bushel of soil and sulphate of potash at the rate of three-quarters of an ounce to the bushel . . . It is a fine piece of work, this enquiry into the perfect compost, and will lead to further and much needed investigations into the fertility of the garden and its soils."

BULB EXPERIMENTS AT KIRTON AGRICULTURAL INSTITUTE[1]

"Interesting experiments in connection with bulbs are again being carried out at Kirton Agricultural Institute (England) this season," reports Gardening (London, April 18). "The cultivation experiments include hyacinth propagation; effect of growing stocks from 'mother' bulbs versus small offsets narcissus; cutting versus non-cutting narcissus and tulips for market and the effect on bulbs when forced; effect of weeds on bulb production; conditions of storage and effect of temperature. In addition, the R. H. S. trials of varieties of narcissus are open for inspection, together with trials of 200 newer varieties of narcissus. The latter demonstration was established at Kirton in 1934-35 season. Manurial experiments are also carried out and experiments on the control of disease are included."

CULTURE OF AMARYLLIDS

I. W. Heaton, *Florida*

The past year has definitely shown the need of some changes in standard amaryllis culture. The advantages of some form of shade have been proven conclusively. In fertilizers Milorganite has proven a valuable source of both Nitrogen and Bacteria. Market conditions have forced the adoption of the Dutch bed method of cultivation in order to reduce production costs, as it is not possible to grow Amaryllis in the open field at a profit under present market prices.

This change has naturally necessitated further changes in soil management as cover crops cannot be grown in conjunction with bed culture and shade. To offset loss of humus from cover crops, dairy fertilizer and local peat have been extensively used. Closer planting under the bed method has necessitated the need of incorporating greater amounts of plant food both in the form of humus and organic fertilizer materials.

The average cost of producing hybrid amaryllis under the Dutch bed method for 13,000 bulbs is as follows,—

Lumber, 350 bd. ft.		$14.00
Labor, 2 men, 1 day @ $1.50		3.00
Manure, 6 cu. yds.		6.00
Muck, 6 cu. yds.		6.00
Fertilizers:		
Hardwood Ashes	200 lbs.	
Lime	400 lbs.	
Goat Manure	400 lbs.	21.00
Tankage	200 lbs.	
Tobacco	200 lbs.	
Bone	200 lbs.	

[1]Daily Digest, Off. of Inf., U. S. Dept. Agric. LXI, May 8, 1936.

Labor working in material and final grading	3.00
Planting	9.00
Cultivating 10 times	7.50
Two additional applications of mixed Fertilizer, 200 lbs.	7.20
Total	$76.70

The cost on a one year basis $5.90 per M. Production when planted to 2½" stock is as follows: 9,100, 2½-3"; 2,600, 3-3½"; and 1,300 culls.

I. W. Heaton

Heaton shaded propagation house

Vegetative propagations on two benches to right; seedlings on two benches to left.

If seedlings are planted these additional items must be added to the first years cost of $5.90,—

Cultivation 10 times	$ 7.50
Three applications of 200 lbs. each	9.80
	$17.30

This makes an additional charge of $1.32 per M. or a total of $7.22 per M. for two years with a production of 4,290, 3"; 6,500, 2½"; and 2,210 culls.

Placing these figures on an acre basis and including the cost of one acre of shade the total is $1,372.00 against a production of 75,000, 3" and 84,000, 2½" bulbs, at an average cost of $8.00 per M. for marketable sizes. These figures do not include taxes or interest on miscellaneous items.

The following table roughly outlines the best growing conditions for amaryllids in Florida.

Table 1. Indicating requirements for amaryllids in Florida.

Species	Soil Type				pH	Shade	Dormant Period
	Heavy Muck	Medium Muck	Heavy Sand	Sand			
Agapanthus	yes	yes	no	no	5–7	yes	evergreen
Amarcrinum	yes	yes	no	no	6–7	yes	evergreen
Hybrid amaryllis	no	yes	yes	no	6–7	yes	Aug. to Feb.
Clivia	no	yes	yes	no	5–7	yes*	evergreen
Crinums	yes	yes	yes	no	4.5–6	yes*	Winter
Eucharis	no	yes	yes	no	6–7	yes*	evergreen
Equestre, single	no	no	yes	yes	4.5–6	yes	Aug. to Feb.
Equestre, double	no	no	yes	no	7–8	yes	Aug. to Feb.
Haemanthus	no	no	yes	no	6–7	yes	Oct. to May**
Habranthus	no	no	yes	no	6–7	yes	Feb. to Sept.
Lycoris aurea	no	yes	yes	no	7–8	yes	May to Sept.**
Lycoris squamigera	no	yes	yes	no	6–7	yes	May to Aug.**
Nerines	no	no	yes	yes	6–7	yes	May to Oct.**
Sprekelia	no	yes	yes	no	6–7	yes	Oct. to May**
Zephyranthes	yes	yes	yes	no	4.5–6	yes	Varies with species.
Ismene	no	no	yes	no	6–7	yes	Oct. to May**

*__Clivia__ and __Eucharis__ require complete shade. __Crinum Moorei__ requires some shade. All of the others appreciate some shade.

**Species marked with a double star in the dormant period column must have very good drainage or be dug and stored during this period.

William Lanier Hunt

A sea of Atamasco Lilies

Carl H. Krippendorf

The Awakening of Spring; Narcissi naturalized in Ohio Woodland

HARDINESS AND LANDSCAPE VALUE OF THE AMARYLLIDS IN THE NORTH AND THE UPPER SOUTH*

WILLIAM LANIER HUNT, F. R. H. S., *Chapel Hill, N. C.*

Gardeners everywhere, are becoming increasingly interested in the Amaryllidaceae because of the colorfulness, character and interesting habits of the plants included under the genera in this family. Their extreme showiness, owing to their brilliant color, attractive form and habits, and the unusual shapes of the flowers in certain genera arouse the interest of the plant lover. The fact that many of them bloom in late summer and early fall, at a time when there is something of a dearth of flowers commends them immediately to landscape and garden use. More and more of them are coming to be found winter hardy, and with the increasing knowledge of how to handle them in the colder states, there is a greater incentive to raise them there. At the same time, their liking for the drought and long, hot summers of the Southern States recommends them particularly to these regions.

The name *Amaryllis* immediately suggests brilliant color to the mind. While all the genera in this family do not have flowers which are quite as brilliant as certain amaryllis or *Hippeastrums,* few of them are drab or lacking in showiness. The colors run the whole gamut of red, copper, orange, fulvous red, crimson, scarlet, pink, yellow and white. Blues and lavenders are not so plentiful but are present in four genera: *Tecophilaea, Ixiolirion, Griffinia* and in the new *Zephyranthes caerulea.* As the result of the work of hybridists, we can expect many shades and tints of this whole range of color before long.

The shape of the plants, among the larger genera of amaryllids, is somewhat odd to dwellers in the temperate zone, because it is quite at variance with the majority of our native plants with their superabundance of leaves. This very oddness makes these plants useful as accents, for wide, strap-like foliage and bells of flamboyant flowers held on the sturdiest of stems, as in the *Hippeastrums,* is bound to attract attention. The small amount of foliage on a plant with such a show of flowers is also calculated to catch the eye. Then, to go to the extreme in both directions, the tremendous size of the leaves and comparatively small flowers in *Crinum* and the total lack of any leaves at all at the time of flowering in *Lycoris* are phenomena one cannot overlook. All of these habits add interest to plants in the landscape.

Where color or shape of the plant does not get the eye, some other distinctive trait or habit seems to be present to do the work. The fragile and ephemeral little *Zephyranthes* are not large enough to be very showy in a single flower, but they surely make up for it in the numbers that grow and flower together at the same time. This is a pointer from nature which we should not overlook in using these small bulbs, for they simply cannot be at their best in lots of three and four, stuck around in gardens. Even *Agave virginica* is able to assert itself by its odd appearance in a land of mostly non-succulents. This, by the way, is one of the most refined little succulents one can own.

In *Hymenocallis* and *Sprekelia* we have good examples of the unusual shapes to be found among the flowers in the Amaryllidaceae. Incidentally, *Sprekelia* seems to be coming into popularity somewhat as a pot plant these days. Nerines combine both color and shape for their beauty. They have the very interesting habit of coming up out of "nowhere" and blooming all of a sudden. Perhaps no other habit or trait is more creative of human interest than this popping into bloom without the least warning so typical of many amaryllids.

The liking of many amaryllids for the drought and hot summer in the South is a point in their favor which cannot be overemphasized. Any plant which will put up with these conditions is a boon to gardening in a locality where it is well-nigh impossible to do a lot of watering through the summer and where most gardeners go to the mountains or the beach and leave things to dry up until fall. Fortu-

*Mr. Hunt, who is working on the hardiness of amaryllids and other plants, will be interested to receive any information on amaryllids which have proven hardy in the Northern States and the upper South.

nately, the climate in the South is enough like that at the Cape for these bulbs to like it. When Southern gardeners have caught on to the ease with which they may grow them, there ought to be a tremendous interest in all the various genera. It is high time that the people in the South take the hint from the successful way in which Nerines, Sternbergias and the like grow in their States and give more of the Cape flora a trial here, instead of wasting their time and money on things recommended in Northern literature which are definitely and very apparently unsuited to Southern heat.

In discussing the landscape value of as large a family as the Amaryllidaceae over an area as large as that of almost half the United States, for practical purposes one must necessarily consider the point of winter hardiness. The amaryllids are a joy where they can be grown in the open, and everyone should seek to cultivate them outside, wherever it is possible.

FOR THE NORTHERN STATES

In the States above Washington, D. C., of course, the genera *Narcissus, Leucojum* and *Galanthus* are well known, much in use and, with the exception of a few species, winter hardy. One is glad to see, too, that *Lycoris squamigera* is coming to be better known and that gardeners are more willing to pay the usual price of a dollar a bulb for this most worthwhile summer bloomer. Reports coming in from New York, New Jersey and other places in the Northern States indicates that *Zephyranthes atamasco,* collected in the middle and upper South, are being grown successfully and with no losses owing to cold there. Some gardeners have succeeded with *Sternbergia lutea* around New York City, and *Nerine sarniensis* has been successfully grown by at least one gardener in the New England States. In addition to these species, there is *Hypoxis hirsuta,* native from Maine to Florida, and *Agave virginica,* native from Maryland south, seems to be able to withstand a lot of cold. The writer has not had the opportunity to check on the hardiness of *Hymenocallis galvestonensis* which Bailey says was introduced as hardy all over the United States, but several other *Hymenocallis* are hardy.

If Northern gardeners were aware of the splendid results which a few pioneers, there, are getting with the tender and "borderline" amaryllids grown in pots and set into the garden to blossom, or grown in the open and stored like gladioli they would undoubtedly try their luck with them. Elsewhere, in the Year Book of the Society, instructions for this kind of culture have been given. To these instructions the writer would like to add from his personal experience the suggestion that Northern gardeners try out a method of planting amaryllis and other tender bulbs which has been highly successful for him in raising subjects not supposed to be hardy even in the upper South. Beds are used which are a foot or more above the surrounding surface of the ground. In preparing such beds, the original surface is thoroughly worked, and then the extra one to one and a half feet of soil is simply added to the top. In this location, drainage is perfect throughout the winter, and the results are quite surprising.

In considering the suitability of amaryllids to a given climate, one must take into account more than mere hardiness of the bulbs to cold. All the species which have winter foliage must be protected somewhat, so that the leaves can have the benefit of the sun. The chief reason for the success of *Lycoris* in the North probably lies in the fact that the foliage does not appear until Spring, when snows and cold are passed. By the same token, *Habranthus miniatus,* hardy in the upper South, should be tried out in the Northern States, for if the leaves are killed in winter, this plant will send up a new crop to ripen the bulbs in spring. Another thing in favor of its hardiness, there, is the fact that the long-necked bulbs, unlike most amaryllis, must be planted deeply—six inches, and would probably escape freezing in protected places. Even *Placea,* supposed to be quite a tender bulb, might turn out to be hardy, since its bulbs are said to occur at great depths in its home in the high mountains of Chile.

William Lanier Hunt

The unusual shape of Hymenocallis flowers is sure to attract the eye

William Lanier Hunt

***Frost-proof**, golden sternbergias carry their color well into November*

FOR THE UPPER SOUTH

For the temperate states from Washington, D. C. to Florida and west to the Mississippi, the number of genera which we are finding to be hardy is growing rapidly. To gardeners in this section, the amaryllids offer one of the most remarkable groups of all the flowers available. Many a fine plant has never even been tried out in the Middle Atlantic States because of the lack of any but Northern advice on gardening. The word "tender" has too often frightened people away from bulbs which are entirely hardy, even in the colder, mountain sections of these states. Where *gladioli* and dahlias live in the ground with no protection over winter and with only an occasional loss, there is every reason to try out these "borderline" things.

FALL

Possibly the most valuable and interesting group of amaryllids in the Mid-South is the Fall-blooming group composed of *Hippeastrum advenum, Nerine sarniensis* and *Sternbergia lutea.* Nothing at this time of the year gives more color or a more startling performance than the flowers from these bulbs which come up out of the ground and bloom where three or four days before, not a thing was visible.

Hippeastrum advenum, the "Oxblood Lily" is, of course, new to gardeners, but one can safely vouch for its beauty and ease of culture in the South. To those who have the feeling that the larger *Hippeastrums* are somewhat too big or even coarse, these little flowers will be a charming surprise. The real ox-blood hue of their little bells is a thing seldom found in flowers and most useful in the garden. The dark, shiny, evergreen foliage persists until June.

The airy, crystalline red flowers of *Nerine sarniensis* appear shortly after those of the "Oxblood Lily" and then bloom concurrently with them for several weeks in wonderful contrast of shape and color weight. Nerine foliage is somewhat the more glaucous of the two, of a bluer green, and there is a distinct little whitish midrib down the center. In winter this little foliage contrast is quite valuable where the two are planted together.

Sternbergias usually follow the *Nerine-Hippeastrum* combination very closely and continue to bloom for as long as six weeks after they have passed. These cheery little yellow flowers are apparently frost proof. They can be counted upon, in seasons when they do not start blooming too soon, to provide good color through the middle of November.

The leaves of *Hippeastrum, Nerine, and Sternbergia* are almost as valuable as the flowers. These bulbs provide for Southern gardens, where the winter aspect is almost as important as that in summer, a green ground cover, together with an abundance of flowers in the fall. For many years, *Nerines* and *Sternbergias* have been used to edge the beds of old gardens in Eastern Virginia and Maryland. *Sternbergias* are small enough in stature to be attractive at the very front, but *Nerines* should be planted somewhat back in beds if they are not to hide any lower fall-blooming perennials. Perhaps the commonest use of *Nerines* is in strips down the sides of paths. Here they form wide bands of brilliant color which is particularly surprising in Fall when one hardly expects such a demonstration from bulbous plants. This wholesale use of *Nerines* has always seemed to the writer a bit like using diamonds for paving purposes, however, because the exquisite form of the flowers is almost totally lost. They are seen to best advantage where they can rise in small groups from some kind of herbage not over a foot high, and the airy flowers can float and dance over the beds like so many butterflies.

All three of these bulbs naturalize successfully if their few cultural requisites of drainage and exposure to winter sun are satisfied. They are especially beautiful planted in drifts under high, deciduous shrubs, such as Lilacs, Philadelphuses and Spiraea van Houttei. The evergreen foliage is particularly pleasing to the eye in winter when the leaves are off the shrubs, and in summer their bare locality cannot be seen. Around old houses, in some places in the South, where the deciduous trees have gradually taken the garden, *Nerines* and *Sternbergias* may be found still thriving and multiplying. The overhead branches probably help to break the frost and at the same time to prevent the winter's sun from thawing them out too rapidly in the morning, after a cold night.

The *Cooperias* and some of the hardy *Crinums* are sure to be still blooming in the Fall, also a few *Zephyranthes* flowers if there is any rain. *Crinum fimbriatulum* really gives its best blossoms just at the right time to be the feature in Fall flower shows. Then, in very late Fall, *Galanthus byzantinus* and *G. Elwesii* are almost sure to flower sometime before Christmas in the warmer sections in rock gardens. Possibly we shall be able to procure *G. nivalis Olgae* and *G. nivalis Rachcliae* for our gardens here some day, also *Leucojum autumnale* mentioned by Mrs. Peckham some years ago as of doubtful availability.

Winter

The open winters of the Southern States are to be thanked for the flowers of Polyanthus Narcissi and many kinds of snowdrops in January and February. There is a growing interest in winter gardens, and one of the good results of the rock garden craze is that people are paying more attention to the little bulbs such as *N. minimus, N. cyclamineus, Galanthus nivalis, G. Elwesii, Leucojum vernum* and others as they become available. As companions for these bulbs one may conveniently use the winter-flowering irises, crocuses, and *Bulbocodium vernus, B. versicolor, Chionodoxa, Hyacinthus Azurea* and the very attractive little *Eranthis hyemalis.*

Spring

One needs only to mention the *Narcissi* and *Leucojum aestivum* in March and April. Then, with April and May come the dainty little golden yellow flowers of *Hypoxis erecta,* milk white meadows of "Atamasco Lilies" and pots of *Hippeastrum Johnsoni, Clivias* and *Eucharis* in the flower shows all over the South. In gardens one can have *Zephyranthes carinata,* which blooms in May, as a rule, and then off and on during the summer. A wonderful companion-piece for *Hypoxis* is "Blue-eyed Grass," *Sisirynchium* species. The two are of nearly the same height and make ideal ground covers to follow the early bulbs in the rockery or woodland.

If *Zephyranthes* look silly in threes and fours, they look more ill-at-ease perched on top of rock gardens where they will usually scorch to death. The little bulbs of *Zephyranthes atamasco* seem to thrive almost anywhere they are put, but the best place for them in the garden is near a pool, in a bog garden itself, or best of all, in the drain-off from the pool or along a streamside in sun or half shade. Cypress Gardens in South Carolina offers a most dramatic example of good use of this subject. The bulbs can hardly be planted in too wet a place, provided water does not actually stand over them for long at a time, for the little roots apparently come up for air. In digging them, one cannot fail to notice how the roots follow right up the sides of the bulb toward the top, instead of going down like most roots, so that they form a little threadwork over the bulb.

Summer

Cooperias and *Zephyranthes carinata* are very likely to produce a few flowers in spring and early summer, and *Chlidanthus,* some *Hymenocallis* species and various hardy *Crinums* will flower in June, but the most useful season of the amaryllids comes after July 15. One may expect the flowers of *Lycoris squamigera, L. aurea, Amaryllis bellodonna, Z. rosea, Z. candida,* and others if they are available, many *Crinums, Hymenocallis* and *Alstroemerias* at any time after a good rain (if any) from mid-July to mid-August. All of these valuable and showy August flowering subjects should be carefully planted where there is no chance of their being missed when in flower, for the smaller ones can come and go unseen in a large garden in some out-of-the-way place. There appears to be a temptation to put them in some "safe place" because of the danger of cutting into the bulbs, especially those of the "naked-flowering" ones, but they can be too safe, for people do not go far to see things in their gardens in August.

BUYERS' GUIDE

In the following pages the foremost dealers in amaryllids and the necessary accessories for their culture display their varied stocks. These stocks are becoming more complete with each issue of Herbertia.

The advertisers are to be commended for the support they are lending to the worthy enterprise of advancing the amaryllids. Most of them have written that they consider it not more than proper that they do what they can to show that they are backing the officers in the only way that really counts. They have done their share, and merit the patronage of the reader.

If the amaryllid enthusiast is to show yearly progress, he should procure for his collection some new types and varieties each season. In the northern sections, for outdoor culture there is a wealth of material—narcissi in great variety, sternbergias, galanthus, alliums, lycoris, hemerocallis, etc. For indoor culture there is no limit except the available window, conservatory or greenhouse space. In the southern sections untold treasures await the collector which can be grown outdoors in many cases without protection. The more tender forms can be managed with some slight winter protection.

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E. G. Duckworth,
President.

BACK NUMBERS OF THE YEAR BOOK

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