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HERBERTIA

1953

THE AMERICAN PLANT LIFE SOCIETY

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The American Plant Life Society
26 E. Camino Real, Arcadia, California

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SECOND NARCISSUS EDITION

EDITED BY
HAMILTON P. TRAUB
HAROLD N. MOLDENKE

THE AMERICAN PLANT LIFE SOCIETY
26 E. Camino Real, Arcadia, California

THE AMERICAN PLANT LIFE SOCIETY

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

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[THE AMERICAN AMARYLLIS SOCIETY—continued on page 4.]

PREFACE

The *Narcissus* articles for this SECOND NARCISSUS EDITION were assembled by the NARCISSUS COMMITTEE—Mr. Grant E. Mitsch, Chairman, and the other Committee Members. The NARCISSUS COMMITTEE is to be congratulated for an excellent job. The Committee has appropriately voted the 1953 HERBERT MEDAL Award to Mr. E. A. Bowles, V. M. H., the eminent authority on *Narcissus* and the *Galantheae*. On account of the infirmities of advanced age, it has not been possible for Mr. Bowles to send in his autobiography in time for inclusion in this issue.

There is a wealth of *Narcissus* lore in this SECOND NARCISSUS EDITION beginning with Mr. Wilson's interesting article on 40 years devoted to *Narcissus* breeding. The 1946 HERBERT MEDAL was awarded to Mr. Wilson in recognition of his outstanding achievements in *Narcissus* breeding. Mr. Quinn contributes a thought provoking paper on miniature and decorative daffodils, naturalizing in the Washington, D. C. region, and a comprehensive beginners' list of daffodils, Mr. Hannibal writes about *Narcissus viridiflorus,* the green *Narcissus,* and other fall-flowering *Narcissus,* Mr. Powell, about his 30 years devoted to *Narcissus* breeding, Prof. Ballard, and Dr. Cooley, on *Narcissus,* Mr. Tuggle, on daffodils in Piedmont, Virginia, Mrs. Evans, on old naturalized *Narcissus* in the South, Mr. Mitsch, on daffodils in Oregon in 1952, and Mr. Johnson, on daffodils in northern California.

The other amaryllids, as usual, are not neglected in this issue. Mrs. Morton reports on the 1952 New Orleans Amaryllis Show, and the dedication of the New Orleans Amaryllis Garden, Mrs. Parks and Mrs. Slaughter, on amaryllid activities in Houston. Mr. Jones writes on Texas Rain Lilies, Mr. Manley, and Dr. Thornburgh on the evaluation of Hybrid *Amaryllis* Clones, Mr. Freeman, on *Allium tanguticum,* Mrs. Henry, on *Amaryllis belladonna* var. *barbata,* Mr. Saxon, and Prof. Ballard, on *Hemerocallis,* Mr. Chandler, on *Calostemma* in Australia, Mr. and Mrs. Orpet, on *Amaryllis immaculata,* Mr. Howard, on *Crinum scabrum,* Mr. Hayward, on *Lycoris,* Mr. Woelfle, on *Hymenocallis,* Mr. Burlingham, on *Amaryllis belladonna* in Florida, and Mr. Gilmer, on Krillium and *Hemerocallis* culture. There are descriptions of two new *Amaryllis* L., species, articles on the viability of seeds of white-flowering Hybrid *Amaryllis* clones, pot-culture of *Amaryllis belladonna* L., and others.

On account of increased work in connection with his fertilizer business, Mr. E. Frederick Smith has found it necessary to resign as your Membership-Secretary as of January 1 of the present year. Mr. Smith, a real plant enthusiast, served the Society faithfully and efficiently since 1945 and he will always be remembered for his role in getting the organization soundly established. We are sure that we voice the sentiment of the members also in expressing the gratitude of the Society to Mr. Smith for his outstanding accomplishments, and in wishing him every success in all his future undertakings. The members will be interested to know that Mr. Smith has agreed to serve the Society in the future with his counsel when needed.

The new Membership-Secretary is Miss Pauline Buck who has been interested in plants since childhood. Miss Buck is also an accomplished musician, holding the B.M. (Bachelor of Music) degree from Texas Wesleyan College, Ft. Worth, Texas.

The 1954 issue of Herbertia will be the SECOND HYBRID AMARYLLIS EDITION, and it will be dedicated to Mr. Thomas R. Manley who is a leader in the evaluation of Hybrid *Amaryllis* clones. A revision of the recognized *Amaryllis* flower types, the schedule of exhibition classes and score card will be included in addition to the other phases of Hybrid *Amaryllis* culture. As is customary, the other amaryllids will not be neglected in this issue. Articles for this issue are due by July 15, 1953, and should be sent in to the editor as soon as ready so as to assure early publication.

1531 Rodeo Road,
Arcadia, California,
January 5, 1953

Hamilton P. Traub
Harold N. Moldenke

[THE AMERICAN AMARYLLIS SOCIETY—continued from page 2.]

(c) REGISTRATION OF PLANT NAMES

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

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

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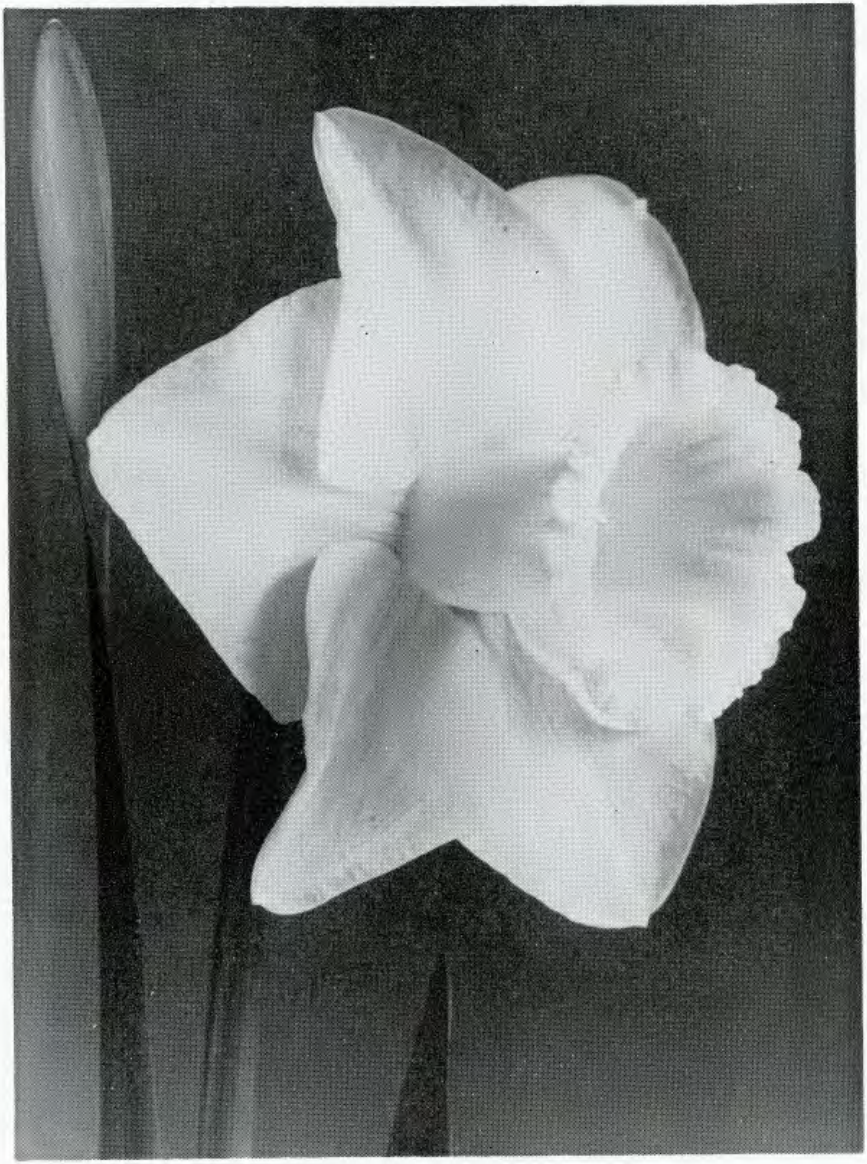
FLOWER TYPES AND SCORE CARD FOR HYBRID AMARYLLIS

For classification of flower types and score card for Hybrid Amaryllis see PLANT LIFE *6:* 43-46. 1950.

[THE AMERICAN AMARYLLIS SOCIETY—continued on page 145.]

Dedicated to
E. A. Bowles



Hybrid *Narcissus*—Empress of Ireland

Plate 1

SOME FAVOURITES AMONGST DAFFODILS I HAVE RAISED

GUY L. WILSON. *V. M. H., M. Agr.,*
Northern Ireland

I have just spent a few winter evenings in turning over the pages of the books in which I have kept a record of my Seedling Daffodils since they began to flower in the year 1912. It has been interesting to recall a few of those that appealed most strongly to me. Some of those from selections in those earlier years that got as far as being named and distributed have of course since been superseded and have disappeared from show benches and catalogues, partly to make way for newer and better ones, for few indeed that appear year by year from breeders gardens at our shows are destined for such lasting fame and popularity as the noble KING ALFRED or FORTUNE or BEERSHEBA.

Nothing that flowered in 1912 ever got named though I can remember that some of the flowers that did appear were good enough by then existing standards to be immensely encouraging, and sufficiently exciting to ensure that having put my hand to the plough of daffodil breeding I should never look back as long as health and opportunity made it possible to continue.

In the year 1913 two flowers appeared which in due course were named—the first, No. 2/25 was a seedling from the old bicolor trumpet Grandee which was itself a plant of very distinct character: what the pollen parent of this seedling was I do not know, but No. 2/25 was a uniform soft yellow throughout with a remarkably fine broad flat smooth perianth of great substance standing at right angles to the rather slender trumpet—it was subsequently named Darius—but like its parent its stem was too short. I have always had a special love for white daffodils, particularly white trumpets, and so was immensely delighted by a seedling, No. 2/30, which came in a small batch from MADAME DE GRAAFF by pollen of a white trumpet named LOLAH bred by the late Ernest Crosfield. This was for those days a large white trumpet of fine form, as its wide spread perianth had firm texture and stood well out from the long gracefully flanged trumpet;—moreover it was very much whiter than MME. DE GRAAFF and seemed an advance on any white trumpets that I had seen—so in due course it was named WHITE DAME, and some bulbs were distributed;—but its stem was too short—a fault common to white trumpets of those days—and its texture though firm was rather ribby; it was soon superseded.

In the next season, 1941, amongst a fair sized batch of seedlings from MME. DE GRAAFF by KING ALFRED pollen, one appeared that was quite distinct from all the others, a beautiful flower of first rate exhibition quality, it was a quite large trumpet of exceptionally smooth waxy tex-

ture and clear soft rather lemon yellow self colour—it was a well balanced flower with a smooth flat perianth; and was a vigorous plant with distinct broad smooth foliage and fine large smooth bulbs, but unfortunately its stem was quite short. However, I named it HONEY BOY, and for some years it was a valuable exhibition flower and got fairly widely distributed, giving a good account of itself at shows in New Zealand.

I knew that a fine race of beautiful and vigorous varieties known in those days as "Giant Leedsii" had been produced from the old Leedsii MINNIE HUME by pollen of MME. DE GRAAFF and WEARDALE PERFECTION —so I had been making some crosses on MINNIE HUME, and it was also in 1914 that I flowered a few seedlings from this old variety by pollen of PEARL OF KENT, a large but short stemmed white trumpet bred by the late Rev. G. P. Haydon of Canterbury which caused something of a sensation when it appeared. One of these seedlings which I subsequently named IRISH PEARL was really about the best plant of its type that I had seen, as it was a large bold flower of beautiful form with broad flat perianth and frilled crown—it was, moreover, a most vigorous exceptionally free flowering and fast increasing plant. I subsequently disposed of the stock and in time lost trace of it, though I should not be surprised if it is still in circulation, as it was an excellent garden plant.

It must have been in either 1913 or 1914 that I flowered a few seedlings from Hispanicus Maximus and from amongst them one was kept though for some reason not numbered or recorded at the time; so far as I remember it improved considerably when grown on for a few seasons and was temporarily nicknamed "Max Orange," subsequently christened GOLDBEATER—and it is interesting because it turned out to be the first seedling of my own raising that I have continued to grow and distribute up to the present time—I am sure that it came from self-fertilized seed of Pyrenean Maximus—it is like a larger and bolder and much more vigorous Maximus of deepest intense self gold, a very durable flower of entirely decorative type, carried on a tall strong stem that makes a splendid garden plant.

Nothing of particular note seems to have appeared until the year 1917 when a late and most charming and dainty flower turned up—its seed parent was an old type Leedsii named MISS WEISS, raised by William Baylor Hartland of Cork, while its pollen parent was a large poeticus seedling of Mr. Engleheart's raising. Its perianth was just off white, while its almost flat saucer eye had a white ground shading to a cool apple-green centre and having a well defined narrow rim of soft clear pinkish orange. It proved to be a good doer and increased. I think it was next season that I sent a flower of it to Mr. Engleheart to see. I heard nothing from him for a longish time, and began to think that he had taken exception to my having used pollen from a flower that he had left on his stand at the close of a show—but in the end a delightful note came from the great man saying that he saw from his notes that I had sent him a flower af a "Hybrid Leedsii" like some he had raised but *better than any of them.* Need I say that I "wouldn't have called the

Hybrid *Narcissus*—CANTATRICE

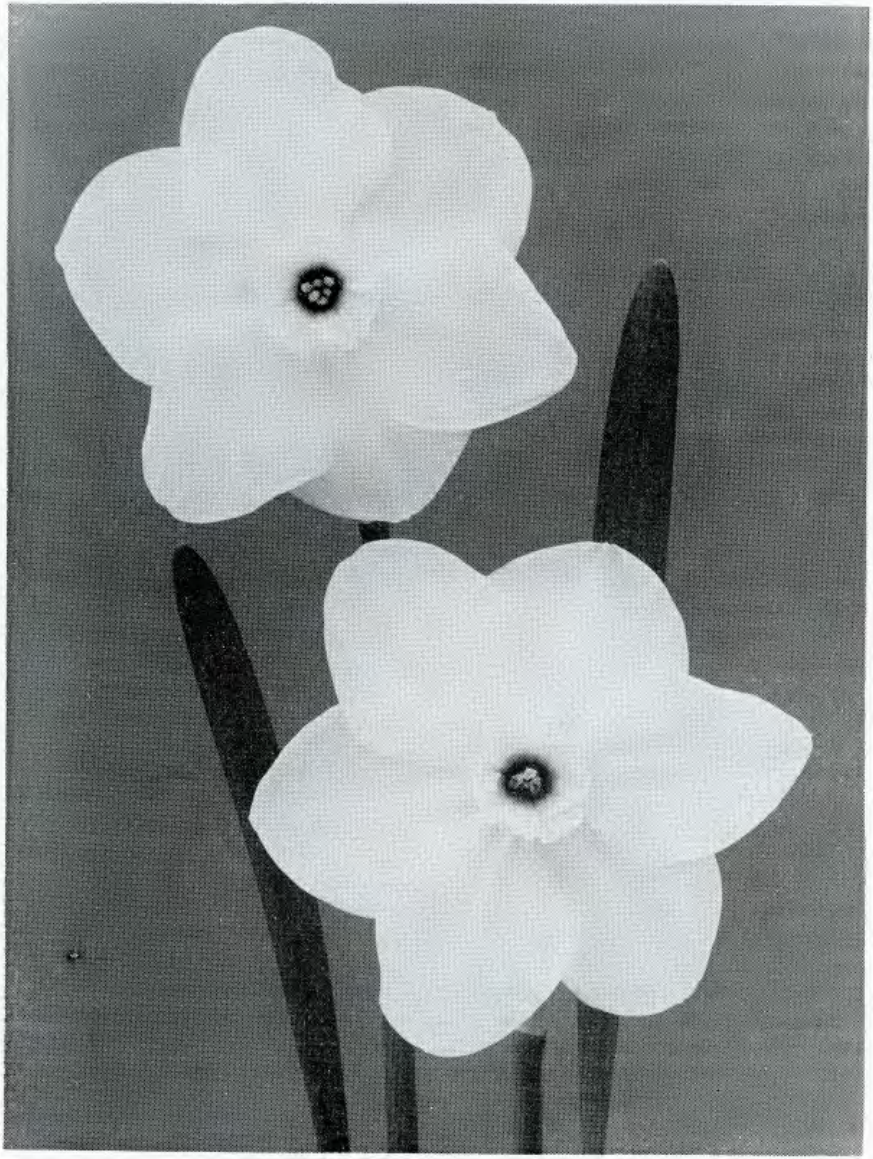
Plate 2

King my uncle''! So my flower was named MYSTIC, and travelled far and wide. I still grow a row of it though I no longer distribute it.

Seedlings were of course flowering in increasing numbers year by year and I suppose I was getting harder to please, but so far as memory and my notes carry me, no outstanding landmarks seem to have appeared during the next eleven years—incidentally, readers might note that, and realize that it is not surprising that a high price per bulb is sometimes asked for a really outstanding novelty when it is first introduced and there are as yet very few bulbs in existence.

In 1928 however there appeared what I still think one of the best and most perfect little flowers I have ever raised, namely CUSHENDALL. Its seed parent was a small pure white green eyed flower called EMERALD EYE raised by Mr. Engleheart, and its pollen parent Mr. Engleheart's fine late Poeticus, DACTYL. EMERALD EYE was a lovely little flower when it opened properly, and was first listed at the for those days high price of £30, about $85.00 per bulb—it was given me by my most generous of all Daffodil friends, the Brodie of Brodie. Unfortunately it had a poor constitution and often did not open its flowers perfectly, as is sometimes the case with these late small-crowned things, so I was fortunate indeed in getting it to seed to DACTYL, for CUSHENDALL is a much stronger plant and its flowers always open perfectly here. It is a flower of faultless form, quality and substance, with broad nearly circular snow-white perianth, its small crown having a cream coloured fringe while the centre is wholly moss-green. So it was easily much the best green-eyed white flower that had appeared anywhere up to that time, and has been enthusiastically loved and admired by all who see it. To see its flowers in their full beauty, it must be cut and brought indoors as the buds are just bursting, as the strong sunshine at the late end of the season quickly fades out the green colouring. As soon as I saw what a jewel I had got, I repeated the cross which had given it to me, and sowed another batch of seed, but more of that anon. Another very good flower of 1928 was DUNLEWEY, which was also bred between two flowers of Mr. Englehearts raising, namely MITYLENE seed by KANTARA pollen, the latter being a very large rather short stemmed white trumpet. DUNLEWEY is a large white and cream Leedsii or 11-c which in a sunny climate would bleach to white throughout—it has good form and quality and has been a useful show flower in spite of its too short stem. It is one of the most vigorous, fast increasing and immensely free flowering varieties that I know, and makes a superb garden plant—its rather short stem becoming a virtue saving it from getting broken off by wind.

It has been truly said by such great breeders as Engleheart and P. D. Williams that it is more difficult to raise a good yellow trumpet of good constitution than any other variety of daffodil. In my early days I probably made more extensive use of KING ALFRED as a parent both for seed and pollen than any other variety, and yet with the exception of one or two fairly good ones, which I have since parted with, bred from MONARCH by KING ALFRED I can recall nothing of note. It was around the year 1927 or 1928 however that I flowered PRINCIPAL which



Hybrid *Narcissus*—FRIGID

Plate 3

was bred from CLEOPATRA by SORLEY BOY, the latter a yellow trumpet of fine form and substance, of unknown parentage, that appeared in a bed of mixed seedlings—PRINCIPAL, which is a flower of excellent form and habit and has a good stem, proved a good doer and in due course was awarded a First Class Certificate, and has been widely distributed.

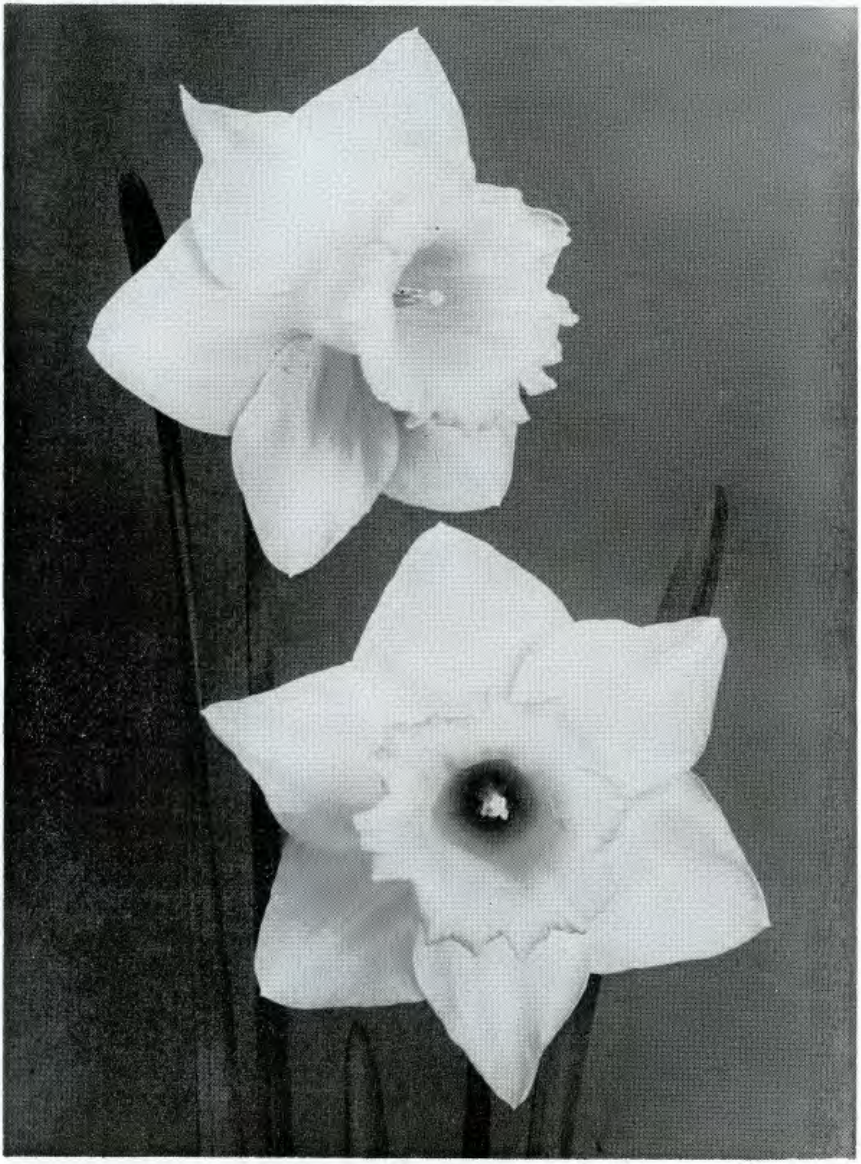
In 1929 a batch of seedlings from the well known and beautiful MRS. E. H. KRELAGE by pollen of BEERSHEBA flowered. I still grow two of these: ARDCLINIS, the earlier, is a pure white flower of beautiful form and proportion that has done well in many places. The second one, SAMITE is later and taller and is a milk white flower of thick smooth velvety texture, beautiful form and quality and good length of stem—I think it likely that it came from a self-fertilized seed of MRS. KRELAGE as I can see no trace of BEERSHEBA in its appearance or character. When I had sufficient flowers of it, it gained a First Class Certificate. I have always thought highly of it on account of its exceptional quality, and it has proved of some value in breeding.

In the following season, 1930, one of the most important flowers I have raised made its first appearance: this was KANCHENJUNGA: its seed parent was an unnamed flower bred by Brodie of Brodie from WHITE KNIGHT by CONQUEROR, and its pollen parent was Brodie's magnificent ASKELON. In my note at the time of its flowering I wrote:—

> "A marvellous flower whose unfortunate fault is lack of sufficient substance"—

a criticism that I soon retracted, because as it developed in the next few seasons it soon came with abundant substance. It was a spectacular advance in size in white or near white trumpets, and I had not hitherto seen a flower in which such a very fine large widely flanged or bell-mouthed trumpet was so adequately balanced by a great perianth of immensely broad segments. Instead of lack of substance its fault is that, particularly on two-year-down plants a proportion of its flowers come with a cockled petal, but the perfect ones are a noble sight. Fortunately it is a first rate doer and increases freely. Its chief value however is as a parent: it transmits its great breadth of petal and has produced a number of large or very large flowers of better quality than itself. TROSTAN a fine tall pale bicolor trumpet was another find of the 1930 season. I had marked it the previous season without giving it a number or recording its parentage in my book—I had evidently not thought it outstanding so merely put a small wooden label against it with the word "Keep" so that I could save it for another chance when digging up the seedling beds, so it was re-planted, and in spring 1930 it flowered again as a really very fine large pale bicolor trumpet on a 2-foot stem, quite outstanding for those days—I have always felt pretty certain that it was bred from KING ALFRED by ASKELON—at all events its vigour and fine length of stem were to prove of much value in subsequent breeding.

The fifth seedling that I selected quite early in season 1936 was ZERO. This came from a short stemmed sturdy growing rather rough pure white trumpet or trumpet-Leedsii seedling, by pollen of Engle-



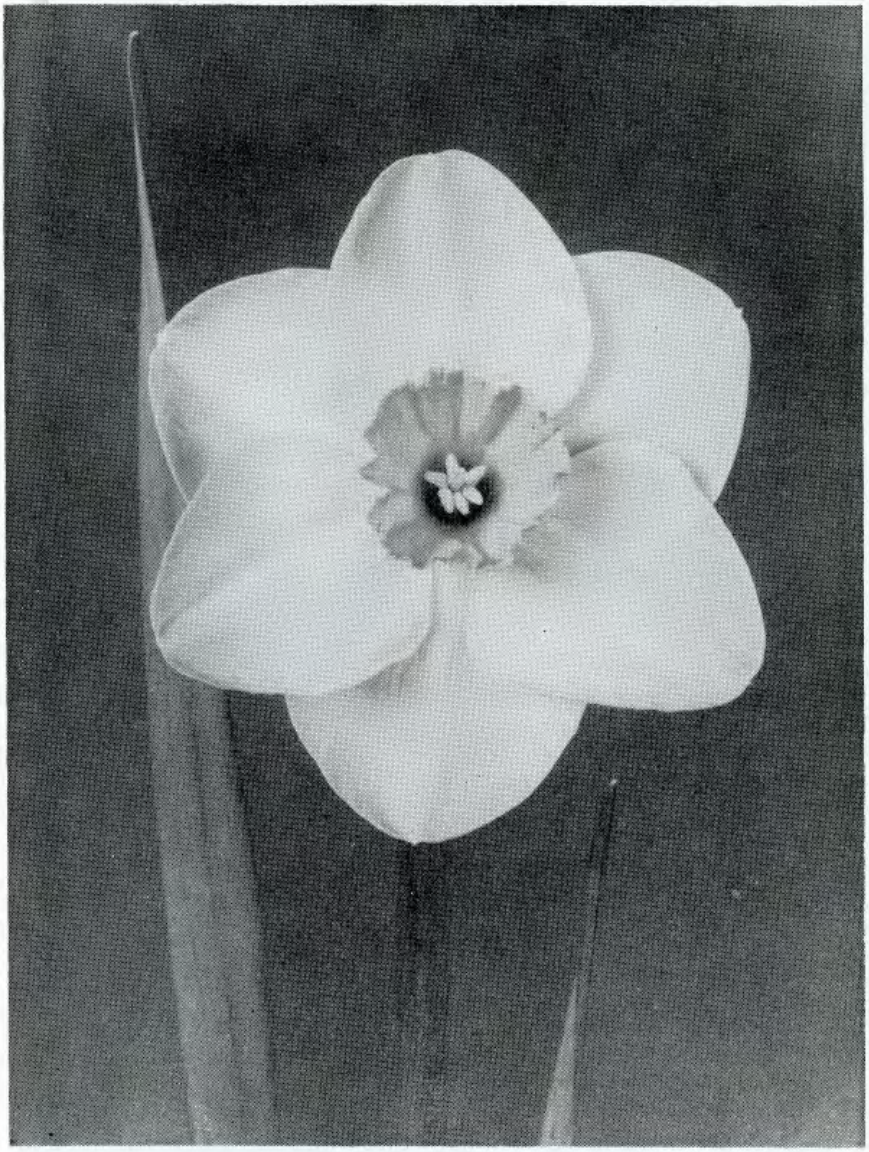
Hybrid *Narcissus*—FORESIGHT

Plate 4

heart's NAXOS, a very tall stemmed large crowned Leedsii of distinct character, which though now superseded as a flower, proved a most valuable breeding plant in helping to produce tall stemmed pure whites of fine quality. Curiously enough, though not itself an ice white, it had the faculty of giving green bases and great purity to a proportion of its progeny. ZERO, though many of its flowers are rather too rough for highest exhibition quality, is a spectacular flower on account of its great size and uniform icy whiteness—at its best it is a lovely flower as it has beautiful form and proportion its great spreading perianth standing away at right angles to the graceful somewhat slender and vase shaped crown which is almost of trumpet proportion, the perianth tube is deep green and the flower is short necked and well carried on a strong stem of adequate length—it is much admired and has been received with great acclaim in Japan. This same year also saw the birth of the white trumpet CANTATRICE [Plate 2] which many regard as one of the best things I have raised. It has great beauty and refinement of form, while its texture is quite unsurpassed having the smoothness of marble or polished ivory—it is a pure self white, and about the only improvement one could imagine would be to get a shade of that enchanting cold sea-green into the base of its trumpet. Anyhow in the Royal Horticultural Society's annual Daffodil Ballot which is conducted amongst the highest ranking exhibitors and growers only, it has now for seven successive seasons been voted the leading exhibition white trumpet—so I think it can be regarded as a really great daffodil.

TRUTH was one of the most beautiful flowers that came in 1933. It came from NAXOS seed by pollen of a short stemmed white trumpet seedling of unusual substance. It is a lovely and refined smooth pure white flower of beautiful form and finish carried on a very fine stem, not quite so large as ZERO and not quite so green in the base but rather better in texture.

It must have been in April 1931, the year after they were both selected, that I crossed a flower of TROSTAN with pollen of KANCHENJUNGA and got a very few seeds—from these, so far as I remember, only three plants grew—one of these outstripped the other two, and it was with increasing excitement that in the spring of 1936 I watched the development of an immense and tall stemmed bud. The largest daffodil bud I had ever seen—excitement rose to fever heat as a truly majestic flower began to open and display an immense and noble gracefully flanged and frilled long trumpet amply backed and balanced by a huge perianth. It was not fully out when I was due to leave for the London Show, and I hesitated much whether to cut it and take it with me, or leave it on the plant to develop and help me win the White Daffodil trophy at the Midland Daffodil Society's show the following week. I finally decided on the latter course, tied the flower to a supporting stake and covered it with a tall tubular glass "light," a few of which I had made for protecting special flowers. When I got home from London I found one of those horrible re-visitations of winter from which our fickle springs frequently suffer—there had been a hard frost, followed



Hybrid *Narcissus*—CHUNGKING

Plate 5

in the morning by violent hail, some of which still lay about. My heart sank, but I thought "At any rate that great flower will be safe under its cover;" but when I reached the plot where it was growing, I could not suppress a cry of dismay as I saw that the flower had been completely bent over by the frost and was hanging head downwards inside the "light" with its stem apparently broken where it had been tied. However closer examination revealed that the stem had not been broken—so although recovery seemed scarcely possible, we tied it up carefully with several supporting tieings and in due course the sap flowed again, and the stem became as strong as though nothing had happened and the great flower developed to its full size and stature and went to the Midland Show where it created a sensation as it was of a size and height with a stem over 2-feet, hitherto undreamed of in a white daffodil. The evening of the second day when the show closed, I went to stay with friends at Presteign, taking the flower with me, and the following day it accompanied us, still fresh and perfect, to the Hereford Daffodil Show to astonish visitors there! And that is the story of the birth and début of BROUGHSHANE! Well, I have raised other daffodils that I love better, but I doubt if any gave me more exciting thrills in its early days. It grows with immense vigour and has, with its length of stem, size and fine constitution been of great importance in breeding. I have been mating it with smaller pure ice-whites of good habit and am getting some grand large flowers of ample stature, better quality and habit. It has of course had many triumphs at shows both here and overseas.

Earlier in these notes I said that when I saw what a perfect gem I had got in my dear little CUSHENDALL, I repeated the cross between EMERALD EYE and POETICUS DACTYL, which had given it to me, and sowed another batch of seed. These flowered in 1936 and the best one of the lot was in due course named FRIGID. [Plate 3] It undoubtedly is one of the loveliest things that I have ever seen—an enthusiastic Japanese correspondent went so far as to call it the most beautiful bulbous flower he had ever seen. It is very late, later than CUSHENDALL, so late that I was able to show it at the Royal Horticultural Society's Chelsea Show in late May where it was awarded a First Class Certificate. It is larger than CUSHENDALL and whiter, being absolute ice-white throughout both perianth and crown except for a touch of vivid emerald in the eye—to see that at its best you must cut it as it is bursting and let it develop in a cool shady room—its broad perianth is rather more pointed than that of CUSHENDALL—it is a more vigorous grower and is very free flowering, the flowers being perfectly posed on tall stiff stems which carry them well above the foliage. It comes like a celestial benediction, along with POETICUS RECURVUS and the dear old double white "gardenia-flowered" poeticus right at the very end of the season. It flowers better on two year down established plants, and like the Poets probably will do best in the cooler and moister climates. It is of course far too late to compete at Daffodil Shows—it is just something to love in the peace of your own garden and the quiet of your own home.

In contrast with the lateness of FRIGID the next season, 1937, brought me FORESIGHT [Plate 4], which is the earliest flower of any

Hybrid *Narcissus*—PREAMBLE

Plate 6

consequence that I have raised, and one that I greatly like. It came, I believe, from self-fertilised seed of BONYTHON, the late P. D. Williams' fine early bicolor trumpet. Relative earliness or lateness of individual varieties varies a good deal in differing climates. Here at any rate, however, FORESIGHT is ten days earlier than FORTUNE, it is a beautiful bicolor trumpet of perfect form and balance; a very fast increaser and extraordinarily free flowering—its fault is that the stem is rather short, but in spite of that I think that its extreme earliness will make it a valuable market flower, especially as it forces easily and also makes a perfectly beautiful pot plant, grown out of doors its perianth is cream white, but indoors it comes pure white.

Later in that same season I flowered several very good vivid orange scarlet and yellow 111-a seedlings from MARKET MERRY, by pollen of a smallish brilliant orange scarlet and yellow flower named CLACKRATTLE that I had brought from Mr. P. D. Williams' garden in CORNWALL when paying him a visit. One of these, afterwards named CHUNGKING [Plate 5] turned out to be the best of the batch. It is a fine flower of good size with broad circular rich golden perianth and well proportioned intense deep vivid orange red shallow crown; it is a most vigorous plant and extraordinarily rapid increaser. Like CANTATRICE the Royal Horticultural Society's panel of daffodil experts have for the past seven successive seasons placed it as the best exhibition 111-a.

The third and probably most important notable flower that appeared in 1937 was CHINESE WHITE which also owes its existence to pollen of a flower that was sent me from Mr. P. D. Williams' garden—this time a beautiful SILVER COIN seedling, which I used on the flat crowned New Zealand raised variety SILVER PLANE. CHINESE WHITE is now fairly well known as it has had much success at Shows both in Britain and overseas—it is a big well proportioned circular shallow-crowned pure white 111-c of first class quality and has also for the past seven successive seasons been placed at the top of its class as a show flower by the R. H. S. daffodil ballot. Personally I consider FRIGID when well grown to be a more exquisitely beautiful flower, but it is so late that it never appears in competitive classes at shows.

It was in the year 1938 that my bicolor trumpet PREAMBLE [Plate 6] first flowered as a very neat and most perfect smallish early bicolor trumpet. It must have been 5 or 6 years after that first flower that it seemed suddenly to grow up and reveal itself as a full sized or even large flower of absolutely superlative quality, faultless perfection and beauty. It was bred from seed of Mr. P. D. Williams' beautiful and very perfectly formed 11-c NIPHETOS, by pollen of KANCHENJUNGA. It has perfectly smooth and flat pure white perianth and rich chrome yellow trumpet of ideal finish and proportion. After a few days this colour passes to a more lemon tone, but the flower remains a distinct bicolor till the end of its life. It is exceptionally durable, I have more than once been able to exhibit it at three successive shows; and it is so consistent in high quality that practically every bloom would be fit for exhibition. It is perfectly posed with a short neck on a good sturdy stem, and flowers

very freely. Few flowers give me such unalloyed delight and complete satisfaction. I consider it one of the very best things I have raised.

1938 was also the birth year of MILANION which I think one of my best yellow trumpets. It came from ROYALIST by pollen of a seedling, and is a clear medium yellow flower of ideal form balance and quality, well posed on an excellent stem—it is extremely free of increase and bloom.

I have had quite a few of the intrigueing and often charming pinky crowned flowers amongst my seedlings. INTERIM, one of the most interesting of these turned up in 1939. It was bred from a small dainty 111-c named CUSHLAKE, by pollen of a tall well formed 11-c named Dava, and is a fine vigorous plant making a large strong bulb and sending up a tall strong stem. The flower is more of decorative than show type, with clear white very slightly reflexing perianth, the petals slightly incurved at their edges while the neat cup is pale citron primrose with a band of salmon pink at the edge. It is proving an interesting parent and has given several seedlings with cups of definitely better pink colouring than its own.

No further outstanding landmarks came to light till 1942 when a considerable batch of seedlings flowered which had been bred from a yellow trumpet named KING OF THE NORTH, raised by Brodie of Brodie, by pollen of P. D. Williams' striking and beautiful very pale lemon CONTENT. Breeders had for long been trying to produce deep Maximus gold trumpets like KING ALFRED or deeper, as distinct from the softer and less brilliant yellow of the once popular EMPEROR. I remember that the late Walter T. Ware had pointed this out to me many years ago, and I had heard that a nice cool lemon trumpet had been bred from KING OF THE NORTH by Brodie's cream trumpet NEVIS—so I thought I would try CONTENT instead of NEVIS. It was a lucky cross and gave me quite a batch of beautiful large very cool and clear limey or almost greenish lemons to choose from: they really were quite a new colour break, in their way as exciting as the pinks. The most strikingly coloured is the one I have named SPELLBINDER which is a very clear bright limey lemon self on first opening, the inside of its trumpet gradually passes to almost white giving the effect of a reversed bicolor—hence it is classed as belonging to division 1-d though the trumpet retains at the very edge of its fringe a sparkling rim of lemon. Another of this family is MOONSTRUCK [Plate 7], a real giant of truly heroic dimensions and yet not at all coarse as its texture is good, and its form and proportion perfect, also it is beautifully posed with a short neck on a tall strong stem. These varieties flower quite early in the season and when exhibited in the trade groups they make a most telling and distinct feature and attract much admiration. I hear from Mr. Grant E. Mitsch of Canby, Oregon that he has also bred some very fine flowers from the same cross.

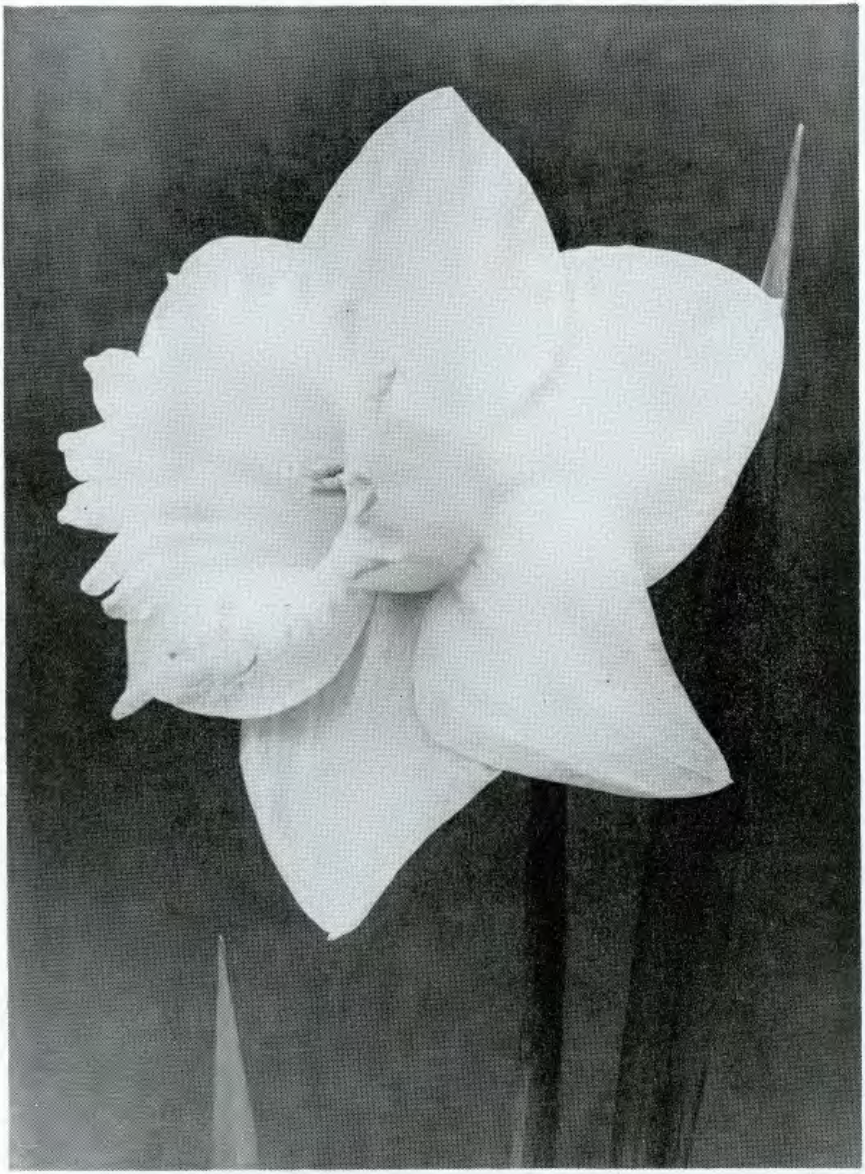
In the following season a most lovely little late-flowering jewel came amongst seedlings from CUSHLAKE in division 111-b. It has slightly reflexing and waved clearest pure white perianth and a small shallow crown of cool viridian or almost sea green shading paler towards the rim

which is sharply edged by a narrow band of vivid salmon orange. It has a nice wiry stem, and is altogether charming if cut young as it opens and brought indoors. Its name is LOUGH AREEMA, after a little fairy lake, up in hills above the County Antrim Coast.

In 1946, amongst other red cups there came a very nice neat rather early smallish flower with clear bright yellow perianth and vivid orange red cup—I gave it a number but cannot have paid very much attention to it amongst a host of others till the past season when I discovered that it is completely and absolutely sunproof—it was fully out before I left home for the London Show and though there were six days of the most brilliant sunshine of the season, and it was quite unprotected during my absence, when I came home I found it looking better than ever, and without the slightest trace of fading. This was a gratifying discovery, as I had made the cross from which it came in the hope of getting sunproof colour. Its seed parent was a flower bred between one I called SUNPROOF ORANGE by pollen of TREVISKY, while its pollen parent was RUSTOM PASHA. SUNPROOF ORANGE, which I no longer grow, was a vigorous fast increasing but not very free flowering 11-a with a bright yellow perianth and a cup that opened only slightly orange but deepened to tangerine with exposure. TREVISKY has very bright colour which holds better than some, while RUSTOM PASHA opens with a somewhat greenish orange cup which the sun develops to a rich tangerine red that is practically sunproof.

In 1947 several fine flowers came from a smallish batch of seedlings bred from GUARDIAN by KANCHENJUNGA. Now GUARDIAN is bred from P. D. Williams' high quality 11-c NIPHETOS by pollen of the tall vigorous pale bicolor trumpet TROSTAN—it is a flower of excellent quality and fine substance with broad smooth white perianth, and very faint lemon almost white crown of nearly trumpet measurement—it is moreover a very vigorous plant of splendid habit carrying its flowers which are short necked, on strong stiff stems well above the sturdy upright foliage. Amongst its seedlings from KANCHENJUNGA pollen one was obviously outstanding even at its first flowering: a very large white trumpet of ideal form and proportion, short necked and perfectly posed on a fine strong stem. It has improved considerably since first flowering and a bloom that I exhibited at the London Show in April 1952 was judged to be the best flower shown in the competitive classes: a glorious and majestic great white trumpet of quite faultless balance, proportion, and perfectly beautiful form with immense very broad flat smooth perianth, the great major segments being of the ideal ace of spades shape, while the smooth perfectly balanced trumpet has a beautifully finished flange. It probably owes the beautiful form of its perianth in part to its grandparent NIPHETOS. I think it is perhaps the finest big white trumpet I have seen up-to-date, and have named it EMPRESS OF IRELAND [Plate 1]; so I hope it will maintain its good character. Unfortunately a daffodil fly took toll of it, so there are as yet very few bulbs.

[Wilson—FAVOURITE DAFFODILS, continued on page 26.]



Hybrid *Narcissus*—MOONSTRUCK

Plate 7

Ceremonies at the dedication of the New Orleans Garden Circle Amaryllis Garden which was designated as an Official American Amaryllis Society Garden, with American Plant Life Society affiliations: From left to right, Mrs. M. B. Carlier, Mrs. Virginia Causse, Mrs. E. L. Jones, Jr., Mrs. Henry Isaac, Mrs. Chris Pervel, Mrs. Albert Georgi, the Hon. Victor Schiro,, Mrs. Leonce Aucoin, Mrs. W. D. Morton, Jr., Mrs. M. M. Sanchez, and Mrs. George Vandervoort.

Plate 8

1. REGIONAL ACTIVITY AND EXHIBITIONS

NEW ORLEANS AMARYLLIS GARDEN

New Orleans now has another beauty spot—a municipal Amaryllis Garden. It is located in the heart of the City on Loyola Street, between Tulane Avenue and Gravier Street. It is directly in front of the future eight and a half million dollar City Hall. It was dedicated August as the GARDEN CIRCLE AMARYLLIS GARDEN by the Hon. Victor Schiro, Commissioner of public Buildings and Parks. It was designated as an Official AMERICAN AMARYLLIS SOCIETY GARDEN, with AMERICAN PLANT LIFE SOCIETY affiliations (Plate 8).

Commissioner Schiro presented Mrs. W. D. Morton, Jr. (past President of the Garden Circle and Chairman of the Official Amaryllis Show for the past four years) with a Gold Key to the City for her excellent work in creating widespread interest in Amaryllis, and in putting on outstanding shows for the past four years.

Commissioner Schiro was made an honorary member of the Garden Circle and was presented with a silver ash tray. Mrs. M. M. Sanchez, President of the Garden Circle was given well-deserved praise for the Club's activities.

NEW ORLEANS SCHOOL AMARYLLIS GARDENS

Mrs. Morton writes under date of January 30, 1953 that the Garden Circle of New Orleans has established Amaryllis Gardens in McMain Junior High School and the Rabourn School, and plans have been made to organize more of these in other New Orleans schools as opportunity offers.

GARDEN CLUB OF HOUSTON BULB MART

MRS. J. WILLIS SLAUGHTER, *Hort. Chairman, Garden Club of Houston*

Our Garden Club of Houston's civic project, The Mart, is staged annually, and the proceeds are for the planting and year-round maintenance of the grounds of the Houston Museum of Fine Arts.

When my husband was called to Rice Institute to head the Department of Sociology in 1919, I arrived on the Gulf Coast with all my crates

of beloved bulbs transported from our place on the Hudson River, with high hopes for their future in this semi-tropical climate. Within eighteen months most of my darlings had given up the fight and I set myself to find by experimentation just what bulbous plants could survive and prosper here.

In 1943, as President I asked the Club's Board to finance a Bulb Sale—the results of my long test in my own garden. The growing of bearded iris proved hopeless because of our high humidity, so I turned to the beardless types. It appears that the only bulbs grown in this region at the time of my advent were *Iris germanica* var. *florentina* Dykes, *Lycoris radiata,* Creole Easter Liliums, tuberoses, *Hemerocallis flava* and the lovely old Crinums known as the Milk and Wine Lilies.

As amateurs we have never bought at wholesale, but gradually, with support of such mentors as Cecil Houdyshel (Calif.), Giridlian (Calif.), E. O. Orpet (Calif.) and Wyndham Hayward of Florida, our horizons broadened each season, and this past year we made a net profit of over $2800.00 in our three day sale, held the first week in November under a huge marquee on the grounds of the Museum. We have become a tradition for the garden-minded in this region—have an established clientele—and usually I have orders in advance on the books of from $1200 to $1800 in value before the Mart opens. I think we may say that my great satisfaction is that our efforts have been educational, and have literally transformed the planting scheme locally. At first we were looked upon rather coldly by local nurserymen, but when they realized that we had created a demand for things on hand for which they had no orders, they became our warmest allies.

To put the project over required a strenuous program of talks, with and without lantern slides of plants brought into bloom in Houston, to Garden clubs all around Houston and neighboring towns. We cannot grow perennials in the accepted sense, but by actual experience, I had worked out the planting of permanent gardens which demonstrated our slogan, "Permanent Planting for Year Round Bloom." It is true that we have to treat tulips, Dutch hyacinths and daffodils by refrigeration to bring them into bloom and then replace them annually, but bulbs from tropical America, including *Amaryllis* L., and some bulbs from South Africa, and some Liliums, beardless iris, are superb here, as are also *Hemerocallis.* Thus we are not limited to a narrow range of plants after all. On request, I helped to organize the Houston Amaryllid and Bulb Society to meet the interest of the public outside our local Chapter of the Garden Club of America, and am at present in the process of shaping up the new Spuria Section, with a Spuria Test Garden to be set up early in the Fall under the auspices of the American Iris Society. Once this is accomplished, at my age, I look forward to a placid puttering about in my own little garden.

In our efforts, both the local Federation groups and the Council Groups have been our staunch supporters, as has also the State organization.

NEW ORLEANS AMARYLLIS SHOW, 1952

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

One of the most outstanding flower shows ever staged in New Orleans was the Fourth Official Amaryllis Show on March 22nd and 23rd

Fig. 1. The Queen of the Official Amaryllis Show of New Orleans, 1952, Miss Phyllis Massicot (center) is crowned by Commissioner Victor Schiro at ceremonies at the MacMain High School Cafeteria. Others, from left to right, are Miss Shirlee Gaglieano, Miss Gayle Mackenroth last year's Queen, and Miss Ethelee Gaglieano.

1952. The Show was beautifully staged on the entire floor of the block square McMain High School cafeteria at 5712 South Claibourne Avenue.

The New Orleans Garden Clubs were represented in both artistic arrangements and horticulture. The *Amaryllis* exhibits made an outstanding appearance against the club colors of Jade Green and Silver. The show was judged by eight accredited Judges. The awards consisted of 3 gold cups, 5 APLS awards, 2 club ribbons, 2 sweepstakes, and 35 additional prizes. Two new features were added this year. The Junior Garden Clubs staged exhibits, and corsages made of *Amaryllis* were entered as exhibits. Both features proved most interesting. In the standard *Amaryllis* exhibits more quality bulbs were shown this year than ever before.

The main event of the show was the crowning of Miss Phyllis Massicot, daughter of Mr. and Mrs. Sidney J. Massicot as the "Official Amaryllis Queen of New Orleans" by the Hon. Victor Schiro, Commissioner of public Buildings and Parks. Maids were the Gaglieano twins, Misses Shirlee and Ethelee Gaglieano. Miss Gayle Mackenroth, last year's Queen returned to present this year's Queen (Figure 1). Commissioner Schiro presented the new Queen with an "Official Amaryllis Queen of New Orleans Certificate" and a gold key to the City.

Plans are now being made for a larger and finer show for 1953.

AMARYLLIS SOCIETY OF MOBILE

As we go to press word was received that the newly organized Amaryllis Society of Mobile is sponsoring its first Show, March 28-29, 1953, at the Murphy High School Cafeteria, Mobile, Ala. The Amaryllis Society of Mobile is affiliated with the American Amaryllis Society. The report on the Show will appear in the next issue of

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[Wilson—FAVOURITE DAFFODILS, continued from page 20.]

As last spring Empress of Ireland appeared to be up-to-date about the climax of my efforts in breeding white trumpets, I think I had better bring this already lengthy and somewhat rambling tale to a close. Of course quite a number of things that promise to be fine have appeared amongst my seedlings during the five years since Empress of Ireland flowered, but I daresay that as yet but few of them have fully grown up and shown the best that they can do. So it is perhaps best to wait and see before saying much of them—and of course I hope that still better and better flowers than any that have yet appeared may keep on coming to all lovers and breeders of daffodils as the years pass.

THE HOUSTON AMARYLLID AND BULB SOCIETY

Mrs. Asbury S. Parks, *Bulletin Editor, Houston, Texas*

The Houston Amaryllid and Bulb Society held its annual show this year in conjunction with the International Flower Show sponsored by the Men's Garden Club of Houston, and the Houston Beautification Program of the Chamber of Commerce. Mr. F. A. C. McCulla was chairman of the bulb show, and Mr. Paul Carroll was general chairman. The booth was well located [Fig. 2]. The exhibits of two of our local

Fig. 2. Exhibit at the 1952 Show of the Houston Amaryllid and Bulb Society. From left to right, Mrs. Asbury S. Parks, Mrs. J. Willis Slaughter, and Mrs. John Cashman.

nurseries were placed on the sides of our exhibit, and this gave a harmonious setting for the beautiful potted and cut Hybrid *Amaryllis*, iris, daffodils, and numerous other plants. The gold medal winners were a Black Calla exhibited by Mr. and Mrs. W. V. Vietti, and a white Dutch Hybrid *Amaryllis* exhibited by Mrs. G. B. Reneau.

The Society was organized in March of 1948 by Mrs. G. B. Reneau, Mrs. J. Willis Slaughter, and Mrs. Del B. Prosperi. Mr. Ben Duffie was the first chairman. A bulletin is issued quarterly.

AMARYLLIS SOCIETY OF MOBILE

The Amaryllis planting campaign initiated by Mr. Lou Costa, Garden Editor of the MOBILE PRESS REGISTER, and first President (1952-1953) of the AMARYLLIS SOCIETY OF MOBILE, has received the "wholehearted endorsement of the 1954 AZALEA TRAIL COMMITTEE."

At the May meeting of the AMARYLLIS SOCIETY OF MOBILE, the following officers for 1953-1954 were elected: Mrs. A. Primo, President; Mr. Ed Shelton, Vice-President, (Fairhope); Mrs. William O. Cazalas, Secretary, and Mr. Percy B. Skinner, Treasurer.

[Moldenke—AMARYLLID GENERA AND SPECIES, continued from page 80.]

filiform, 8 mm. long, longer than the ovary. Collected in Chile, Bertero 290 in the DeCandolle Herbarium. *Gardinia violacea* Bertero, in mss. Common name: "mapolita."

Brodiaea ameghinoi Speg., in Rev. Facult. Agron. Vet. La Plata *3:* 575-576. 1897. Triteleia, 1-valved, 2-flowered, with an ovate bulb, the leaves synanthous, linear, almost flat, rather obtuse at the apex, the scape equally long or shorter than the leaves, glabrous, slender, 2-bracteate at the apex, the flowers tubular, borne on rather long pedicels, the divisions very narrowly linear, rather thick, velutinous-papillose, olivaceous, crowning a shorter tube. It grows in sandy meadows along the Gulf of San Jorge, collected by Carlos Spegazzini in February, 1896.

Observations: bulb rather deeply (3.5 to 5 cm.) buried, ovate, 2 cm. high, 1 cm. in diameter, covered by many subhyaline thin tunics, bearing 5 to 8 leaves and 1 to 4 scapes at the apex; leaves synanthous, fasciculate, glabrous, green, narrowly linear, 8 to 12 cm. long, 2 to 3 mm. wide, rather obtuse at the apex, ampliate into a thin sheath at the base, the exposed portions rather flat or canaliculate-subplicate, the underground portions nervose-carinulate; scapes shorter than or rarely equaling the leaves, 5 to 8 cm. long, 0.8 mm. in diameter, terete, glabrous, livid, naked, erect, simple, 2-bracteate at the summit; bracts lanceolate-linear, 15 to 20 mm. long, 2 to 2.5 mm. wide, long-attenuate upwards, very much acute, the sheathing bases very shortly connate in ochrea-like fashion, 2 mm. long, thinly membranous, subhyaline, the outer one longer, very thinly and almost inconspicuously 7- to 9-nerved, the inner one shorter, 3- to 5-nerved; pedicels erect, livid, naked, 1 to 2 cm. long, 1-flowered; flowers solitary or paired in the bracts, the tube cylindric, 12 mm. long, 2 mm. in diameter, becoming livid at the base, toward the apex greenish-white, coarsely 6-striped with green stripes, the apex crowned with 6 lobes which are arched-spreading, subequal, always narrowly linear, 7 to 9 mm. long, 0.5 to 0.8 mm. wide, rather obtuse or short-acute at the apex, rather fleshy, rather rigid, on the upper surface convex slightly convex, densely velutinous-papillose, deeply and beautifully green-olivaceous, never white-margined; all the stamens included

[Moldenke—AMARYLLID GENERA AND SPECIES, continued on page 53.]

2. SPECIOLOGY

[EVOLUTION, DESCRIPTION, CLASSIFICATION AND PHYLOGENY]

DAFFODILS: THE PINKS, MINIATURES, NATURALIZING, DECORATIVES, AND A COMPREHENSIVE BEGINNERS' LIST

CAREY E. QUINN, *Washington, D. C.*

[The following extracts are quoted from a general review of daffodils (1952) written for members of the Washington Daffodil Society of which Mr. Quinn is the current President. The first part concerning a review of *Narcissus* stars is omitted here on account of space limitations.]

The Pinks. There is so much accent on Pinks at present that I feel I must devote a special paragraph to them. The greater percent of the pinks offered each year, with a few exceptions, are of small value from any critical standard. I believe that in a few more years there will be many fine and acceptable flowers with pink crowns. In the meantime the best I have seen or heard about are: PINK MONARCH, ROSARIO, ROSE of TRALEE, ROSY DIAMOND, SALMON TROUT, and maybe ROSY SUNRISE and KARANJA. I have not actually seen what are probably the two best of the lot—namely PINK MONARCH (Australian), and SALMON TROUT (Irish). But the items named are all fine flowers—their pink only one of their charms—and they would be rated as stars whether pink or not.

I decline to rate a daffodil on its pink suffusion or shade alone.

The Little Daffodils. You can't really compare the ever-increasing mass of small little flowers with the big ones that comprise most of those we have seen appraising hereinbefore. These small fellows I am therefore grouping largely around their use (not according to bloom period) in crannies, rock gardens, borders, living rooms—where anything imposing or over 16 inches tall would be out of place. There are beauties among the little fellows and I believe the future will have many more of them. Grace and charm are the underscored objectives we seek in the petite tribe—in short, the exquisite. I am including poets and some poetaz that seem to fit here better than elsewhere although not miniatures.

I doubt that I have or have ever seen a comprehensive collection of the small fellows. There is no Alec Grey in my acquaintance either altho my friend George Heath of Virginia is probably a good substitute. He raises many of the wee fellows. But here is a list of the best I have or have seen—featuring of course the usual elements of a good daffodil, and accenting charm as I know it.

ANGELINE (3b); FAIRY CIRCLE (3b); RIPPLING WATER (5); TRESAMBLE (5); ACOLITES (5); SILVER CHIMES (5); DAWN (5); RAINDROP (5); APRIL TEARS (5); JENNY (5); ESTRELLITA (6a); JONQUILLA HELENA (10); MARCO (3b); BLACK PRINCE (9); KENTUCKY (9); MINUET (9); SMYRNA (9); QUEEN OF DIAMONDS (9); SHANACH (9); CANTABILE (9); ACATEA (9); ANGIE (2c); HAWERA (4); WEE BEE (1a); CUSHLAKE (3c); PICATOR (3b); N. WATIERI (10); XIT (3c); SWEETNESS (7); CHERIE (7); JUNE (3b); SUN DISC (1a); KEHELLAND (1a); TANAGRA (1a); FEBRUARY SILVER (6); and BERYL (6).

I know that I have left out some of the charming old standbys that my lady friends will frown over. I've done it because there are better flowers available and I'm hoping the lovers of the little fellows will get more critical. I've left out also some little fellows because despite their small size they are queer, unbalanced and devoid of charm.

Naturalizing. Most of the bulbs sold for naturalizing are not especially adapted or fitted by nature for the role. Of course some varieties will do better than others. So-called "Naturalizing Mixtures" in most instances are just a way to dispose of bulk quantities of cheap nameless bulbs. Few Daffodils planted in turf or meadows will stay there—they either starve or rot in a few years, altho *some* of the old varieties not too far removed from the wild will persist remarkably well.

Of course if by "naturalizing" you mean planting in well drained, reasonably good soil in open woods or borders where there is no great turf competition or other matted vegetation,—then any daffodil will serve—just consult your purse.

But for real "naturalizing" the only daffodils fitted by nature for the job are some of the little fellows we have just been discussing. The famous meadow park approaches to the equally famous Wisley Gardens in England demonstrates naturalizing with "Bulbocodium" and "Cyclamineus" and these little 4 and 5 inch fellows actually thrive in the turf, seeding themselves and multiplying so that they make a tremendous picture. I certainly hope our breeders will look into these possibilities.

So I want to urge the naturalizers to turn to the various "Bulbocodium" forms, to the "Cyclamineus", some *N. triandrus* and the "species jonquils". The "Cyclamineus" forms even enjoy sour, damp soil that will turn up the toes of most daffodils. And finally, these aforementioned fellows in bloom last a very long time—a most desirable feature in the open meadow drifts.

The Decoratives. There are a certain number of Daffodils that are striking, different, showy,—the ones that 8 out of every 10 ordinary persons will rush to and exclaim over. Most of these wenches can never be stars (there are a few exceptions) because they usually have some bad defects and yet we love them and grow them. Let's call them "decorative" and accept them in a place of their own. Who am I to look down my nose at them even of a lot of them are "hussies". A "hussie" is alright in her place as long as she is pretty. They are the ones a lot of people want—in fact all they want. They make a colorful mass picture in perennial borders or in nooks between shrubbery planted in three or five contrasting colors. And as material for arrangements,—

No I'm not turning up my nose—instead I am listing about 50 of the best and most strikingly unusual that you will find easy to grow and to keep. They are good flowers and a lot of my listeners here will think they should be over in the "Star" groups. ADA FINCH (1c); BALMORAL (2a); BROOKVILLE (2b); CELLINI (2a); CHERIE (7); CHEERIO (2a); CHAMPAGNE (2b), (pink); DICK WELLBAND (2b); DURESTAN (3b); DUKE OF WINDSOR (2b); FANCHEON (2a); FALAISE (4); FRAU ANGELICO (2a); FRILLED BEAUTY (2b); FLORA's FAVORITE (2b); GAPILLON (2b); GRATIA (2b); HARDY (2b); JOHANNESBURG (2b); JULES VERNE (2c); KANDAHAR (1a); KANCHENJUNGA (1c); LADY KESTEVEN (3b); LA RIANTE (3b); LAUSANNE (1a); MABEL TAYLOR (2b), (pink); MERAPI (2a); MUSIC HALL (1b); NELLIS FAVORITE (3a); ORANGE BUTTON (3b); PAPILLON BLANCHE (3b); PRINCE OF ORANGE (2a); PIN WHEEL (2b); PRINCE FUSHIMA (2b); QUEENIE (2c); RADIUM (3a); REDMARLEY (2a); REVE D'OR (2a); ROBBIN HOOD (1a); ROXANE (1c); SCARLET LEADER (2a); SELAM LAGERLOFF (2b); SHANGHAI (2a); SMARGAD (2b); TEXAS (4); TUNIS (2b); TWINK (4); UNSURPASSABLE (1a); WALTER J. SMITH (2b); WODAN (2a); OKLAHOMA (1b).

Suggested Daffodils For Beginners. While this review is not intended primarily for either casuals or beginners, yet perhaps I should here include the list of recommended varieties prepared by the Washington Daffodil Society for these Classes of gardeners. Some of the items are not the ones I would have preferred, yet it is a good list of dependable inexpensive varieties for the beginner—in fact the best and most intelligent one I have seen.

Trumpets

Dawson City, 1a (yellow)
Lord Wellington, 1a (yellow)
Music Hall, 1b (bi-color)
Beersheeba, 1c (white)
Roxane, 1c (white)

Large Cups

Fortune, 2a (yellow)
Scarlet Elegance, 2a (Yellow-red)
Hades, 2b, (white-red)
John Evelyn, 2b (white-orange)
Niphetos, 2c (white)

Small Cups

Alight, 3a (yellow-red)
Mangosteen, 3a (gold-red)
Carolina, 3b (white-red)
Firetail, 3b (white-red)
Samaria, 3c (white)

Double

Cheerfulness, 4 (white)

Triandus

Thalia, 5a (white)
Agnes Harvey, 5b (white-lemon)

Cyclamineous

Orange Glory, 6a (yellow)

Jonquil

General Perishing, 7a (yellow)
Trevithian, 7b (bi-color)

Tazetta

Geranium, 8 (white-orange)

Poet

Actaea, 9 (white-red)

Species

Ionquilla simplex, 10 (gold)

[EDITORIAL NOTE.—The editor suggests that similar lists of "Daffodils for Beginners" for each of the climatic regions of the U. S. and Canada be assembled by the NARCISSUS COMMITTEE for publication in 1954 HERBERTIA. This will do much to widen the interest in *Narcissus.*]

NARCISSUS VIRIDIFLORUS

HAMILTON P. TRAUB, *California*

Several years ago Jan de Graaff kindly sent the writer three small seedling bulbs of *Narcissus viridiflorus* Schousb. These were potted in a mixture of one part each of clayey loam soil, coarse sand and black carex peat. These plants were watered regularly and fertilized with Vigoro (at fortnightly intervals) from September through April, and

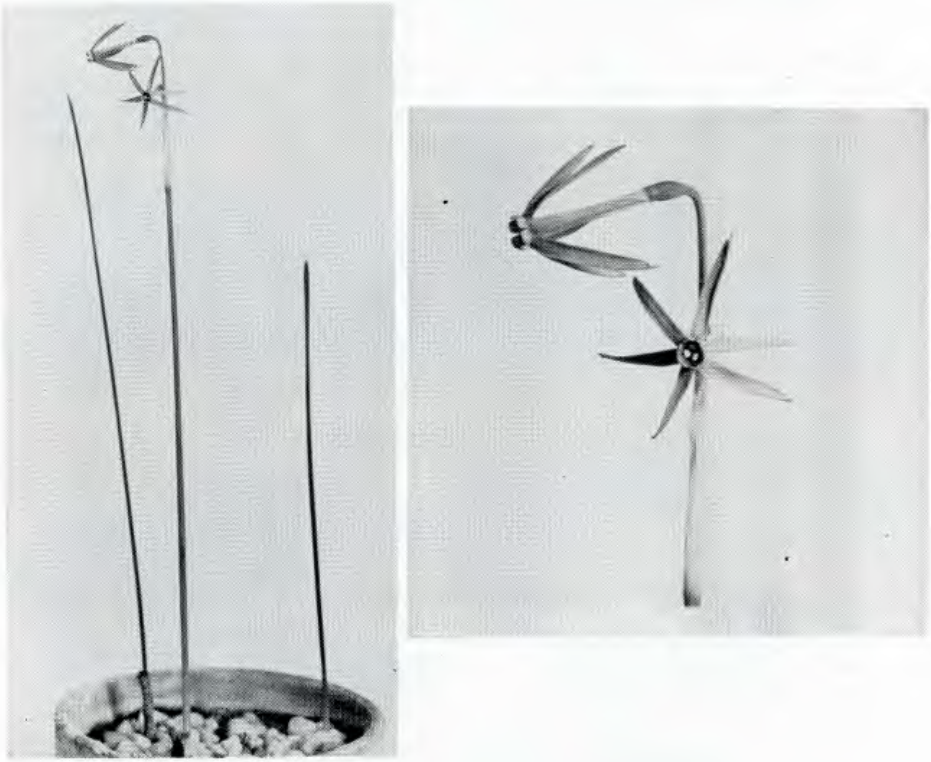

Fig. 3. *Narcissus viridiflorus.* Left, seedlings; note single leaves of two seedlings not in flower, and inflorescence of center seedling without a leaf. The top of this same inflorescence is shown in natural size to the right.

were kept entirely dry in the pot from May through August. The plants did not flower during the first two years but one bulb flowered in the fall of the third year as shown in Fig. 3. The following year all three bulbs flowered. The flowers are entirely green and give off a delightful fragrance that can be detected over a wide area. It is a very charming subject which should be more widely cultivated. In the Southwest, par-

ticularly in California, the species thrives out of doors and blooms regularly in the fall. Unfortunately, sufficient stock is not as yet available, but it is hoped that before long this deficiency will be corrected by the commercial growers.

It may be that this species can be used in breeding experiments. Such attempts will be started by the writer during the season 1953-1954. This may not be an easy project but is surely worth trying.

A report on *Narcissus rupicola, N. serotinus, N. cyclamenius, N. scaberulus, N. jonquilla* var. *henriquesii, N. bulbocodium* var. *nivalis, N. bulbocodium* var. *concolor, N. bulbocodium* subsp. *obesus, N. triandrus* var. *cernuus,* and *N. asturiensis* as grown under southern California conditions will be included in a later issue of HERBERTIA.

In the article that follows these notes, Mr. Hannibal discusses the subject of fall-flowering *Narcissus* species from the standpoint of breeding.

THE FALL FLOWERING NARCISSUS

L. S. HANNIBAL, *Calif.*

The Fall Flowering *Narcissus* have been known for many years, but their star of popularity is near nil since only a few collectors have seen or grown the plants. Yet they have no particular cultural problems if grown in large pots or well drained frost free beds containing a sandy-clay-loam mixture.

The writer became interested in the group some ten years back when it was suggested that they could possibly hybridize with the spring flowering Daffodils to produce a fall flowering type. Thus far little has been accomplished beyond propagating a quantity of these hard-to-locate bulbs. The hybridizing of fall daffodils is as remote as ever since genetic studies have indicated that the problem is far more complex than the layman would anticipate. Nevertheless the lack of results should not deter a discussion concerning the habits of these odd plants.

In 1858 Gay established the section *Autumnales* to the genus *Narcissus* L. in order to account for the fall flowering species that he knew: *Narcissus elegans* Spach., *N. serotinus* L., and *N. viridiflorus* Schousboe. This is a mechanical arrangement that is entirely satisfactory from a geographical or cultural standpoint, but there have been some minor variations in morphology that have caused the experts to disagree in a number of ways as to the validity of such an arrangement. The decision was finally settled through chromosome studies by Dr. Fernandes (1943) in Portugal. These studies will be touched upon later, but for the time being Gay's outline is very convenient.

Narcissus elegans Spach grows along the shores of the Mediterranean from Morocco to Tunis, and in some scattered areas about Sicily and Southern Italy. Rarely is it found more than a half score miles inland. In most instances the bulbs are located on limestone or clay hillsides where the soil is thin and well drained.

Growth begins in October with the first light rains. One or two leaves emerge a few days after the moisture reaches the bulb which is four or five inches down. The scape shows shortly after and often within a fortnight the bulbs will be in flower. *N. elegans* is considered a *Tazetta* and on seeing a cluster of blossoms one can readily recognize the relationship. The flowers are definitely such with long slender milk-white segments, a small cup varying from yellow-green to citron depending upon the age. Even the blossoms have the characteristic odor of the "Paper White" *Narcissus*. Usually the blossoms last several weeks and during this time the petals slowly reflex to take on a twisted appearance, making the flower appear as a child's small paper pinwheel. Then too the scape which may be three or four inches when the bud opens continues to grow until long after the flower fades, eventually reaching a length of 18 inches or more by the first of March.

This habit of scape elongation is not limited to *N. elegans* as it also occurs with the other two species, which are actually sometimes leafless. This point represents an interesting economy of foliage with a consolidation of functions where the scape either assists the leaves or replaces their function entirely depending upon the species. The combination of a shortage of moisture and very long growing period makes this possible.

Dr. Fernandes (1943) has pointed out that *N. elegans* has two subspecies: variety *intermedius* Gay having a larger diameter scape and being most closely a *Tazetta* whereas variety *fallax* F.Q. is of more recent origin. The chromosome number (20) is identical, but the pattern varies slightly.

Narcissus serotinus L. is a dwarf autumn species somewhat reminiscent of *N. elegans*. Its native range covers most of the shores of the Mediterranean from Gibralter to Egypt and Lebanon. Apparently it grows under a variety of soil conditions and rainfall. Tom Craig (1946) commented recently upon its erratic habits and flowering habits in French Morocco where the minute blossoms had the facility of appearing most everywhere, even in the middle of the army drill fields.

A single flower generally appears upon a leaf like scape. Leaves themselves rarely appear as the scape functions as a leaf. The wee flower is well shaped with nicely rounded petals about a proportionally large cup, but the parts are all so small that if the flower were placed face down on a 10 cent piece the perianth segments would barely cover the coin.

Narcissus viridiflorus Schousboe is also sometimes leafless, unless one considers the scape a leaf. The interesting features are the extreme reduction of all flower parts to the ultimate minimum and the introduction of green chlorophyll into the petals such that they too function as leaves. The small slender green-rayed flower, with its very small six-

segmented corona, is delightfully fragrant and will perfume an entire garden. It has the Jonquil odor 100%.

The natural range of this plant is very restricted, being found only about Gibralter and Tangiers, and usually in clay soils. However the writer has found it very adaptive to many localities in California. The segmentation of the corona into six small lobes has long puzzled botanists, who, not knowing that the *Jonquillae N. rupicola* was similarly lobed, considered this a unique primitive factor and went to some trouble to substantiate the relationship of *N. viridiflorus* to the other *Autumnales.* Dr. Fernandes (1943) has settled this difficulty. The chromosome patterns of *N. viridiflorus* and *N. jonquilla* L. are identical except that *N. viridiflorus* has double the number (28) of *N. jonquilla* L. (14). This may point to a close relationship and may indicate that *N. viridiflorus* with its high count is far from primitive.

It also appears that the cleft corona is not so rare either. A *N. schizocoronatus* bicolor (Meyer, 1936) hybrid has been isolated and bred with this cleft corona. The character does not appear particularly primitive or recessive.

To some, chromosome studies may appear confusing, but they can be a very useful tool. The established relationship of *N. viridiflorus* to the *Jonquillae* group gives a clew as to the most practical line of inter-species breeding to be taken. Namely that if viable seedlings are desired the Jonquil would be the most promising line of material to work with.

In turn *N. elegans* with its 20 chromosomes resembles the Tazetta patterns of 20 and 22 chromosomes and should cross with "Paper White" or one of the other few viable forms in the trade. It may be a waste of time to cross *N. elegants* with a trumpet daffodil, or Incomparabilis, as the Tazettas rarely take on these forms. It may, however, produce sterile hybrids with *N. triandrus* or *N. poeticus* species..

Narcissus serotinus has a chromosome count of 30 and its analysis is quite distinct from any other known *Narcissus* form. It probably represents an "orphan" group. Sterile hybrids, both natural and man-made, have been reported (4) between it and *N. viridiflorus,* so it is possible that it may breed with others of the *Jonquillae* group, and it may cross with other polyhybrid daffodils.

It appears that if the Fall flowering Narcissus have any potential values for breeding the combinations may be limited. Pollens can be stored for six weeks or more, but some tricky temperature controls are needed to advance or retard flowering dates to effect the crosses.

The culture of the species fall-flowering *Narcissus* is not difficult if conditions simulating their Mediterranean homeland are maintained. The most necessary item is a hot dry summer position where the bulbs bake for a long period. Soil temperatures of 90 or 100 degrees appear beneficial and will insure certain flowering. More than a mild frost may burn the foliage, but frosts of 18 degrees has not been serious. The major distinction is seed germination. Seeds of the *Autumnales* germinate as soon as the ripe seeds drop to the ground. This is a bit unusual

as all other Daffodils require that their seed remains dormant over the summer and be planted the following fall. Attempts to send fresh seed from Europe to South America disclosed that this aestivation was necessary, as the six months difference in seasons discouraged germination completely for fresh Daffodil seed.

The reclassification of *Narcissus* sections *Jonquillae, Autumnales,* and *Hermione:* Since Dr. Fernandes work on the species of *Narcissus* has been mentioned in the preceding article we present herein his recent reclassification as published in the Boletim da Sociedade Broteriana, Vol. 17, 2a series, P. 38 (1943).

Jonquillae DC. ap. Red.
N. scaberulus Henriq.
N. calcicola Mend.
N. rupicola Durf.
N. Watieri Marie
N. juncifolius Lag.
N. gaditanus Boiss. et Reut.
N. jonquilloides Willd.
N. viridiflorus Schousboe

Serotini Parl
N. serotinus Linn.
Hermione (Salisb.) Sprenger
a) *Autumnal* (Baker)
N. elegans Spach.
var. *intermedius* Gay
Var. *fallax* F. Q.
b) *Vernal* (Baker)
N. *tazetta* Linn.

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A NEW RAIN LILY FROM TEXAS

FRED B. JONES, *Texas*

Three years ago, in the early part of July, 1949, the writer happened to be driving near a cotton warehouse in the little south Texas town of Taft, which was then his home, when suddenly, he became aware that growing along the roadside, among the low-growing weeds and grasses, were numerous rain lilies, their flowers just beginning to open. It was about 2:30 o'clock in the afternoon, which seemed to be an odd time for rain lilies to be opening. But stranger still, the color of these bursting buds was not white, as one would expect, but yellow.

On stopping to get a closer look, it became apparent that there were two varieties, one quite small in flower, a good deal smaller than the usual *Zephyranthes brazosensis* (syn.—*Cooperia drummondii)* [Fig. 4]; the other was much larger, about twice the size of the smaller one, and

different also in form, which became more evident as the flowers opened out. The color, foliage and time of opening of the two varieties appeared to be about the same.

A detailed examination showed that the midget variety must surely be *Zephyranthes smallii* (Alexander) Traub [Fig. 4], a species discovered about 160 miles due south of Taft, in or near Brownsville, at the southern tip of Texas by Robert Runyon of that city.

The other yellow variety growing with *Z. smallii* defied all efforts at identification, so a brief description of it was sent to V. L. Cory, Field

Fig. 4. Texas *Zephyranthes:* (left) *Zephyranthes jonesii;* (right) *Z. brazosensis;* and, (in front) two flowers of *Z. smallii.* Photo by Fred B. Jones.

Botanist of Southern Methodist University at Dallas (See V. L. Cory, "The Genus Zephyranthes in Texas," *Herbertia* IV, 117-120). Cory was of the opinion that the large-flowered yellow variety was a new species, and after studying herbarium material of it, he concluded that indeed, here was a new *Zephyranthes* [*Cooperia*] deserving of specific rank. Naming it [*Zephyranthes jonesii* (Cory) Traub] in my honor for having found it, Cory published the description in *Field and Laboratory* in January, 1950 (Vol. XVIII, No. 1, 43-46), as follows:

Bulb subglobose, 2.5-3 cm. in diameter, with its base seated usually about 7.5 cm. below surface of ground; scape up to 3 dm. high or more; leaves slightly glaucous green, 2-3 cm. wide and 25-35 cm. long, the tips

not acute, perianth-segments yellow, 3-4 cm. long, oblanceolate to oval; perianth-tube up to 5.5 cm. long or more; style white, 6-7.5 cm. long, the stigma markedly exceeding the stamens (as much as 5 mm.); ovary slightly or not at all stipitate.

Recognizing the close relationship of the new species to *Z. smallii,* Cory made a comparison of the two species, chief points of difference being the length of the tube and style, relation of stigma to anthers, shape of the perianth segments, and as already mentioned, the size of the flowers. In other respects the species are very close, notably in size and shape of the bulb, foliage, color of the flower, time of opening in the afternoon and in habitat.

In the interval between the time that the plants were first observed and when Cory described the new species, the writer had ample opportunity to study *Z. jonesii* (Cory) Traub in its habitat [Fig. 4]. He found it to occur only in situations where water collects after heavy showers, these spots being as a rule the elevated portions of the swales which occur with some frequency in this coastal area of Texas. Never did he find it in the lower and wetter portions of these swales where certain other amaryllids do grow. The soils in which the species is found vary from rather heavy clayey soils to somewhat sandy, silty types, alkaline in reaction no doubt. These particular soils are usually tillable, especially if the swales are drained, and being tillable, they have largely been put to the plow. This is likely the reason why *Z. jonesii* occurs, so far as I can determine, in only a few locations, all in an area about 15 miles in length and 6 miles in width. In not a single location is the species abundant and not all the specimens one finds are true to the type. In fact, some forms intermediate between *Z. jonesii* and *Z. smallii* have been observed, one in particular having the longer perianth-tube of *Z. jonesii* but otherwise more like *Z.smallii.* Cory thought that these intermediate forms might possibly be hybrids.

In cultivation *Z. jonesii* seems to have about the same requirements as other well-known species, namely rich, well-drained soils and plenty of moisture. While it grows in full sun in nature, it has bloomed well for me in a lathhouse.

In Texas, the flowers open from the 5th to the 8th day following a good rain, in the months of July, August and September. Under favorable conditions this species blooms into November. The flowers hold their color well the first afternoon, but in full sun or warm weather, will fade to ivory on the second day. From the accompanying photograph, it can be seen that the perianth is of attractive form and quite large enough to make a show if planted in masses in the border or rock garden. The scent is faint and delicate.

It seems strange that this species should have been overlooked by other observers and collectors, however, it may be noted that new species of plants are constantly being found in Texas, especially in the western and southern parts. There may still be undiscovered rain lilies in this region. The search for these little gems is indeed fascinating, and lucky is the plant lover who happens to be at the right spot at the right time, for this is what it takes to find a new rain lily.

THE RANGE OF ZEPHYRANTHES TRAUBII IN TEXAS

Fred B. Jones, *Texas*

In June, 1952, Dr. Traub mentioned that bulbs collected by Dr. Ruth Patrick on the site of the new Du Pont plant in Victoria County had been identified as *Zephyranthes traubii* (Hayward)/Moldenke. This is the lovely white species, rare in cultivation, which Mr. Stansel discovered several years ago on the grounds of the Angleton Experiment Station south of Houston (See HERBERTIA III, 63).

It happens that the Du Pont plant is no great distance from Corpus Christi, so following a general rain in September, I set out in the general direction of the site, hoping to find this species in bloom. Long before I reached the plant—actually I never got even near it—I discovered colonies of a white Zephyranthes which appeared to be *Z. brazosensis* Traub (Syn. *Cooperia drummondii* Herbert), the common white species so abundant in some parts of Texas. But as the latter species usually doesn't grow in colonies, I took a peek through my binoculars. Here and there, scattered among the native wildflowers and grasses, were handsome rain lilies with slender, reflexed tepalsegs fluttering in the breeze. These couldn't be *Z. brazosensis,* I thought, so I crossed a ditch of water to investigate. It didn't take long to determine that here was a pure stand of *Z. traubii* in full bloom (Fig. 5), something I had been looking for in the counties somewhat to the south and west for years. The location of this and the other colonies I saw was roughly between San Antonio and Copano bays, somewhat back from the coast, and about 100 miles southwest of Angleton, the type locality.

The big surprise was the variation in size and form of the perianths of the specimens in bloom. I expected to see about the same amount of variation as commonly occurs in other Texas Zephyranthes. But in each colony I visited, I found this startling variation, so it may be characteristic of the species. The largest perigone I saw measured 2¾ inches across; the smaller ones weren't half as large. The tepalsegs likewise varied a great deal, some being long and narrow, often recurved; others were broad and not recurved at all. Many specimens looked a good deal like *Z. brazosensis* even at close range, yet practically all had the highly elevated stigma and extremely narrow, glaucous foliage typical of the species; and samples of bulbs taken from place to place indicated that practically no variation occurs in their size and shape. The largest bulbs were much smaller than those of the usual *Z. brazosensis.* The comparison with the latter species is made because the two species are obviously very close, as noted by Hayward in the original description. *Z. traubii* (chromosome number, 2n=24) is a more dainty and slender species than the tetraploid *Z. brazosensis* (chromosome number, 2n=48), yet the flower is proportionately larger, at least in some speci-

mens. *Z. traubii* seems to be a very distinct species, and undoubtedly one of the most charming of all *Zephyranthes.*

The colonies observed were growing in rather poorly-drained, dark-colored clays, alkaline in reaction no doubt. I think these locations had never been in cultivation, in any case, there was every evidence that they had been grazed for many years.

Fig. 5. *Bottom photo,* Colony of *Zephyranthes traubii* (Hayward) Moldenke in Calhoun County, Texas. *Upper left,* specimen representing the typical form; *upper right,* showing variation in perigone shape. All photos taken in September 1952, in mid-afternoon by Fred B. Jones.

Several questions remain to be answered about this species. One is its range. Indications are that it is rather widespread, perhaps occupying what is known as the gulf coast prairie. But some students have probably mistaken it for *Z. brazosensis,* so that a good deal of field study

will be necessary to determine exactly its distribution. It will be interesting to know, incidentally, if it usually occurs in colonies, as in Calhoun and Refugio counties where I observed it. Possibly it doesn't grow along roadsides and in every favorable location, becoming a weed pest, as is the case with *Z. brazosensis*.

The question of the perigone variation is an intriguing one. A study of the species in cultivation ought to throw light on this problem. It may turn out that the age or condition of the bulb determines the size if not the form of the perigone, but this is only a guess.

HYBRID AMARYLLIS TRIALS, 1952

THOMAS R. MANLEY, *Vermont*

This report, the third, of the initial *Amaryllis* trials represents the final rating of many varieties and the inclusion of new varieties received for evaluation in the fall of 1951. Plants that were forced for the Cleveland Flower Show in 1950 and 1951 were allowed to bloom naturally. Many varieties were slow in recovery from the apparent shock forcing gives them, those making rapid recovery were given full consideration of their exceptional vigor.

During the vegetative season the plants were watered regularly and received weekly applications of liquid cow manure plus 1 tablespoon of 5—10—10 per pot each month, May through August.

The great demand for highly rated varieties has far exceeded the ability of the Dutch bulb growers to supply them. As a result bulbs have been marketed that were undersized thus not able to produce results comparable to the large mature bulbs of the initial years of trials. This has given several of our leading American *Amaryllis* importers much concern. We are aware of this condition and are unable to remedy it, however we suggest you plant and carefully grow your *Amaryllis* if small or immature bulbs are received for a season, removing the scapes as soon as the florets fade. Do not allow seeds to develop as they devitalize the plant reducing the chances of huge blooms the following season.

Cultural practices during the blooming season are vital to the production of flowers and a dry cool rest period, when the plant is completely dormant is most essential.

We are receiving many new varieties for trial in 1952 and will report their performance in the HERBERTIA each season. Although not at Valleevue Farm, I am now located at Champlain View Gardens, Burlington, Vermont, here we have ample greenhouse space for *Amaryl-*

lis evaluation. Those desirous of having *Amaryllis* evaluated may do so by sending 3 large bulbs of a variety to me at my new address.

The letter rating of AA—Superior; A—Excellent; B—Good; C—Fair, for discard is based on clean color, floret size, number of scapes per bulb, number of florets per scape, floret form, floret substance, length and texture of scape and vigor of bulb and foliage.

SALMON

BOUQUET, Ludwig. Light salmon that pales considerable as it ages. Huge flat florets. 2 scapes 18″ tall with 4 seven to nine inch blooms. Rating A.

MONA LISA, Ludwig. A salmon suffused pink. Color irregular and fades, 2 scapes 15″, 3 to 4 five and one-half inch blooms. 1950 rating —C; 1951—C. Final C.

QUEEN'S PAGE, Warmenhoven. Clean salmon orange, 3 scapes 20″ tall with 4 eight inch blooms. Rating 1950—A; 1951—AA; Final A.

SALMONETTE, Warmenhoven. Listed in 1950 as Salmon Joy, a name duplication. Clear salmon with deeper salmon in throat. 2-3 scapes 24″ tall with 4 to 6 eight inch blooms. Rating 1950—A; 1951—A; Final A.

SALMON JOY, Ludwig. Salmon scarlet, blending to deep red at base of petals, occasionally scratchy white line on throat, heavily substanced floret, wide open. 3 scapes 22″ tall with 4 nine inch blooms. Rating 1950—A; 1951—A; Final A.

SWEET SEVENTEEN, Warmenhoven. Frosty salmon rose on white, giving a flesh pink tone to the floret. 3 scapes 20″ tall with 4 nine inch blooms. Rating 1950—B; 1951—A; Final A.

ORANGE SCARLET

BORDEAUX, Warmenhoven. Clean light orange scarlet, blending to deep scarlet in throat. 2 scapes 28″ tall with 4 ten inch florets. Rating 1950—A; 1951—A; Final A.

CARUSO, Ludwig. Orange scarlet intensifying at base of petals, slight striation at base of petals. 2-3 scapes, 24″ tall with 4 eight inch blooms. Rating 1950—B; 1951—B; Final B.

GENERAL MacARTHUR, Ludwig. Brilliant metallic red, velvety and glossy in appearance, large flat blooms. 2 scapes 15″ tall with 4 six to eight inch blooms. Rating A.

INVINCIBLE. Ludwig. Smooth orange scarlet, blending to deep red in throat. 2-3 scapes 22″ tall with 4 nine inch florets. Rating 1950—A; 1951—AA; Final A.

SCARLET

FIRE KING, Ludwig. Scarlet, deepening to medium red in throat, floret long tubed. 2-3 scapes, 18″ tall with 4 six inch florets. Rating 1950—B; 1951—A; 1952—B.

HALLEY, Ludwig. Clean, frosty scarlet with great substance and growth. 3 scapes 22″ tall with 3-4 eight and one-half inch florets. Rating 1950—AA; 1951—AA; Final AA.

LUDWIG'S SCARLET, Ludwig. Glistening scarlet, blending to deep red in throat, color breaks to yellow green at base of petals. 3 scapes 26″ tall with 4 seven and one-half inch blooms. Rating 1950—B; 1951—B; 1952—A.

PRINCE OF ORANGE, Warmenhoven. Scarlet, blending deep in throat, fades as floret ages. 3 scapes 19″ tall with 3-4 eight inch blooms. Rating 1950—B; 1951—B; Final B.

SCARLET BEAUTY, Warmenhoven. Scarlet blending to medium red to dark red in throat. Possesses a velvety sheen that glistens. 3 scapes 24″ tall with 4 nine inch blooms. Rating 1950—A; 1951—AA; Final—A.

SCARLET LEADER, Ludwig. Scarlet suffused with red suffusion lines intensifying in throat. 3 scapes 22″ tall with 4 seven inch blooms. Rating 1950—B; 1951—A; Final A.

SCARLET TRIUMPH, Warmenhoven. Clear scarlet appearing nearly light red. Leathery substance to florets. 3 scapes 24″ tall with 4 ten inch florets. Rating 1950—A; 1951—A; Final A.

PINK

DORIS LILIUM, Ludwig. Light rose pink deepening to rose in throat, very heavy substance. 3 scapes 20″ tall with 4 six inch blooms. Rating 1950—A; 1951—A; Final—A.

FIDELITY, Ludwig. Pale rose pink with green at base of petals, clean color, 3 scapes 14″ tall with 3 to 4 five inch blooms. Rating 1950—B; 1951—B; 1952—B.

LIBERATOR, Ludwig. Salmon rose with deep rose red throat, midribs of lower petals white. Color appears as a suffusion of rose salmon on white giving a netted appearance. 3 scapes 26″ tall with 3-4 seven inch blooms. Rating 1950—B; 1951—B; 1952—A.

MARGARET TRUMAN, Ludwig. Soft light rose that does not open flat but possesses a color that is new and pleasing. 2 scapes 18″ tall with 3 to 4 seven inch blooms. Rating AA.

DEEP ROSE

AMERICAN FASHION, Ludwig. Deep rosy pink that failed to open wide. 2 scapes 18″ tall with five inch blooms. Rating C.

FANTASY, Ludwig. Rose and white bicolor, each petal has marginal half rose and throat creamy white. 2 scapes 20″ tall with 4 five and one-half inch blooms. Rating 1951—B; 1952—B.

PINK PERFECTION, Ludwig. Clear medium rose with brighter color toward the margin of the petals giving a pink halo effect. 2-3 scapes 30″ tall with 4 seven inch blooms. Rating 1951—A; 1952—A.

VIOLETTA, Warmenhoven. Medium to deep rose with a light rose throat. Light rose midribs. 3 scapes 22″ tall with 3-4 eight inch florets. Rating 1950—B; 1951—B; Final—B.

LIGHT AND MEDIUM RED

AMERICAN EXPRESS, Ludwig. Huge, clean, medium red blending into deep red in throat. Substance excellent for large floret. 2 to 3 scapes 28″ tall with 4 ten inch florets. Rating 1950—AA; 1951—AA; 1952—AA.

ANNA PAULOWNA, Warmenhoven. Glistening light salmon red with deep red throat. Fades as it ages. 2 to 3 scapes 26″ tall with 4 eight inch florets. Rating 1950—B; 1951—A; 1952 B.

BRILLIANT, Ludwig. Very thin leathery light red with deep red in throat, occasional irregular white line on lip petal. 3 scapes 24″ tall with 4 six inch florets. Rating 1950—B; 1951—B; Final B.

MOTHER'S DAY, Ludwig. Medium rose red deepening to crimson red in throat with white striping at base of petal. Irregular flecks of darker red to violet red appear in petals. 2-3 scapes 20″ tall with 3-4 six inch florets. Rating 1950—B; 1951—B; Final B.

ORANGE KING, Warmenhoven. Light red that loses its color as the florets age giving a blue gray sheen. 2-3 scapes 18″ tall with 4 eight inch florets. Rating 1950—B; 1951—A; Final B.

ORANGE WONDER, Ludwig. Light red blending into a pink to white throat. Color combination is odd and blending not too smooth. 2 scapes 21″ tall with 4 five inch florets. 1950—C; 1951—B; Final B.

SHAKESPEARE, Ludwig. Glistening medium red, blending to deeper red in throat, white line on some petals most prominent in throat. 3 scapes 18″ tall, with 4 six inch florets. Rating 1950—A; 1951—A; Final—A.

WYNDHAM HAYWARD, Ludwig. Huge glistening red with a metallic finish, particularly outstanding and worthy of the name it is its honor to possess. 2—24″ scapes with 4 flat eight inch blooms. 1952 AA.

DARK AND WINE RED

FRANKLIN ROOSEVELT, Ludwig. Deep rose red that pales from the margin as it ages. Velvety sheen deep in the throat. 2 scapes 24″ tall with 4 seven inch blooms. Rating B.

LUCIFER, Warmenhoven. Medium dark red of great substance. 2 scapes 19″ tall with 4 eight inch florets. Rating 1950—B; 1951—B; Final B.

MORENO, Warmenhoven. Medium dark red with slight suffusion of rose red in throat. 3 scapes 26″ tall with 4 eight inch florets. Rating 1950—AA; 1951—A; 1952—AA.

MYSTERIE, Warmenhoven. Rose red blending to deep red in the throat. Midribs and tips of petals are rose. 2 scapes 20″ tall with 4 seven inch florets. Rating 1950—B; 1951—B; Final B.

RED MASTER, Warmenhoven. Huge dark red of great substance with flat florets. This variety possesses the deepest color of any amaryllis. Its floret size may be due to its inability to hold over 3 florets per scape. 2 scapes 24″ tall with 2-3 eleven to twelve inch blooms. Rating 1950—AA; 1951—AA; Final—A.

WHITE

CASPER LUDWIG, Ludwig. Pure white with yellow green line in throat, 3 to 4 scapes 16-20″ tall with 4 five inch blooms. Rating 1950—B; 1951—B; Final B.

EARLY WHITE, Ludwig. Very early pure white with faint green tinge deep in throat, good substance. 3 scapes 22″ tall with 4 to 5 six and one-half inch blooms. Rating 1950—A; 1951—A; Final A.

JOAN of ARC, Warmenhoven. Pure glistening white with green in throat. 2-3 scapes 24″ tall with 4 to 6 seven and one-half inch blooms. Rating 1950—A; 1951—A; Final—A.

LEADING LADY, Warmenhoven. Wide open pure white with green throat. 3 scapes 20″ tall with 3 to 4 seven inch blooms. Rating 1950—B; 1951—B; Final A.

LUDWIG'S SENSATION, Ludwig. White with greenish tinge deep in throat. 2-3 scapes 18″ tall with 4 six to seven inch blooms. Rating A.

MOUNT TACOMA, Warmenhoven. Pure white with faint green tinge in throat. Petals are winged at base, 3 scapes 24″ tall with 4 seven inch blooms. Rating 1950—A; 1951—A; Final—A.

NIVALIS, Ludwig. Creamy white with greenish tinge in throat. 2 scapes 15″ tall with 4 five inch blooms. Rating—B.

QUEEN of the WHITES, Warmenhoven. Glistening waxy pure white with faint tinge of green in throat, blooms flat with slight recurve at tip. 3 scapes 25″ tall with 4 to 5 nine inch blooms. Rating 1950—AA; 1951—AA; Final AA.

SNOW QUEEN, Ludwig. Pure white with faint green tinge. 3 scapes 18″ tall with 4 five and one-half inch blooms. Rating 1950—B; 1951—B; Final—B.

WHITE GIANT, Ludwig. Early pure frosty white with green tinge in throat. 3 scapes 24″ tall with 5 six inch blooms. Rating 1950—A; 1951—A; Final A.

WHITE STRIPED

KING of the STRIPES, Warmenhoven. Frosty pale pink to white with two broad undefined lines of carmine shading to vermilion in throat on each petal. 3 scapes 24″ tall with 3-4 five inch blooms. Rating 1950—A; 1951—A; Final A.

STRIPED BEAUTY, Warmenhoven. Orange scarlet lines that cover a large part of the petal giving the appearance of a white border. 3 scapes 20″ tall with 3-4 six inch blooms. Rating 1950—B; 1951—A; Final—A.

A PERSONAL EVALUATION OF SOME HYBRID AMARYLLIS CLONES, 1952

ROBERT GRANT THORNBURGH, *California*

Realizing that an attempt to evaluate the quality of hybrid *Amaryllis* clones to be found in the market today opens one to criticism, this one is presented with certain reservations. After following the ratings of Mr. Thomas R. Manley a personal rating was attempted in a round robin letter which later got into print in the last HERBERTIA.

This rating is certain to be far less scientific than Mr. Manley's for the reason that all the bulbs mentioned may not have had precisely the same attention as to feeding, potting mixtures, etc. Most of them, on the other hand, received about the same care in potting up, watering or feeding that one who has other time consuming activities can reasonably accomplish. They might be thought of, therefore, as receiving the same attention that any average busy person might give. Many of the bulbs were bloomed for the first time yet others had bloomed from one to several previous years.

Mr. Manley's ratings were more comprehensive, taking into account several factors that did not seem important for the writer's personal desires. The ratings, accordingly, will differ and are probably not com-

parable. For example, Mr. Manley based his ratings on "clean color, floret size, number of scapes per bulb, number of florets per bulb, floret form, floret substance, length and texture of scape and vigor of bulb and foliage." It was felt that clean color was important but that to grade down a clone because it had smaller-sized flowers than others was a mistake. Many *Amaryllis* fanciers have a high appreciation for some of the smaller blooms. If the bloom was extra large combined with other qualities, one might well be pardoned for grading it a bit higher than the rest.

Floret form and substance was considered important though no strict standard of perfection was set for the form. One is reminded that a hundred years ago in England the camellia flower was thought to be very poor grade if it was not perfectly formal in type. Today this seems ridiculous since all of the forms have admirers. Here, then, the *Amaryllis* bloom was rated in terms of beauty but not graded down because it lacked a certain distinct perfect type form. Most hybrid *Amaryllis* fanciers soon learn to look for the round, flat, "pansy-shaped" forms and this might even be the writer's personal preference. Yet the trumpet shapes are so utterly beautiful that who can say that one is a better form than the other.

As to the length and texture of the stem, it was not given a thought since it was found that a little more nitrogen could produce longer stems in most bulbs. In fact, if any importance were attached to length, one might grade it down for long, leggy stems, an objection one sometimes hears. One might well strive to produce large blooms on short stems the better to display them in pots. It was found that the same bulb could produce 24 inch stems or 3 inch stems with the same sized bloom. For cut flowers, of course, adequate stems are important but this seldom seemed to be lacking.

Concerning the number of scapes per bulb, one wonders if this has anything to do with the size and health of the bulb. It should, however, be taken into account since in the flower market, two scapes on a bulb brings a better price than just one. For personal use it did not seem as important as was the quality of the bloom itself. The number of florets per scape have, possibly, less importance here than in the Manley rating. One reads in Henry Nehrling's paper that *Amaryllis* Leopoldi characteristically had only two florets per scape. One might expect that with this excellent parentage the blooms could occasionally come two to a scape in spite of the bulbs having acquired the ability to put out four to a scape. With their size, more than four to a scape is redundancy. Those who may be displeased with this rating because it focuses too much on the individual floret have some justification for their attitude, I'm sure.

Taking all of the preceding into consideration, the letter ratings are the same as Mr. Manley's, that is AA for Superior, A for excellent, B for good and C for just fair. One is tempted to rate all of the following blooms as AA because like one appreciative *Amaryllis* bulb dealer once wrote me, "Hybrid *Amaryllis* are like Maryland whiskies. It's all

good except some are better than others.'' The B rating is, than not just average. It means ''good'' and worth having. The A rating was what might be termed as ''tops''. The AA rating, then is the one that is hard to resist speaking about in less than extravagant terms.

One often hears discussions or reads about named varieties as to whether or not they are clones or merely collections of similar shades. Having seen how much variation one bulb can give in shade, size and shape from year to year it is the writer's conviction that, at least, three Holland growers are producing named clones. One must allow for the occasional mistake in packing or marking, etc. It is a personal feeling that the Dutch have been so typically industrious in their work and, contrary to the communistic idea, are competitive in their efforts, so that they have contributed much more to the business of getting high quality bulbs to the flower lovers than they receive credit for. The Netherlands must be filled with a warm hearted people to devote so much time to producing better flowers for the rest of the world. May they thrive in this endeavor forever!

WHITE

CASPAR LUDWIG (Ludwig) Grade B minus. Bloomed Dec. 29th. Blooms 5½ inches across. Petals 3″ X 5″. One scape 20 inches long, two blooms. Tubular and did not open well. Soft green in throat for about 2″ and a green line on the keel of each petal posteriorly from base to tip. Bulb only medium in size. It bloomed better the previous year when the bulb was larger in size.

EARLY WHITE (Ludwig) Grade A plus. Eight inches across. Very white with only faint green deep in throat. Four blooms each of two scapes. Outstanding.

MOUNT TACOMA (Warmenhoven) Grade B plus. Large pure white with only moderate green in throat and along keel from base to tip posteriorly. Petals narrow but long and the crinkled margins were well displayed. Two scapes.

QUEEN OF THE WHITES (Warmenhoven) Two bulbs. One Grade C plus and the other C minus. Both bulbs obtained from the same reliable dealer and observed to bloom over a two year period. Obviously not of the same clone. The best one is tubular like an ''Easter Lily'' with narrow petals hardly touching in places. The other bulb had pink lines in the throat both years it bloomed. All blooms small. Five others owned by Mr. W. E. Rice were observed in bloom and it was agreed that they were all inferior by comparison to other whites. Two to four blooms per scape. Six inches across.

SNOW QUEEN (Ludwig) Grade A. This was nearly pure white with almost no green. Seven and a half inches across.

WHITE GIANT (Ludwig) Grade AA. Extremely handsome. Two blooms of one scape but the previous season, four blooms to each of two

scapes. Eight inches across with wide petals. Flat and round with good substance.

BRIDESMAID (Ludwig) Grade B. Small white. Two scapes, two blooms each.

LUDWIG'S DAZZLER (Ludwig) Grade AA. One is tempted to grade this one triple-A. On two bulbs, two to three scapes per bulb with four florets each. Large flat face. This one had the least green present of any white that was observed. The green was so faded as to be actually a soft yellow just at the center or base of petals in throat. Shapes not always uniform but very graceful. This was the best of the whites in this group.

MARIE GORETTI (Ludwig) Grade AA. Very white with a little cool green in the throat. Form very attractive, possibly because of the delicate appearance brought about by the crenation of petal margins. It surely lived up to its name, suggesting virginity, purity and saintliness. The next best of the whites.

WHITE WITH MARKINGS

W. C. CAMPBELL (W. E. Rice) Grade A plus. Mr. Rice, who has had five acres of hybrid *Amaryllis* under cultivation for a number of years saw fit to name very few clones, in spite of the fact that he had many good blooms. Of these he did name, I believe this one to be his finest. It is full faced, with wide petals but instead of the round pansy shape, each petal is individual even though over-lapping. The white is very white and the upper five petals are marked with two panels of red with central band of white. The two lower anterior petals are marked slightly less than the upper three though the color is brilliant. This one sparkles and glints in the sunlight. The intensity of the red is apt to vary from one bloom to the next. It is altogether a pleasing worth-while bloom. It is such a slow multiplier that it has never been distributed commercially and will probably never be since Mr. Rice has just this year retired from the bulb growing business. He will, naturally, continue to enjoy a few of his own accumulation of bulbs.

"PURE WHITE" (van Tubergen) Grade A plus. The first year this bloomed it was a disappointment since being labelled "pure white", the finding pink markings in the throat was not expected. This last season, however, it came out with such a whopper of a bloom, two to a scape with such an unusual lovely form that it was "out of this world." The petals were long and wavy though well overlapping. Such grace and beauty was not approached in the same way by any other bloom except the MARIE GORETTI. The small pink lines in the throat just made it a bit different and gave it a delicate blush or glow. This was the more odd since the flower was suggestively a faint green over its entire surface even though a white bloom. Difficult to describe other than that it was like the complexion of the medical student's easy girl

friend in the story HUMAN BONDAGE. The girl was afflicted with chlorosis resulting in a peculiar greenish shade to her skin that enslaved the student. Since I had no other white with this appearance, I also was charmed.

"Picotee" (Herman Brown) Grade A. Two bulbs presented to me by that kindly gentleman, Mr. Herman Brown. They were white and almost completely outlined by a reddish pink line which broke in places to punctate accumulations. The form of these were not outstanding yet it is possible that this might improve when the bulbs are better established. Considerable green in throat. These were valued sufficiently high that their pollen was used on all the best whites in order to reproduce and, possibly, improve this strain. These were the best picotees seen.

"Picotee" (Howard & Smith) Grade B. These were better in form and very complete in the picotee though they had large rose-red blotch markings at the mid-petal area. Therefore they were not primarily noticeable as a picotee in the way Mr. Brown's were.

OTHER BICOLORS

ROSE QUEEN (van Meeuwen) Grade AA. This one is a "must" on any collectors list. Two scapes, four blooms, each being 7 inches across. Very white large centers in throat without a blemish of any color other than faint soft green at base of petals. A wide border of vermilion fairly well delineated where it meets center white. Petals tend to be wavy or ruffled but do not recurve or twist out of shape, thereby giving an effect of delicate informal grace yet leaving plenty of face. Petals may double at times giving six, seven or eight petals. A semi-trumpet but very beautiful. This one will make the men turn, look back and whistle.

ROSE

PINK PERFECTION (Ludwig) Grade AA. Old Neyron Rose, Royal Horticultural Chart No. 623. Large 8 inch, flat, round form each year. This had only two blooms to a scape but was from a very small bulb that had been divided five months previously. It seems that this one is very vigorous and had split by fission or cleavage into several equal bulbs about five in all the previous season. In spite of repotting, it went ahead and bloomed. The quality of the single floret rated a double A. Almost the ultimate in the "pansy" round form.

DORIS LILLIAN (Ludwig) Grade AA. Eight inches across. Three scapes from three bulbs were obviously of the same clone. According to the RHS chart, the tips of petals were 722/3, mid-portion

722/1 Cherry. Very clear. No green whatsoever in throat though slightly on base of petals posteriorly. When the flowers age a bit the color changes to Rose Madder RHS 23. Just before the bloom actually starts to fade, multiple small "checks" of actual light blue begin to appear and stand out all over the face. Last year the color looked Magenta but the RHS chart indicated a Tyrian Rose. Since these bulbs were brought to bloom in the coolness of the oceanside, the color is apt to be deeper. More sun with its increased temperature, will lighten the color. This has also been noted to occur on the near-whites where the pink lines are apt to appear in the cooler shade than warmer sunlight. If you like rose, this is another "must."

MORENO (Warmenhoven) Grade A minus. It didn't open well. This was probably not the fault of the bulb since a sudden change of weather (becoming very cold with no sun) at the time seemed to arrest the progress of blooming before it had a chance. Four blooms, one scape. Florets 6½ inches across. RHS 22. Clear except for slight green at base. A second scape was Grade B since, here again, in spite of favorable weather etc., the blooms did not open more than half way. Color of second was Cherry RHS 722/1 at tips and 722/2 at throat. The color and form resemble DORIS LILLIAN. It is hoped that this one will improve as it becomes better established.

SALMON

SWEET SEVENTEEN (Warmenhoven) Grade B plus. Very round, flat, wide petals that begin to recurve slightly at tips accentuating the circular shape after 24 hours. This might better be called a salmon pink. It has a narrow, well defined band of white running from throat to the tip of each petal though on the lowest petal this was not as pronounced. This one was much appreciated by the ladies who saw it but in spite of the excellent qualities of the bloom, the color did not personally appeal to me as much as others. Upper petals RHS Begonia 619/1; lower petals Azalea Pink 618/3 and Vermilion 18/2.

QUEENS PAGE (Warmenhoven) Grade B. Good form. Light salmon, Nice if you like it.

SALMON JOY (Ludwig) Grade A minus. Very flat, round and large. RHS Poppy Red 16. Some adulterating yellowish lines along the throat. Last year it was Manderin Red. One scape, two blooms.

AMERICAN FASHION (Ludwig) Grade A minus. Manderin Red RHS 17. Two yellow stripes on each petal in throat keeps this from being an A plus. Resembles SALMON JOY so much that it might be the same through some error. It was not as described by the grower. Firm broad, flat and very large florets. Stands up well and for a long time. It is still a great beauty.

ORANGE

ORANGE KING (Ludwig) Grade B minus. Didn't open up well. Capsicum red RHS 715. Florets 6 inches across. Clear without green anteriorly. Two blooms to scape. Quite pretty.

PRINCE OF ORANGE. Grade A minus. One scape, two blooms, very round, pansy-shape and flat. Medium size. Petals notched at base. A very fine self.

INVINCIBLE (Ludwig) Grade A plus. Excellent form. Many fine lines veining the petals. Very worth-while.

LIGHT AND MEDIUM RED

MYSTERY. Grade B plus. Delft Rose 020/1 at the tip of petals, Geranium Lake 20 at mid-petal and Current Red 821/2 in center of throat. Brighter in throat and softer at periphery almost to point of dullness. Nearly round and flat with shallow throat. Posterior three petals show a faint rosy lighter colored band along the length of anterior center line from base to tip. Posterior petals 4 inches wide, anterior 3½ inches wide and bloom 7 inches across. Small notch along edge near throat. Outstanding, pleasing form.

DARK REDS AND SCARLETS

BRILLIANT (Ludwig) Grade B. Didn't open too well. Two short scapes of four blooms each.

"van Tubergen Scarlet." Grade B. Signal Red 719/1. Very large and clear. Petals roll back excessively. But for that defect would rate A plus. Two blooms per scape. Two scapes, one being 24 inches and the other 8 inches long.

CHERRY QUEEN (Ludwig) Grade B plus. Signal Red 719/2 changing to Orient Red 819 in throat. Notched petals. Two scapes of 3 to 4 blooms each. Quite clear. Yellow streaks in throat. No green anteriorly but is present posteriorly. Blooms 6½ inches across.

CARDINAL SPELLMAN (Ludwig) Grade B. Signal Red 719/1. Yellow markings in throat. Four blooms on each of two scapes.

BATON ROUGE (Ludwig) Grade B. Two scapes of three small flowers each which opened poorly.

AMERICAN EXPRESS (Ludwig) Grade AA. Cardinal Red RHS822/2. Four blooms per scape. All very clear and of maximum startling brilliance.

QUEEN SUPERIORA (van Meeuwen) Grade B minus. Orient Red 819. Five inch blooms, four to a scape. Florets opened like a

crocus. They all angled up 45 degrees and were notched at base. Two scapes. Very pretty and may do better next time, I'm certain.

LUDWIG'S SCARLET (Ludwig) Grade A plus. Three florets to each of two scapes being 8½ inches across. Clear both front and back but third bloom showed some streaks of dirty-yellow which prevented a grade of double A.

ANNA PAULOWNA (Warmenhoven) Grade A plus. This one is a "knockout". Almost a double A rating.

HALLEY (Ludwig) Grade A. This one is another dark red "knockout" Signal Red 719. Three blooms on one scape.

FRANKLIN D. ROOSEVELT (Ludwig) Grade A. Orient Red 819 to blood red 820. Blooms 7½ inches. Very appropriately named. Not a bit of green anteriorly or posteriorly. An excellent self deep red.

BORDEAUX Grade B minus. Form of this was not as good as others but may do differently next season. Petals narrow enough to see between them. Geranium Lake 20 at tips. Throat deeper than Blood Red 820. Blooms 7½ inches, four to a scape.

All of the above described blooms are worth while. Do not be misled by these ratings. Try them for yourselves and discover that you are apt to rate some blooms as "tops" that are here rated as lesser than the others.

In closing permit me to mention that a similar evaluation published last year in PLANT LIFE under my name contained an amusing error. To those of you who know my wife by her first name, Marie Jassamine, and who have written to me asking who "Edith" was, let me explain. The "Edith" was our esteemed friend, Mrs. Roger Strout, not my wife. The article was but a portion of a "round robin" letter that must have been miscopied. Edith, of course, is a member of that robin.

[Moldenke—AMARYLLID GENERA AND SPECIES, continued from page 28.]

in the tube of the perigonium, the 3 that are opposite the outer segments attached below the middle of the tube, the 3 that are opposite the inner segments attached higher up; filaments slender, pale, glabrous; anthers yellow; ovary ovate, 3 mm. long, 1.5 mm. in diameter, glabrous, green; style rather thick and short, 3 mm. long, minutely and obtusely subtrilobed at the apex; fruit absent.

Sternbergia exscapa Tineo, ined. Gussone, in Fl. Sic. Syn. 384-385. 1842. Leaves narrowly linear, flat, obtuse; spathe radical; corolla segments not known. Grows in sunny mountainsides. Collected by Tineo at Etna and Madonie, Sicily in September and October. Perennial plant; leaves erect, nerveless, shiny-green, 4 mm. wide, bordered at the apex by a thinly membranous margin; spathes radical, scarious, rather obtuse; scape not surpassing the leaves; flowers not seen; capsule elliptic, 3-sulcate, very smooth, 6 mm. long, obtuse with a very short acumen, sup-

[Moldenke—AMARYLLID GENERA AND SPECIES, continued on page 153.]

AMARYLLIS BARREIRASA

HAMILTON P. TRAUB, *California*

Seeds of an *Amaryllis* L. species were collected in late November 1949 by Dr. Ernesto de Miranda Neto in Brasil in the neighborhood of Barreiras which is situated at the confluence of the upper Rio Grande and Rio Ondas near the western border of the State of Bahia. This

Fig. 6. *Amaryllis barreirasa* Traub, sp. nov. [see description for dimensions]. Photo taken before pedicels had greatly elongated after anthesis.

species begins to bloom at the beginning of the summer rainy season for the region—October through November (southern hemisphere). The local names for our plant are "Flor de Trovão," which translates as

"Thunder Flower," presumably because it tends to bloom at the start of the rainy season, and also "Cebola brava," or "wild onion," apparently because it is a bulbous plant. The seeds were received by the writer via air mail in late December 1949, and excellent germination was obtained. The first plants bloomed on June 22, 1952, about 2½ years after germination [Fig. 6].

The plant is related to *Amaryllis belladonna* L., but is sufficiently distinct to merit specific rank, and has been named *Amaryllis barreirasa* (pronounced bär-reé-ra-sa). The chromosome number is 2n = 22 as reported elsewhere (Traub, 1953, Plate 2-L). The flower is relatively large for the size of the rest of the plant, and there is a conspicuous paraperigone of greenish bristles at the throat. The plant blooms at the beginning of summer (June, in the northern hemisphere) whereas *Amaryllis belladonna* L. blooms in the spring. It is morphologically distinct and is also effectively isolated reproductively from the latter which entitles it specific rank.

Amaryllis barreirasa Traub, **sp. nov.**

Planta bulbosa; bulbo mediocri; foliis usque ad 5 per anthesi non omnino evolutis, statu maturi usque ad 41 cm. longis, ad basin ca. 1 cm. latis, ad ¾ altitudinus 2.5 cm. latis, apice acuto-rotundato; pedunculo 27 cm. alto, post anthesin evoluto; valvis spathae 2 lanceolato-acutis 9.8—10 cm. longis; umbella 4-flora; pedicellis usque ad 5.5 cm. longis post anthesin evolutis; ovario 1.2 cm. longo; tubo tepalorum 3.1 cm. longo; perigonio patente subplano 18 cm. diametro; segmentis tepalorum in parte 1/3 inferiori macula irregulari subviridialbida ornatis, partibus superioribus inter begoniinis et roseis porcellanis coloratis; paraperigonio in gula setis subviridibus constato; segmentis setepalorum obovatis 10—10.5 cm. longis, 5—6 cm. latis; segmentis petepalorum elliptico- usque ad unguiculato-lanceolatis 9.5—10 cm. longis, 2.5—4 cm. latis; staminibus styloque declinato-adscendentibus, e perigonio non exsertis; stylo ultra stamina 1.1 cm. prolato; stigmate capitato.

Description.—*Chromosome number*, 2n = 22 (Traub, 1953, Plate 2-L); *bulb* medium sized; *leaves* up to 5, not fully developed at time of flowering in type, and may therefore not be contemporary with the flowers in the native habitat, up to 41 cm. long when mature, about 1 cm. wide at the base, 2.5 cm. wide ¾ from base, apex acute-rounded; *peduncle* 27.0 cm. tall, elongating after anthesis to 44 cm. tall, 1.2 x 2.1 cm. at base, 1 x 1.3 cm. at apex; *spathe-valves* 2, free, lanceolate-acute, 9.8—10 cm. long; *umbel* 4-flowered; *pedicels* reddish-*greenish,* varying from very short up to 5.5 cm. at anthesis of the first flower, elongating greatly after anthesis to 14.5—16.5 cm. long; *ovary* 1.2 cm. long, 5.5 mm. diam. at base, 6.5 mm. diam. at apex; *tepaltube* 3.1 cm. long, 5 mm. diam. at base, 1.2 cm. diam. at apex; *perigone* wide open, almost flat, 18 cm. across face, irregular greenish-whitish area in lower 1/3 of tepalsegs, upper portions between Begonia (RHS 619) and

Porcelain Rose (RHS 620); *paraperigone* of conspicuous greenish bristles at the throat; *setepalsegs* obovate, 10-10.5 cm. long, 5-6 cm. wide; *petepalsegs* elliptic- to unguiculate-lanceolate, 9.5-10 cm. long, 2.5-4 cm. wide; *stamens* and *style* declinate-ascending not exserted from the perigone; *style* extending 1.1 cm. beyond stamens; *stigma* capitate; *capsule* 2.1 cm. long, 3.9 cm. wide, distinctly trilobed, lobes extending below center by 7 mm.; *seeds* numerous, winged, discoid to D-shaped, black, 1.5 x 2.2 cm. Type: Traub Nos. 210 and 211, in the Traub Herbarium; type illustration: Fig. 6.

Literature cited

in combined staining and mounting media. Euclides *13:* Plate 2-K-L. 1953.

AMARYLLIS APERTISPATHA

Hamilton P. Traub, *California*

On August 17, 1940, Mr. Mulford B. Foster collected a stoloniferous *Amaryllis* L. species (Foster No. 972; Traub No. 110) at an altitude of 1200 ft., on granite rocks, in Cachoeiro de Itapemirim, State of Espirito Santo, Brasil. Some of the bulbs were given to Mrs. Mary G. Henry who gave some of the increase to the writer in 1944. They flowered for him in 1952 [Plate 9].

This is one of the most distinct species on the basis of chromosome number since it is the first hexaploid *Amaryllis* L. species (2n = 66) discovered as reported elsewhere (Traub, 1953, Plate 2-A). This was first suspected when it was found that it would not cross with other species, but was self fertile, a condition rarely met with an *Amaryllis* L. species, which are usually self sterile but will set seeds by close pollination, that is by crossing different seedlings. The species is also morphologically very distinct since it is the only species with green spathe valves that are open from the start, resembling shorter true leaves, and which remain green even after the seeds have ripened. It blooms later (late May and June) than *Amaryllis belladonna* L. which it resembles somewhat in flower shape.

Amaryllis apertispatha Traub, **sp. nov.**

Planta bulbosa; foliis 3—5, lorato-lanceolatis usque ad 31 cm. longis, ad basin 1 cm. latis, ad 2/3 altitudinis 2.5 cm. latis, apice acuto; pedunculo usque ad 30.6 cm. alto, post anthesin evoluto; umbella 2- vel 3-flora; valvis spathae viridibus non clausis, foliis brevioribus oblanceolato-acutis

Amaryllis apertispatha Traub, sp. nov. [see description for dimensions.] Photo taken before pedicels had elongated after anthesis.

Plate 9

consimilibus, usque ad 9.5 cm. longis, ad basin 1.1 cm. latis, ad ¾ altitudinis 2 cm. latis, donec post maturitatem seminorum viridibus; tubo tepalorum 2.7 cm. longo; pedicellis usque ad 3 cm. longis, post anthesin evolutis; paraperigonio in gula setis paucis albidis constato; perigonio in gula viridi-albidis, reliquo inter begoniinis et roseis porcellanis colorato; segmentis tepalorum oblanceolato-acutis vel lanceolato-acutis usque ad lanceolatis 7.8—7.9 cm. longis, 1.8—3.6 cm. latis; staminibus styloque declinato-adscendentibus, stylo paullo ultra stamina prolato; stigmate capitato per indistincte trifido.

DESCRIPTION.—*Chromosome number* 2n = 66 (Traub, 1953, Plate 2-A); bulb relatively small for the genus; *leaves* 3—5, lorate-oblabceolate, slightly concave, up to 31 cm. long, 1 cm. wide at base, 2.5 cm. wide 2/3 from base, apex acute; *peduncle* up to 30.6 cm. tall at anthesis, elongating after anthesis, slightly compressed, edges rounded, up to 1.7 x 1.1 cm. at base, 1.1 x 0.9 cm. at apex; *spathe-valves* 2, free, green, open from the start, resembling shorter oblanceolate-acute leaves, margin infolded, up to 9.5 cm. long, 1.1 cm. wide at base, 2 cm. wide 2/3 from base, remaining green after anthesis for a relatively long time until after seeds have ripened; umbel 2—3-flowered; *pedicels* up to 3 cm. long, elongating after anthesis; *ovary* 1.5 x 0.7 cm. diam. at anthesis; *tepaltube* up to 2.7 cm. long, 0.6 cm. diam. at base, 1.3 cm. diam. at apex; *perigone* greenish-whitish in the throat region, the rest between Begonia (RHS *619*) and Porcelain Rose (RHS *620*); *paraperigone* of a few whitish bristles at the throat; *tepalsegs* oblanceolate-acute, lanceolate-acute, to lanceolate, 7.8—7.9 cm. long, 1.8—3.6 cm. wide; *stamens* and *style* declinate-ascending; *style* extended slightly beyond the stamens; *stigma* capitate, very obscurely trifid; *capsule* trilobed; seeds discoid to D-shaped, black. Type: Traub Nos. 207, 208 and 209, in the Traub Herbarium; type illustration: Plate 9.

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Traub, Hamilton P. Arabinic acid, a new non-precipitating ingredient in combined staining and mounting media. Euclides *13:* Plate 2-A. 1953.

THE GENERA **RHODOPHIALA** PRESL, **PHYCELLA** LINDL., AND **AMARYLLIS** L.

HAMILTON P. TRAUB, *California*

I. RHODOPHIALA PRESL

The small-flowering species of the genus *Amaryllis* L. as recognized by Baker (1888)—the subgenera *Chilanthe* Traub (Traub & Moldenke, 1949), and *Rhodophiala* (Presl) Baker, differing only in the nature of the stigma (trifid vs. capitate)—had been reduced to this position by Baker (1888) on a morphological basis alone. In a recent paper (Traub, 1952), it was shown that the species of these small-flowering subgenera with a basic chromosome complement of n = 9, differ on a cytological basis from the typical large-flowering members of the genus *Amaryllis* L. (type: *Amaryllis belladonna* L) with a basic chromosome complement of n = 11. This basic difference is also reflected in breeding experiments (Traub, 1952) which show that crosses are possible between the small-flowering species and *Habranthus juncifolius* Traub which in turn crosses with ZEPHYRANTHES *grandiflora* Lindl., but attempted crosses between the small-flowering and the large-flowering *Amaryllis* L. species uniformly fail. This points to the untenable nature of Baker's disposition of the small-flowering species, and therefore the genus *Rhodophiala* Presl has been restored (Traub, 1952). This means also that the genus *Amaryllis* L., now confined to 45 species, becomes again a very homogeneous group (taxon) with 57.8% of the species originally described under the generic name *Amaryllis* L. (See Table 1.).

In restoring the genus *Rhodophiala* Presl, Traub (1952) indicated that the type of this genus is *Rhodophiala amarylloides* Presl (Bot. Bemerk. 115. 1844) which is a synonym of *Rhodophiala pratensis* (Poepp.) Traub. The genus *Rhodophiala* Presl was recognized by R. A. Philippi who proposed six additional species under that name, but three of these are now recognized as synonyms. The three valid species are *Rhodophiala biflora* R. A. Phil., *R. modesta* R. A. Phil., and *R. uniflora* R. A. Phil. The following new combinations are required to bring the subject up to date so as to accord with the *biologic facts:*

Rhodophiala consobrina (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum consobrinum* R. A. Phil., in Anal. Univ. Chile *93:* 52. 1896.). *Rhodophiala tiltilensis* (Traub & Moldenke) Traub, *comb. nov.* (syn.—*Amaryllis tiltilensis* Traub & Moldenke, Tribe Amaryll. 88. 1949.). *Rhodophiala tenuiflora* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum tenuiflora* R. A. Phil., in Anal. Univ. Chile *93:* 154. 1896.). *Rhodophiala moelleri* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum moelleri* R. A. Phil., in Anal. Univ. Chile *93:* 154. 1896.). *Rhodophiala berteroana* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Habranthus berteroanus* R. A. Phil., in Linnaea *29:* 66. 1857-58.). *Rhodophiala bagnoldii* (Herb.) Traub. *comb. nov.* (syn.—*Habranthus bagnoldii* Herb., Bot. Reg. Lond. *17:* pl. 1396. 1831.).

Rhodophiala ananuca (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum ananuca* R. A. Phil., in Anal. Univ. Chile *93:* 150. 1896.). *Rhodophiala bakeri* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Habranthus bakeri* R. A. Phil., in Anal. Univ. Chile *93:* 150. 1896.). *Rhodophiala advena* (Ker-Gawl.) Traub, *comb. nov.* (syn.—*Amaryllis advena* Ker-Gawl., Bot. Mag. Lond. *28:* pl. 1125. 1808.). *Rhodophiala jamesonii* (Baker) Traub, *comb. nov.* (syn.—*Hippeastrum jamesonii* Baker, in Jour. Bot. (Lond.) *16:* 83. 1878.). *Rhodophiala bifida* (Herb.) Traub, *comb. nov.* [See Plate 10.] (syn.—*Habranthus bifidus* Herb., Bot. Mag. Lond. *52:* pl. 2597. 1825.). *Rhodophiala araucana* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum araucanum* R. A. Phil., in Anal. Univ. Chile *93:* 152-153. 1896.). *Rhodophiala splendens* (Renjifo) Traub, *comb. nov.* (syn.—*Habranthus splendens* Renjifo, in Renjifo & Phil., Descr. Alg. Pl. Nuev. reimpr. 6. 1884.). *Rhodophiala soratensis* (Baker) Traub, *comb. nov.* (syn.—*Hippeastrum soratense* Baker, Amaryll. 42. 1888.). *Rhodophiala chilensis* (L'Herit.) Traub, comb. nov. (syn.—*Amaryllis chilensis* L'Hérit., Sert. Angl. 11. 1788.). *Rhodophiala lineata* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Habranthus lineatus* R. A. Phil., in Anal. Univ. Chile 43: 542. 1873.). *Rhodophiala elwesii* (C. W. Wright) Traub, *comb. nov.* (syn.—*Hippeastrum elwesii* C. W. Wright, in Kew Bull. 330. 1914.). *Rhodophiala andicola* (Poeppig) Traub, *comb. nov.* (syn.—*Amaryllis andicola* Poeppig., Fragm. Syn. Pl. Phan. 5. 1833.). *Rhodophiala rosea* (Sweet) Traub, *comb. nov.* (syn.—*Habranthus roseus* Sweet, Brit. Fl. Gard. ser. 2. *2:* pl. 107. 1833.). *Rhodophiala flava* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Habranthus flavus* R. A. Phil., in Anal. Univ. Chile *27:* 333. 1865.). *Rhodophiala montana* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Habranthus montanus* R. A. Phil., in Anal. Univ. Chile *43:* 543-543. 1873.). *Rhodophiala fulgens* (J. D. Hooker) Traub, *comb. nov.* (syn.—*Habranthus fulgens* J. D. Hooker, in Bot. Mag. Lond. *92:* pl. 5563. 1866.). *Rhodophiala pratensis* (Poeppig) Traub, *comb. nov.* (syn.—*Amaryllis pratensis* Poeppig, in Fragm. Syn. Pl. Phan. 5. 1833.). *Rhodophiala gladioloides* (Hieron.) Traub, *comb. nov.* (syn.—*Habranthus gladioloides* Hieron., in Bol. Acad. Nac. Cien. Cordoba *4:* 70. 1881.). *Rhodophiala colona* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum colonum* R. A. Phil., in Anal. Univ. Chile *93:* 148. 1896.). *Rhodophiala rhodolirion* (Baker.) Traub, *comb. nov.* (syn.—*Hippeastrum rhodolirion* Baker, Jour. Bot. Lond. *16:* 84. 1878.). *Rhodophiala popetana* (R. A. Phil.) Traub, *comb nov.* (syn.—*Hippeastrum popetanum* R. A. Phil., in Anal. Univ. Chile *93:* 156. 1896.). *Rhodophiala purpurata* (R. A. Phil.) Traub, *comb. nov.* (syn.—*Hippeastrum purpuratum* R. A. Phil., in Anal. Univ. Chile *93:* 156. 1896.).

EDITORIAL POSTSCRIPT.—The new combination, **Rhodophiala pratensis** (Poepp.) Traub, was first published in **Taxon 1:** 122. 1952. The new combination, **Rhodophiala bifida** (Herb.) Traub, was first published in **Euclides 13:** 156. 1953. Plate 10 on page 61 has been reproduced from Bot. Mag. Lond. **53:** pl. 2597. 1825.

II. PHYCELLA LINDL.

Baker (1878; 1888) reduced the genus *Phycella* Lindl. to a subgenus of *Amaryllis* L. (syn.—*Hippeastrum* Herb.). This disposition was always questionable. Further study of the plants accommodated under the subgenus *Phycella* (Lindl.) Baker (Traub & Moldenke, 1949) indicated that morphologically this group is near to *Eustephia* Cav. as previously indicated by Stapf (1927). *Phycella* Lindl. is therefore restored and is placed next to *Eustephia* Cav. in the sub-family *Pancratioideae* (1953). Two of the species included were originally described under *Phycella* Lindl.,—*Phycella herbertiana* Lindl., and *Phycella angustifolia* R. A. Phil. One new combination was made by Herbert, *Phycella bicolor* (Ruiz & Pav.) Herb. The four necessary new combinations to bring the subject up to date to accord with the biologic facts follow:

Phycella phycelloides (Herb.) Traub, comb. nov. (syn.—*Habranthus phycelloides* Herb. in Bot. Reg. Lond. *17:* pl. 1417. 1831.). *Phycella bonariensis* (O. Kuntze) Traub, *comb. nov.* (syn.—*Hippeastrum bonariensis* O. Kuntze, Rev.

Rhodophiala bifida (Herb.) Traub. This species is widely cultivated in the United States under the name, **Amaryllis advena** Ker-Gawl.

Plate 10. (See Editorial Postscript on page 60.)

Gen. Pl. *3(3):* 311. 1898.). *Phycella gayana* (O. Kuntze) Traub, *comb. nov.* (syn.—*Hippeastrum gayanum* O. Kuntze, Rev. Gen. Pl. *3(3):* 311. 1898.). *Phycella granatiflora* (Holmb.) Traub, *comb. nov.* (syn.—*Hippeastrum granatiflorum* Holmb., in Anal. Mus. Buenos Aires, ser. III. *2:* 79—80. 1903.).

III. AMARYLLIS L.

With the transference of the extraneous elements elsewhere to accord with the biologic facts (Traub, 1953), the genus *Amaryllis* L. is restored as a very homogenous taxon as originally typified by Herbert (Herbert, 1819; Traub & Moldenke, 1949, pp. 68—72.). The genus *Amaryllis* L. thus consists of 45 species. These were originally described under the genera indicated in Table 1.

Table 1

Described under:	Number of species	Per cent of total:
Amaryllis L. (1753)	26	57.8%
Hippeastrum Herb. (1821)	17	37.8%
Sprekelia Heist. (1755)	1	2.2%
Griffinia Ker-Gawl. (1820)	1	2.2%

The species of *Amaryllis* L. as recognized are listed alphabetically in Table 2 as they appear in the writer's monograph (Traub, 1953) on the *Amaryllidaceae* on which he has worked for over 30 years and which is now being prepared for the printer.

Table 2

Amaryllis aglaiae Castellanos
Amaryllis andreana (Baker) T & U
Amaryllis angustifolia (Pax) T & U
Amaryllis apertispatha Traub
Amaryllis aulica Ker-Gawl.
Amaryllis barreirasa Traub
Amaryllis belladonna L.
Amaryllis blumenavia (C. Koch et Bouché ex Carr.) Traub
Amaryllis breviflora (Herb.) Seub.
Amaryllis cantraii (Arech.) T & U
Amaryllis calyptrata Ker-Gawl.
Amaryllis correiensis Bury
Amaryllis crociflora (Rusby) T & U
Amaryllis cybister (Herb.) T & U
Amaryllis damaziana (Beauverd) T & U
Amaryllis elegans Sprengel
Amaryllis espiritensis Traub
Amaryllis ferreyrae Traub
Amaryllis flammigera (Holmb.) T & U
Amaryllis forgetii (Worsley) T & U
Amaryllis fosteri Traub
Amaryllis fusca (Kraenzl. T & U
Amaryllis harrisonii Lindl.
Amaryllis immaculata T & M
Amaryllis kromeri Worsley
Amaryllis leopoldii T. Moore
Amaryllis mandonii (Baker) T & U
Amaryllis maracasa Traub
Amaryllis miniata Ruiz & Pav.
Amaryllis moreliana (Lem.) Traub
Amaryllis oconequensis Traub
Amaryllis pardina Hook. f.
Amaryllis petiolata (Pax) T & U
Amaryllis psittacina Ker-Gawl.
Amaryllis reginae L.
Amaryllis reticulata L'Hérit.
Amaryllis scopulorum (Baker) T & U
Amaryllis striata Lamarck
Amaryllis stylosa (Herb.) Sweet
Amaryllis traubii Moldenke
Amaryllis tucumana (Holmb.) T & U
Amaryllis vanleestenii Traub
Amaryllis viridiflora (Rusby) T & U
Amaryllis viridorchida Traub
Amaryllis vittata L'Hérit.

* Originally described under the name *Amaryllis L.*

It should be emphasized that 57.8% of the species were originally described under the genus *Amaryllis* L., and any required new combinations have been made in the past, and all of the names included above under *Amaryllis* L. are recognized and used by those who have specialized on this group for many years (HERBERTIA, 1938—1948; PLANT LIFE, 1949 to the present; published by The American Plant Life Society, 26 E. Camino Real, Arcadia, Calif.).

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[Howard—CRINUM SCABRUM, continued from page 94.]

With all of its fine qualities, one wonders why the plant is not more widely known and grown. Although *Crinum scabrum* increases slowly by offsets, it can rapidly be increased by seeds. It sets seed freely and is very valuable in hybridization. *Crinum scabrum* crossed with the hybrid *Crinum* ELLEN BOSANQUET has produced a hybrid reportedly darker than the wine-rose ELLEN BOSANQUET.

The culture is similar to that of other crinums, that is, just barely covering the bulb completely with soil. It is often suggested that crinums should be planted with most of the bulb protruding above ground. This is all well and good where there is no danger of frost. There are few areas in the South where a hard freeze does not occasionally occur. Many years of mild winters may be followed by a highly damaging winter in which great losses in plants results. The writer has never condoned too shallow planting, and after experiencing two unusually severe winters in which the thermometer hovered around the zero mark for a week, I am convinced that exposing too much of a *Crinum* bulb above the surface can be disastrous. The bulb should be completely covered to the neck of the plant. Since the large bulb of *C. scabrum* has a short neck, the bulb should not be exposed above the surface as it is a tender species. It prefers a sandy soil with an acid pH, but it is fairly tolerant to heavier, slightly alkaline soils. It grows best in full sun, but the flowers keep better in part shade.

ALLIUM TANGUTICUM

RAYMOND B. FREEMAN, *Illinois*

Allium tanguticum is an excellent garden allium of the simplest culture. It has much to recommend it. First, it is a good clear reddish purple color. The umbel is almost a perfect sphere, and the projecting stamens add a pleasant "fuzziness" to this severe geometric shape. Second, the umbels are carried on stiff, strong stems about 2½ to 3 feet high. These stems resist wind very well. Third, the narrow twisted strap leaves are short and do not detract from the floral display. Fourth,

Fig. 7. *Allium tanguticum* Regel as grown in Illinois. Photo by Raymond B. Freeman.

it blooms in August, covering almost the entire month, and under favorable conditions has some bloom in early September.

This species is very easy from seed planted outdoors in the early spring. The clump illustrated (Fig. 7) was transplanted to its permanent location the second spring. As can be seen, it is atop a low wall, hence has very good drainage; although this may not be essential it certainly does no harm. The soil is a neutral clay loam. There is no particular culture given. The location receives sun most of the day. The plants have never been watered artificially. It is this adaption to the mid-West climate that is one of the virtues of this species.

Specimen blooms of this allium have been entered in local flower shows where they invariably excite comment.

AMARYLLIS BELLADONNA VAR. BARBATA

MARY G. HENRY, *Pennsylvania*

Anyone who has ever seen *Amaryllis belladonna* var. *barbata* [Fig. 8] in bloom will surely agree that it is the very quintessence of beauty.

Fig. 8. *Amaryllis belladonna* var. *barbata* in flower. Photo by Mary G. Henry.

The color of the flowers is an entrancingly lovely cream that deepens a little towards the center before it merges into the pale green heart of the flower. They have a sort of waxy texture with a fine velvety finish which fairly glistens when the sun's rays fall on the tepalsegs. The flowers are large, very large for the size of the bulbs, about 12.5 cm. in diameter, and rather informal in shape. The petepalsegs are prettily wavy or slightly ruffled along the edges which gives a very graceful and

elegant appearance to the flower. The reverse of the setepalsegs is the same in color excepting that, sometimes, they are slightly stained reddish along the keel. Although this does not show through, the flowers without it are the most attractive. It is the pristine purity of its luscious creamy coloring that is its great charm. The flowers are held on about a 25 cm. stalk which may be a little taller if grown in part shade. Three-flowered umbels are commonly produced, but they do make four flowered umbels too.

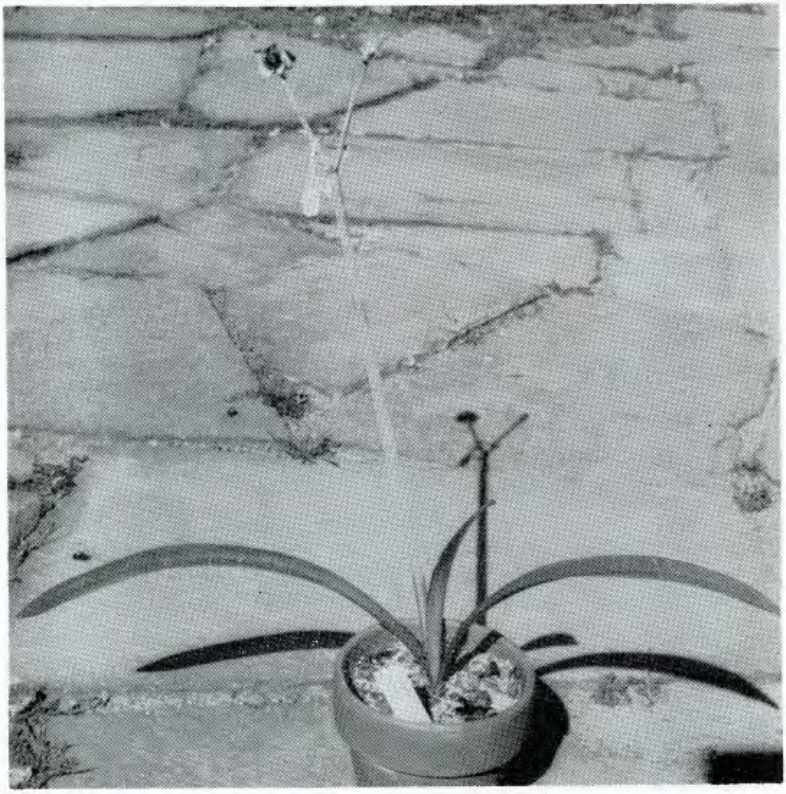

Fig. 9. *Amaryllis belladonna* var. *barbata* after shedding seeds. Photo by Mary G. Henry.

The 4-8 evergreen leaves are of rather a distinct light yellowish green color that sets off to perfection the creamy flowers.

Unlike the undoubtedly handsome and very magnificent huge Dutch hybrid *Amaryllis* which seem to require a store window, a table in a flower show or an immense room to properly set off their noble proportions, *Amaryllis belladonna* var. *barbata* is of a convenient size for the windowsill of even a small room and a large specimen composed of 4-6 bulbs could trim a palace window.

A 4½ inch pot is a convenient size for one bulb, but with good soil and a little fertilizer it can contain two flowering bulbs. In spite of the rather fragile appearance of this *Amaryllis* it is not difficult to grow when its needs are understood and it is given the soil mixture and culture it requires. Coming from its home where it lives on sandy shell mounds it should have a sandy soil with leaf soil and crushed oyster shell well mixed into it. The bulbs which are about 5 cm in diameter should be buried to their necks.

If I could grow but three or four *Amaryllis, Amaryllis belladonna* var. *barbata* would surely be one of the first I would choose, not only for its distinctiveness but also for its utter perfection of form and color, and sheer ethereal beauty.

For a technical description of *Amaryllis belladonna* and its varieties see Dr. Traub's Amaryllidaceae, page 122. *Amaryllis belladonna* var. *barbata* was lost to cultivation when Mr. Foster collected it again a few years ago (see Herbertia 1951, page 17). The plants illustrated in Figs. 8 and 9 were recently obtained from Surinam through the kindness of Mr. van Leesten.

THE TRAUB - USDA DAYLILIES

STANLEY E. SAXTON, *New York*

In September 1950 plants of 15 daylily clones were received from the U. S. Plant Industry Station, Beltsville, Maryland, for commercial propagation. Some of the clones received were small clumps which could be divided and this was done so that the divisions set out were single fan plants in most cases.

The table below shows the number of divisions planted, and the total number of fans as of the date of this report.

Also indicated is type of foliage growth: Evergreen (Ev.) Deciduous (D); Semi-evergreen (SE).

Name	*Planted*	*Fans now*	*Foliage*
1. Clarinda	4	22	Ev.
2. Emily Dickinson	5	20	Ev.
3. Gita	2	5	SE.
4. Golden Triangle	2	4	SE.
5. Iowa	2	7	Ev.
6. Krishna	1	8	Ev.
7. Lemon Tulip	2	4	SE.
8. Mary Henry	3	13	Ev.
9. Mitra	3	8	SE.
10. Purity	3	12	SE.
11. Reinbeck	2	10	Ev.
12. Saffron Queen	2	6	Ev.
13. Stephan Foster	2	2	SE(D)
14. Susannah	1	3	SE
15. Papagaio	1	4	D

Remarks: Almost all of these varieties are evergreen or show some growth in winter here. This has not seemed to retard development as those with the greatest percentage increase are evergreen (KRISHNA). STEPHAN FOSTER which is almost deciduous has been the slowest grower of all which is a surprise. The average increase in two years of growth is 4 fans for one. This is rather slow, but compares generally with evergreen types under the northern New York conditions. It should also be remembered that increase the first year is in almost all cases negligible as it takes that length of time for evergreen clones to become adapted to the long rest period and winter cold. However, not a single division was winter killed, although some were very weak the spring after planting. All are healthy now.

It is still too early to attempt to give a final evaluation of the flowers. Most of the varieties have bloomed and the one that appeals most to the writer is MARY HENRY. This is a large clear yellow flower, ruffled, fragrant and on fairly tall stems up to 4 feet high. The branching is good but this may be even improved later as the plants develop.

REINBECK is a very appealing flower with its overcast of rose-pink. STEPHEN FOSTER is a garnet red with marked midrib—not as true a red as BERWYN but intense. KRISHNA is the deepest in color, a maroon-purple. EMILY DICKINSON is large and attractive in a light shade of canary.

More visitors asked about GOLDEN TRIANGLE than any other. This has a large flower of unusual and appealing form but its slow natural increase slows down its propagation in the North unless the cuttage method of propagation is employed.

Further comments will be made after another flowering season.

AMARYLLID NOTES

HAMILTON P. TRAUB

Leucopum nebrodense (Lojac.) Traub, *comb. nov.*, (syn.—*Erinosma nebrodense* Lojac., Flora Sicula *3:* 80, pl. 5, fig. 4. 1908.)

x*Amaryllis gladwynensis* AND PARENTS. A further study of the progeny of x*Amaryllis gladwynensis* [*Amaryllis belladonna* var. *haywardii* x x*Amaryllis johnsonii* (Naga Hills, India clone)] a hybrid produced by Mrs. Mary G. Henry (Plant Life 8: 86. 1952) shows that the scapes are 2, 3 and 4-flowered, the flower color ranges from scarlet, crimson to pink. Most of the seedlings are robust; showing hybrid vigor. The variation in flower color shows that the pollen parent is not a true x*Amaryllis johnsonii (Amaryllis reginae* x A. *vittata).* Mrs. Henry has selfed x*Amaryllis johnsonii* (Naga Hills clone), but the seed-

lings have not as yet flowered. When they do flower, more information about the pollen parent will be available.

Genus CASTELLANOA Traub, *nom. nov.* (syn. genus *Sanmartina* Traub, in Plant Life 7 : 41—42. 1951, non *Sanmartinia* Buchinger, 1950) ; typus: *Castellanoa marginata* (R. E. Fries) Traub, *comb. nov.* (syn.—*Hippeastrum marginata* R. E. Fries, Act. Soc. Upsal. ser. 4, 1(1) : 161, pl. 9, figs. 3 & 4. 1905).

Ipheion patagonicum (Baker) Traub, *comb. nov.* (syn.—*Milla patagonica* Baker, in Jour. Linn. Soc. Bot. 11: 382. 1871.). *Ipheion luzula* (Speg.) Traub, *comb. nov.* (syn.—*Luzula patagonica* Speg., in Rev. Fac. Agron. Vet. La Plata 3: 577—578. 1897.; *Brodiaea luzula* (Speg.) Mackloskie, in Rept. Princeton Univ. Exped. Pat. 8: 305. 1903-1906.). *Ipheion bivalve* (Lindl.) Traub, comb. nov. (syn.—*Triteleia bivalvis* Lindl., in Bot. Reg. sub pl. 1293, in nota. 1830). *Ipheion violaceum* (Kunth) Traub, *comb. nov.* (syn.—*Triteleia violacea* Kunth, Enum. 4: 468. 1843). *Ipheion poeppigianum* (C. Gay) Traub, *comb. nov.* (syn.—*Triteleia poeppigiana* C. Gay, in Fl. Chil. 6; 117. 1853.). *Ipheion nivale* (Poeppig) Traub, *comb. nov.* (syn.—*Tristagma nivalis* Poeppig, in Nov. Gen. 2: p. 28, pl. 140.). *Ipheion porrifolium* (Poeppig) Traub, *comb. nov.* (syn.—*Triteleia porrifolia* Poeppig, in Nov. Gen. 2: p. 28, pl. 139.). *Ipheion brevipes* (Kunze) Traub, *comb. nov.* (syn.—*Triteleia brevipes* Kunze, in Linnaea 20: 9. 1847; *Milla leichtlinii* Baker, in Gard. Chron. 1(1875)234; Bot. Mag. 102: pl. 6236. 1876.). *Ipheion gracile* (Philippi) Traub, *comb. nov.* (syn.—*Triteleia gracilis* R. A. Phillipi. in Anal. Univ. Chile 550. 1973.). *Ipheion sessile* (Philippi) Traub, *comb. nov.* (syn.—*Triteleia sessilis* Philippi, in Linnaea 29: 72. 1857-1858.). *Ipheion setaceum* (Baker) Traub, *comb. nov.* (syn.—*Milla setacea* Baker, in Jour. Linn. Soc. Bot. 11: 385. 1871.). *Ipheion recurvifolium* (C. H. Wright) Traub, *comb. nov.* (syn.—*Brodiaea recurvifolia* C. H. Wright, in Bull. Misc. Infor. Kew, p. 117. 1915.). *Ipheion circinatum* (Sandwith) Traub, *comb. nov.* (syn.—*Brodiaea circinata* Sandwith, in Hooker's Ic. Pl. 5th ser. 4: pl. 3350. 1837.). *Ipheion spegazzinii* (Macloskie) Traub, *comb. nov.* (syn.—*Brodiaea spegazzinii* Macloskie, in Rept. Princeton Univ. Exped. Pat. 8: 305. 1903-1906.). *Ipheion ameghinoi* (Speg.) Traub, *comb. nov.* (syn.—*Brodiaea ameghinoi* Speg., in Rev. Fac. Agron. Vet. La Plata 3: 575-576. (1897.). *Ipheion viridor* (Killip) Traub, *comb. nov.* (syn.—*Brodiaea viridor Killip,* in Jour. Wash. Acad. Sci. 18: 566. 1926.).

Milla coerulea Adolf Scheele, Linnaea *25:* 260—261. 1852. Native to Texas; near New Braunfels; in colonies on dry prairie. Cites an herbarium specimen by "Roemer, March".

Milla biflora Cav., Adolf Scheele, in Linnaea *25:* 261. 1852. Attributes this species to Texas, but cites no herbarium specimen, and no locality.

Eustephia jujuyensis Hort. ex Traub, in Plant Life *6:* 61. 1950 (err. *yuyuyensis).* Dr. A. Castellanos writes that the correct spelling of the name of the Argentine Province is "Jujuy" and thus the former spellings "yuyuyensis" and "yuyuensis" were incorrect as specific epithets.

SMALL'S *Hymenocallis* TYPE SPECIMENS. It has not been possible to locate most of these, but fortunately, one, *Hymenocallis tridentata* Small, S. E. Flora, 323, 1503. 1933, *nomen subnudum*, has been located through the kindness of Dr. David D. Keck of the New York Botanical Garden. Unfortunately, the herbarium specimens at the New York Botanical Garden are not numbered, making it difficult to find and to cite such specimens. In this case Small apparently collected the plant alive when not in flower in Dec. 1920, the date he gives on the label. Apparently he flowered the plant subsequently in the NYBG propagation house in March 1922, when he made the incomplete type description, and also made a painting from the living plant. This painting has not been located. Small's original description *is incomplete* in some particulars, and *erroneous as to the shape of the leaves* which are "linear-lanceolate," and not "linear" as he states. The revised description—*Hymenocallis tridentata* Small, *emend.*—based on the type specimen and Small's incomplete type description, follows:

Bulb unknown, leaves 5, linear-lanceolate, up to 4 [-5] dm. long, up to 9 mm. at the base, 1.6 cm. at the middle, apex acute, somewhat channeled, keeled beneath, deep green; spring flowering (type plant, March 8, 1922); scape about 3 dm. tall, 2-edged, glaucescent; umbel 2-flowered; spathe-valves 2, free, 7 mm. wide at the base, tapering to a narrow blunt apex, 5.2 cm. long; bracteoles 2, similar, smaller, almost as long as the spathe-valves; flowers white, fragrant, ovary sessile, 1.2 cm. long, number of ovules per locule unknown; tepaltube 5.5—6.4 cm. long; tepalsegs narrow, about 8—8.5 cm. long; staminal cup 5.5—6.5 cm. wide, usually 3-toothed, the middle one the largest, *sometimes up to 6-toothed*, between the filaments; free portion of the stamens 1.7 cm. long; style slightly longer than the stamens, stigma faintly 3-lobed; fruit and seeds unknown.

Range.—Florida, Vero; *Small*, collected Dec. 1920; flowered March 8, 1922, NYBG (type), in Herb. NYBG. According to Small (1933), the range is "Peninsular Florida; swamps and marshes, east coast region," but no citations of specimens, other than the one indicated, are given to back up this statement.

Notes.—According to Small (1933) this species is "conspicuous on account of the very large toothed staminal cup."

REGISTRATION OF NEW AMARYLLID CLONES

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

This information is published to avoid duplication of names, and to provide a space for recording brief descriptions of new Amaryllid clones. Names should be as short as possible—one word is sufficient. It is sug-

gested that in no case should more than two words be used. *The descriptions must be prepared in the form as shown in the entries below, and must be typewritten and double-spaced.* The descriptive terms used should be in harmony with those given in the "Descriptive Catalog of Hemerocallis Clones, 1893-1948" by Norton, Stuntz and Ballard.

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

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

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

The AMERICAN PLANT LIFE SOCIETY numbers the clones known to be published, including those registered and not registered, in various publication media. It is thus an easy matter to report the approximate number of named clones as of any date. Such a report will be made as of July 1 in each year. On July 1, 1952, a total of 3996 hybrid *Hemerocallis* clones had been named.

HYBRID HEMEROCALLIS CLONES

Introduced by Stanley E. Saxton, Saratoga Springs, N. Y.

Far Hills. Robust plant with 45″ stems, well branched with up to 4 open flowers at once. Flowers medium large, full, recurved petsegs of Beetroot Purple (RHS) shading out to a border of Lilac Purple (RHS).

Throat is Javel Green in stunning contrast. The 'bluest' purple we have had. M. to ML. Dormant.

Harvest Sunshine. [Fig. 10] A large, broad petaled, late blooming self of sparkling sunshine yellow (light canary). Flowers open wide, somewhat reflexed, ruffled on petal edges and fragrant. Good branching near top of 36″ stem. Dormant. Medium late to late. Sdlg No. 50-93.

Satin Gown. Star shaped flower of clear, clean rose-pink. A self with no eyezone. Well open, petals somewhat ruffled. 32″, late midseason, dormant. Sdlg No. 50-87.

Introduced by Dr. J. B. S. Norton, Hyattsville, Maryland.

Arabian Sheik. A wide-petaled red, light scarlet, 25″ high, late midseason, day blooming, evergreen, flower 4—5 inches wide, full.

Vieux Carre. Latest of all, blooming Sept. 10 to Nov. 1. Long known and widely distributed in Louisiana, etc., but without name. A *H. fulva* clone, spreading by rhizomes; no seed set so far. Scape 24″ high, narrow segs, coral blush.

AMARYLLID GENERA AND SPECIES

Harold N. Moldenke

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

Pancratium mirennae G. E. Mattei, in Malpighia *31:* 148—149. 1928. Bulb very large, subglobose, tunicated, the tunics pale brown; leaves about 8, appearing after the flowers, either dry from the central bulb during anthesis or some others developing from the smaller lateral bulb, intensely glaucescent, narrowly linear, 7 mm. wide, almost flat, not at all contorted, not ciliolate, rather acute, mucronulate, much shorter than the scape; scape stout, lateral not central, leafless, compressed-terete (that is, obtusely 2-angled), about 12 inches tall; bracts of the spathe 2, free, lanceolate, broadly dilated below, long-acuminate above, scarious when withered, shorter than the flowers; bracteoles filiform, situated between the flowers; flowers umbellate, up to 7, large, showy, white, sweet-smelling, almost like those of *Funkia alba,* 16—17 cm. long; pedicels thick, to 10 mm. long; perogonium-tube stout, green on the outside, to 7 cm. long; segments of the perigonium very narrow, linear, not spatulate, the inner ones scarcely broader, acuminate-apiculate, erect-patulous, revolute along the margins on the outside, all merely pale

green-streaked on the back, grown together with the corona for a long distance and greatly surpassing the corona, 8—9 cm. long; corona large, ample, turbinate, the segments bifid between the stamens (that is, deeply 12-lobed), the lobes crisped-plicate, acute, denticulate toward the sinus, half as long as the stamens, to 5 cm. long; stamens decurrent into the corona; filaments long-surpassing the corona, incurved toward the throat, the free part 15 mm. long; anthers reniform, 6 mm. long; ovary oblong, obtusely trigonous, 15 mm. long; style longer than the stamens; stigma capitate-lobulate. The bulbs were collected on the island "Tine" Cycladum by Reverend Mirenna. Some species in this genus, confused under the name of *P. maritimum,* differ especially in the size of the leaves, the central or lateral scapes, the length of the floral-tube, etc. From Libiam around Machabez and Henné, I have specimens which seem to belong to *P. aegyptiacum* Roemer.

Buphane longepedicellata Pax, Bot. Jahrb. *10:* 4. 1889. Bulb; leaves erect-divergent, glaucous, very glabrous, margined, the margin crisped; scape stout, almost equaling the leaves; spathe withered-deciduous during anthesis; bracts of the single flowers short, withered, filiform; inflorescence umbelliform, spherical, many-flowered; flowers regular, long-pedicellate; pedicels thick; tube of the perigonium very short, the segments narrow, recurved, rose, banded at the middle; stamens equal, inserted at the base of the perianth segments; filaments rose, erect-divergent, filiform; anthers affixed at the middle of the back, oblong, thick; ovary globose-trilobed during anthesis, 3-celled; style almost equaling the filaments, filiform; stigma shortly 3-lobed; ovules 2 or 3 per cell; capsule turbinate-trilobed, the cells 1- or 2-seeded. Leaves 1—1.5 cm. wide; scape almost 1.5 cm. thick, 12 cm. tall; inflorescence 20 cm or more in diameter; pedicels 10 cm. long in anthesis, 3 mm. thick; segments of the perigonium 4 cm. long, 3 mm. wide; filaments 4 cm. long; ovary 5 mm. long, 6 mm. in diameter. In sandy places at Barkly West, Griqualand West, South Africa.

Nothoscordum subsessile Beauverd, in Bull. Herb. Boiss. ser. II. *VIII:* 997, fig. 1-E-H. 1908. Bulb globose, 8—9 mm. in diameter, tunicated; leaves 1.5—4 cm. long, very narrowly linear, rather obtuse, flat; scape 6—8 cm. long, 1-flowered, glabrous, longer than the leaves; valves of the spathe 8—10 mm. long, ovate-lanceolate; pedicel almost none, 1—2 mm. long, much shorter than the spathe-valves; tepals 14—15 mm. long, rounded-spatulate, more or less connate at the base, equal, golden-yellow, green-uninerved; filaments 4—5 mm. long, flat, linear, gradually narrowed above, unequal; ovary 3 mm. long, 2 mm. wide, elliptic, its cells 8-ovulate; style 5 mm. long, longer than the ovary, coming between the anthers of the longer and shorter stamens; anthers 2.5 mm. long; stigmas ternate-capitate. Perennial. In wet places on the summit of Mt. Arequita, dept. Minas, Uruguay, April 18, 1908, C. Osten 5195 bis.

Pancratium hirtum A. Chevalier, Mem. Soc. Bot. Fr. lv. Mem. *VIII:* 88. 1908. Bulb ovoid, subspherical, 2—2.5 cm. in diameter, with an alliaceous odor, the external tunics rather grayish; leaves 3—5, linear, soft, canaliculate, 25—30 cm. long, 4—6 mm. wide, not twisted, pale

green, narrowed in the lower third into a canaliculate petiole which bears a few horrible hairs beneath; flowers solitary; peduncle short, 3—5 cm. long, slender, the portion above ground usually hirsute; spathe membranous, simple or bifid, 5—8 cm. long, terminating in one or two long, scarious, subulate acuminations; perianth-tube slender, 15 cm. long, cupuliform above, the segments lanceolate, ascending, 3—4 cm. long; corona of the stamens bicuspidate between each two stamens; anthers linear, yellow, 5 mm. long; fruit ovoid-triquetrous, 2 cm. long, crowned with the persistent base of the perianth-tube. Upper Chari—Eastern Chari: Kouti and the Ndouka country; at the foot of Kaga Batoro, on shaded ferruginous rocks, May 2—12, 1903, A. Chevalier 8381.

Nothoscordum felipponei Beauverd, in Bull. Soc. Bat. Genev. ser II. *13:* 267. 1921. Bulb ovate-elongate, about 2 cm. long and 1 cm. wide, with a white tunic and many scapes, with a neck elevated about 1 cm.; leaves completely glabrous, unequal, 3—8 cm. long, 1—2.5 mm. wide, recurved or patulous, white-scarious at the margin, dilated at the base, the limb narrowly lanceolate; scape glabrous, erect, exserted 1.5—3 cm. from the neck, reflexed after anthesis; valves of the spathe about 1.2 cm. long, white-scarious, 1-nerved in the middle, striate with 2—4 undivided nerves at the margin, the base of each one united into a short tube about 3 mm. long, bifid at the apex, the outermost one broader, the inner one narrower and with somewhat rolled back margins; flower shortly pedicellate, pedicel about 6 mm. long, erect, golden-yellow, tepals longitudinally one-nerved at the middle, the 3 outer tepals broader and longer than the 3 inner ones, about 1.9 cm. long and 7.5 mm. wide, attenuate at the base, obtuse and scarcely mucronulate at the apex; filaments yellow, inserted at the base of the tepals, about 6.5 mm. long, dilated at the base, subulate at the apex; anthers golden-yellow, about 2.25 mm. long; ovary obconic, about 3 mm. long; style exserted, about 4 mm. long; stigma capitate, obscurely trilobed; mature seeds unknown to me.—"*Triteleia sellowiana* Kunth?" according to Osten 3620 in Herb. Boissier: "perianth yellow, tepals shiny, separately dark purple-banded or -painted, connate at the base; leaves canaliculate, not carinate on the back".—In rocky places, Cerro, dept. Montevideo, Uruguay, July 31, 1898, collected by Cornelius Osten, not *Nothoscordum sellowianum* Kunth, Enum. Plant. 4: 457 et seq. (1843) !—"Cuchilla de Pereira, Montevideo", in the month of June, 1920, where it was collected by the distinguished Dr. F. Felippone (his number 3493), to whom this remarkable *Nothoscordum* is dedicated.

Nothoscordum ostensii Beauverd, in Bull. Herb. Boiss. ser. II. *8:* 996, fig. 1-J-M. 1908. Bulb subconic, 10—12 mm. in diameter, brown-tunicated; leaves 8—12 cm. long, very narrowly linear, rather thick, canaliculate, flexuous; scape 4—8 cm. long, 1-flowered, glabrous, subequaling or surpassed by the leaves; valves of the spathe 9—12 mm. long, ovate-lanceolate, acuminate; pedicel 6—10 mm. long, shorter than or subequaling the spathe-valves; tepals 10—14 mm. long, oblong-spatulate, obtuse or rather acute, almost free at the base, equal, golden-yellow, brown-uninerved; filaments 6—7 mm. long, flat, lanceolate-subulate; ovary subclavate, 3 mm. long during anthesis, the cells 8—12-ovulate;

style 6—7 mm. long, twice as long as the ovary; anthers 1.75—2 mm. long, shorter than the style; stigma capitate. Perennial. On stony hills, Molles, Est. Lawlor, dept. Payandú, Uruguay, August 29, 1898, C. Osten 3611.

Nothoscordum cancescens Beauverd, in Bull. Herb. Boiss. ser. II. *8:* 998, Fig. 1-A-D. 1908. Bulb globose, 9—10 mm. in diameter, brown-tunicated; leaves 6—10 cm. long, very narrowly linear, rigid, rather obtuse, flat; scape 6 cm. long, 1-flowered, hirtellous, shorter than the leaves; valves of the spathe 10—12 mm. long, elliptic-acuminate; pedicel almost absent, 1 mm. long, greatly surpassed by the spathe-valves; tepals 11—12 mm. long, elliptic, rather acute at the apex, lightly recurved, almost free at the base, golden-yellow, green-uninerved; filaments 7—8 mm. long, subulate, dilated-flat below, the alternate ones longer; ovary 3 mm. long, obovate, the cells 8-ovulate; style 4 mm. long, slightly longer than the ovary, with its apex coming to below the anthers; anthers 4 mm. long; stigmas capitate. Perennial. Smelling greatly of *Allium!* In wet places on the summit of Mt. Arequita, dept. Minas, Uruguay, April 18, 1908, C. Osten 5195.

Nerine gaberonensis C. E. B. Bremekamp & A. A. Obermyer, Ann. Transvaal Mus. *16:* 409. 1935. Bulb globose, 1.5—2 cm. in diameter, protracted into a long, spongy, cylindric neck 2.5—3 cm. long; leaves protruding 0.2—10 cm. from the neck, filiform, 1 mm. wide, glabrous; peduncle about 15 cm. long, terete, glabrous; inflorescence in the form of a centripetal umbel; flowers 14 or 15; valves spathaceous, triangular, acute, 1.5 cm. long, 3 mm. wide; pedicel terete, glabrous, 1-5—2.5 cm. long; perianth wine-red, 2 cm. long, the tube 3 mm. long, the segments linear or linear-oblanceolate, 3-nerved, undulate, obtuse, 1.7 cm. long, 2 mm. wide; filaments inserted in the throat of the tube, shortly connate at the base, in 2 series, the longer 17 mm. long, the shorter 14 mm. long; anthers 3 mm. long, oblong, emarginate at apex and base, dorsifixed; ovary 2 mm. in diameter, globose, glabrous, the cells containing a single ovule; style 2.2 cm. long, filiform; stigma obscurely tricuspidate; capsule deeply 3-lobed, membranous. Bechuanaland.

Gethyllis herrei L. Bolus, Jour. Bot. *71:* 122. 1933. Bulb 4.5 cm. long, 3.5 cm. in diameter; basal sheaths 2, marked with deep purple spots and lines, widened above into a hollow with involute margins; leaves 20—30, distantly spirally twisted, narrowly linear, glabrous, exserted to 8 cm. above the upper sheath, 2—3 mm. wide; perianth-tube of withered flower persistent on the fruit and 7 cm. long, in a normal flower 4 mm. in diameter; segments obtuse and apiculate or abruptly acute, white, 3 cm. long, the outer ones 1.2 cm. wide, the inner ones 1 cm. wide; stamens numerous; filaments very short; dried anthers to 1.6 cm. long; style exserted to 7 mm.; stigma small; fruit clavate, yellow, with two blood-red bands, 8 cm. long when dry, 2.1 cm. wide when flattened out, with a disagreeable odor. Namaqualand.

Hessea karooica Barker, Jour. S. Afr. Bot. 1: 32, pl. 1, fig. A. 1935. Bulb oblong-globose, 2 cm. in diameter, 2.5 cm. long, protracted into a neck 2.4 cm. long; leaves 2, appearing after the flowers, obovate, obtuse,

attenuate at the base into a short petiole, minutely scabrous along the margins; peduncle flexuous, reddish at the base, 9—10 cm. long; umbel 6—13-flowered; flowers white and rosy, 1.1 cm. in diameter; spathe 2-foliate, the valves lanceolate, acuminate, papery, purplish, to 2.5 cm. long; pedicels ascending, finally spreading, 4.2 cm. long; perigonium deeply 6-parted, the segments obovate, subacute, attenunate at the base, very wide-spreading, white on the inner surface and rosy-lined, abundantly rosy-lined on the outer surface; filaments subulate, broad at the base, subequal, erect, shorter than the segments; anthers small; style white, expanded at the base, subulate above; ovary purplish, 1.5 mm. in diameter. Cape Province.

Hessa unguiculata Barker, Jour. S. Afr. Bot. *1:* 33, pl. 1, fig. B. 1935. Bulb 3 cm. in diameter, protracted into an elongated neck, to 5 cm. long; leaves 2 or 3, erect, bright green, shiny or glaucescent, obtuse or acute, to 10 cm. long, to 3 cm. wide, mostly broader at the middle, somewhat narrowed at both ends, sometimes broader at the apex, with undulate margins, minutely cliate, convex above, the upper surface, base, and apex minutely ciliate, one leaf straddling the other; peduncle flexuous, 30 cm. long, 3 mm. in diameter; umbel to 17-flowered; flowers white; spathe 2-foliate, the valves oblong-lanceolate, purplish, 2.5—3 cm. long; pedicles ascending, 3.5—6.5 cm. long; perigonium deeply 6-parted, the outer segments acute, the inner ones obtuse, very wide spreading, white on the inner face, red-lined on the outer face, 10 mm. long, 5 mm. wide, all unguiculate at the base; filaments subulate, equal, shorter than the segments, 8 mm. long; style white, expanded at the base, subulate above; ovary 1.5 mm. in diameter. Cape Province.

Gethyllis lata L. Bolus, S. Afr. Gard. *22:* 83, 88. 1932. Only withered leaves seen, linear, 5 mm. wide; perianth-tube 2.3 cm. long above the surface of the ground, the segments 2.2 cm. long, the outer ones to 1.8 cm. wide, obovate-orbicular, white, suffused with rose, with a small apical gland, the inner ones to 1.5 cm. wide, broadly elliptic; stamens 6; filaments exserted 6 mm., slender; anthers about 4 mm. long, not spirally twisted; style exserted 1.1 cm., eccentric, spreading-erect; stigma concave at the middle, 1.5 mm. in diameter. Nieuwoudtville, in the region of Calvinia, Buhr (S. U. G. 727a), in flower November 23, 1931.

Nerine schlechter Baker, in Bull. Herb. Boiss. 2nd ser. *3:* 665. 1903. Bulb unknown; leaves unknown, but probably appearing after the flowers; scape 12 or more inches tall, slender; umbels 3—5-flowered, the valves of the spathe 2, lanceolate, scarious, 12—18 mm. long; pedicels 6—8 mm. long, densely pubescent; ovary depressed-globose, 4 mm. in diameter, densely pubescent; perianth white, 12—14 mm. long; tube above the ovary none; segments flat, equal, lanceolate, 4 mm. wide; stamens declinate, equaling the perianth; filaments filiform, without appendages; anthers small, oblong, brown. Among rocks on Mt. West, alt. 1800 m., Natal, southeastern Africa.

Gethyllis multifolia L. Bolus, Jour. Bot. *67:* 135. 1929. Bulb apparently 4.5 cm. in diameter when dried; basal sheath subtruncate, 4.5 cm. long; leaves 25—30 in a fascicle, narrowly linear (when fresh per-

haps subterete), distantly spirally twisted above, pubescent, 15 cm. long above the surface of the ground, 1 mm. wide, with sparse setae which are pale brown; perianth pale rose, glabrous, the tube exserted 2.5 cm. above the surface of the ground, the segments oblong-lanceolate, acute, slightly narrowed below, 3 cm. long, to 1 cm. wide; stamens 12, monantherous filaments 4 mm. long; anthers 7 mm. long; style strict, exserted 1.6 cm. beyond the perianth-tube, reaching to the middle of the anthers; stigma 1 mm. in diameter. Cape Province.

Gethyllis unilateralis L. Bolus, Jour. Bot. *67:* 135—136. 1929. Bulb not seen; leaves only seen in the withered state, in fascicles of 20, narrowly linear or subterete, slightly spirally twisted, inconspicuously ciliate, to 12 cm. long, 1 mm. wide; perianth rose or pale rose, the tube exserted to 11.5 cm. or more above the surface of the ground, 3 mm. in diameter, the segments acute or abruptly acute to 3.5 cm. (more often 2—3 cm.) long, 1—1.8 cm. wide; stamens 6, monantherous; filaments slender, 3—5 mm. long; anthers finally conspicuously circinate-revolute; style unilateral, considerably surpassing the filaments; stigma in age 1 mm. or more in diameter. Cape Province.

Gethyllis linearis L. Bolus, Jour. Bot. *67:* 136. 1929. Bulb about 1.5 cm. in diameter; leaves 8—10 in a fascicle, linear, flat, closely spirally twisted from a little above the base, glabrous, subglaucous, about 6 cm. long, 2—3.5 mm. wide; perianth rose, its tube 8 cm. long or longer, the segments oblong-obvate, rather abruptly acute, 3—5.5 cm. long, to 1.4 cm. wide; stamens 6, monantherous; filaments and anthers equally long, 4—5 mm. long; style unilateral, exserted 1.6 cm. beyond the perianth-tube; stigma finally 1.5 mm. in diameter. Cape Province.

Gethyllis grandiflora L. Bolus, Jour. Bot. *67:* 136. 1929. Bulb 5.5 cm. in diameter; tunics membranaceous, very thin, conspicuously transversely nerved, without color; leaves mostly withered during anthesis, but nevertheless apparently 45 in the one fascicle seen contemporaneously with the flower, almost all herbaceous, narrowly linear, glabrous, spirally twisted above, 14 cm. long above the surface of the ground, 2—3 mm. wide; perianth glabrous, white, more or less suffused with rose, the tube 6 mm. long, 4—5 mm. in diameter at the base, 9 mm. in diameter at the apex, shortly funnel-form, the segments acuminate, the inner ones always broader than the outer ones, ovate, to 3.5 cm. wide, 5—6.5 cm. long; stamens 6, 8—11-antherous, the anthers shortly stipitate or with a stipe to 5 mm. long, 1.2 cm. long, greatly surpassing the filaments; style strict, exserted about 8 mm. beyond the tube; stigma small. Little Namaqualand.

Gethyllis longituba L. Bolus, Jour. Bot. *67:* 136—137, 1929. Bulbs 2.5 cm. in diameter, 2 or 3 arising from a thickened stem 6 cm. in diameter; sheath purple-spotted above, to 4 cm. long, 1 cm. in diameter; leaves in fascicles up to 18, narrowly linear, spirally 1-twisted, glaucous-green, glabrous and polished, except for the ciliate margins (the cilia spreading or ascending, slightly rigid, white), 13 cm. long above the surface of the ground, 3—6 mm. wide; spathe 7.3 cm. long, sheathing for 3 mm.; peduncle 3 cm. long; perianth glabrous, the tube to 17 cm.

long, the apex 1 cm. in diameter, the segments linear-lanceolate, gradually attenuate above, pale on the inner face, deep rose on the outer face, to 5.5 cm. long, the inner ones to 1.2 cm. wide, the outer ones slightly narrower; stamens to 36, monantherous; filaments 2—3 mm. long; anthers finally conspicuously circinate-recurved, 1.3 cm. long; style strict, exserted 1 cm. beyond the tube; stigma small; fruit oblong-oval, 4 cm. long, 1.7 cm. in diameter; seeds obovate, to 5 mm. long. Cape Province.

Nothoscordum sellowianum Kunth, Enum. Pl. *4:* 460. 1843. Leaves narrowly linear, subequaling the scape; umbel 5- or 6-flowered; spathevalves ovate, acuminate; sepals oblong-lanceolate, rather obtuse, equal, connate at the base; filaments flat, subulate; ovary subcordate-globose, the cells 5-ovulate; style twice as long as the ovary or longer. Collected at Montevideo. A perennial plant; the bulb subglobose, tunicate, whitish; scape 8 to 9 inches long, leafy at the base; leaves narrowly linear, rather obtuse, glabrous, subequaling the scape, 2 mm. wide; umbel 5- or 6-flowered; pedicels 12 to 30 mm. long; spathe 2-valved, a third as long as the pedicels, hyaline-membranous, the valves ovate, acuminate, connate at the base; flowers the size of those of *N. striatum,* erect; sepals oblong-lanceolate, rather obtuse, 1-nerved, equal (?), connate at the base, whitish (?); filaments flat, similar, less than half as long as the sepals; ovary subobcordate-globose, the cells 5-ovulate; style about twice as long as the ovary; stigma subcapitellate, entire. Distinct from *N. striatellum* in the form of the ovary. Is it the same as *N. striatum* or *N. euosmum?*

Milla vitata Griseb., in Goett. Abh. *24:* 318. 1879. Bulb subglobose; scape a hand's breadth [15 cm.?] long, 1-flowered; pedicels not articulated at the apex, surpassing the bracts which are connate at the base; leaves flat, narrowly linear, rather erect, slightly exceeding the scape; perigonium 6-parted, the segments white. red-keeled, oblong, rather acute, four times as long as the funnel-form tube; stamens in two series. It is related to *M. sellowiana,* but is white-flowered and the perigonium is more deeply divided. Leaves 4 to 6, 10—15.3 cm. long, 1.6 mm. wide; scape, including sheath, ½ to 1 inch long; bracts lanceolate-linear 1—1.3 cm. long; pedicels 1.3—2.5 cm long; perigonium 1—1.3 cm. long (its tube almost 2.4 mm. long; cells of the ovary about 8-ovulate. Collected near Conception del Uruguay, everywhere in field after the first rains at the beginning of May.

Milla tweedieana Griseb., in Goett. Abh. *24:* 319. 1879. Differs from the preceding in having the leaves recurved and the scape dwarf 2.5—5 cm. long, sheathed up to the middle and producing a whorl of leaves at the middle; perigonium white, the tube obconic, almost twice as long as the funnel-form limb; stamens in two series, three longer than the others; anthers oblong, incumbent, entire at the apex; stigma capitate. penicillate-hairy; cells of the ovary 10-ovulate. Collected near Conception del Uruguay, in grassy places, blooming around the end of June. ("Buenos Aires").

Milla poeppigiana Baker, Jour. Linn. Soc. Bot. *11:* 383. 1871. Bulb not seen; leaves 6 to 8, synanthous, fleshy-herbaceous, almost flat, 20—

30 cm. long, 5 to 6 mm. wide; scapes 2 or 3, flaccid, almost equaling the leaves; spathe-valves 2 (rarely 3 or 4), lanceolate, 2.5 cm. long, connate at the base; umbels 4- to 8-flowered; pedicels scarcely articulated at the apex, 2.4—3 cm. long; perianth funnel-form, pale-lilac, 18 to 20 mm. long, the segments oblong-spatulate, very slightly longer than the funnel-form tube which is 4 mm. wide at the mouth; stamens in two series in the tube; filaments filiform, 4 mm. long, the upper ones reaching to the throat; ovary sessile; style filiform, 4 mm. long. Collected in Chile by C. Gay.

Milla bivalvis Baker, Jour. Linn. Soc. Bot. *11:* 286. 1871. Bulb ovoid, 12 to 18 mm. thick, membranous-tunicate; leaves 4 to 6, synanthous, fleshy-herbaceous, 6 to 9 inches long, 2 to 4 mm. wide; scape soft, subequaling the leaves; spathe-valves 2, linear-lanceolate, connate at the base, 12 to 18 mm. long; umbels 2- to 4-flowered; pedicels flaccid, 12 to 24 mm. long; perianth funnel-form, white or white-violet, 12 to 14 mm. long, the segments oblong-spatulate, distinctly brown-kneeled, 4 times as long as the bell-shaped tube; stamens in two series in the tube; filaments flattened downwards, 3 mm. long; ovary sessile; style filiform, 2 to 3 mm. long; seeds 5 or 6 in each cell. Collected in Chile by Beechey, by Bridges, Cuming 651, etc.

Zephyranthes minuta (HBK)M. Roem., Syn. Ensat. 121. 1847. Flowers pedunculate, solitary; spathe monophyllous, shorter (only half as long as the flowers), tubular, bifid, acuminate, equaling the campanulate limb of the perigonium; genitals erect; leaves very narrow, linear, flat, striate, somewhat shorter than the scape; spathe inflated at the base; bulb oval, of the size of a small cherry, furnished with small rootlets at the base. Leaves obtuse, glabrous; scape terete, glabrous, an inch long; spathe striate, very thinly membranous, whitish, half as long as the flower; flower an inch long, erect, white or rose-colored, the tube cylindric; ovary triquetrous; stigma trifid. Found in wet temperate places in Mexico between Real del Monte and Cerro Ventoso, alt. 8580 ft. Flowers in June.

Nothoscordum montevidense (montevidensis sphalm) Beauverd, Bull. Herb. Boiss. ser. II. *6:* 1011. 1906. Bulb globose, 10 to 12 mm. in diameter, cinereous; scapes 1 or 2, 2-flowered, 5 to 8 cm. tall, many-leaved at the base; leaves surpassing the scape, narrowly linear, mucronulate, flat, smooth, 0.5 to 0.75 mm. wide; pedicels filiform, 6 to 28 mm. long; spathe 2-valved, the valves hyaline-membranous, 7 to 11 mm. long, connate at the base; sepals yellow, 1-nerved, 8 to 10 mm. long, connate at the base; filaments flat, lanceolate-subulate, yellow, three-quarters the length of the sepals; anthers oblong-linear, tufted; ovary subglobose; style twice as long as the ovary; stigma obtuse.—It blooms in March. It grows in field at Montevideo *(Osten 3717).*

Milla andicola Baker, Jour. Linn. Soc. Bot. *11:* 381. 1871. Bulb 1 inch thick, brown-tunicate, the outermost membrane long-protracted around the base of the scape and leaves; leaves 5 or 6, fleshy-herbaceous, lasting quite long, surpassing the scapes, 1 mm. wide; scapes firm, 3

to 6 inches long; spathe-valves 2, opposite, lanceolate, connate at the base, 12 to 16 mm. long; umbels 6- to 10-flowered; pedicels 6 to 12 mm. long, the apex scarcely articulated; perianth 10 to 12 mm. long, pale-lilac, lanceolate-spatulate, erect-spreading, twice as long as the tube, whose mouth is 2 to 2½ mm. wide; stamens in one series from the throat of the tube, the filaments 4 mm. long, flattened downwards; ovary sessile, the cells 6- to 8-ovulate; style 4 mm. long. Found in the Peruvian and Bolivian Andes along the shores of Lake Titicaca, collected by Meyen and by Pentland.

Allium macrantherum O. Ktze., Rev. Gen. *3:* 312-313. 1898. Anthers linear-oblong, half the length of the filaments or longer; plant small, 10 cm. tall; leaves subfiliform; umbel 4- to 6-flowered; tepals 5 mm. long, white. Collected at Villa Florida, Paraguay.

Nothoscordum gaudichaudianum Kunth, Enum. Pl. *4:* 458. 1843. Leaves very narrowly linear, shorter than the scape; umbel 3- to 5-flowered; spathe-valves ovate-oblong, acuminate; sepals oblong, obtuse, connate at the base, subequal; filaments subulate, the alternate ones longer; ovary oblong, the cells 11-ovulate; style 1½ times the length of the ovary. Collected by Gaudichaud at Montevideo. A perennial plant with the bulb subglobose, tunicate, about the size of a small hazelnut, the tunics dry-membrabous, whitish; scapes 2 or 3 per bulb, 2 to 4½ inches tall, surpassing the leaves; leaves very narrowly linear, obtuse, glabrous, 0.5—0.7 mm. wide; umbel 3- to 5-flowered; pedicels 10 to 16 mm. long in flower, 20 mm. long in fruit; spathe 2-valved, hyaline-membranous, half as long as the pedicels, the valves ovate-oblong, acuminate, connate at the base; flower of the size of those of *N. striatellum,* whitish, the nerves dark-violet; sepals oblong, obtuse, 1-nerved, connate at the base, subequal; stamens inserted at the base of the sepals and shorter than they; filaments subulate, the alternate ones longer; anthers oblong, tufted, yellow, bilobed at the base; ovary sessile, oblong, 3-celled; ovules 11 in each cell, in 2 series; style 1½ times as long as the ovary; stigma depressed-rotund, entire; style small, broader; capsule subglobose, similar to that of *N. striatellum,* differing chiefly in the 11-ovulate ovary-cells. The general appearance is that of *Allium moschatum.*

Caloscordum exsertum Lindl., Bot. Reg. Lond. *33:* sub pl. 5. 1847. Leaves very narrow, flat, half as long as the scape; umbel few-flowered, contracted; pedicels hardly twice as long as the perianth; stamens exserted, shorter than the filiform style.

Milla violacea Baker, Jour. Bot. Lond. *12:* 5. 1874. Leaves 5 or 6, narrowly linear, glabrous, fleshy-herbaceous, 1 to 1½ feet long, 3 to 4 mm. wide; scape weak, subequaling the leaves; spathe-valves 2, lanceolate, 24 to 30 mm. long, connate downwards; umbels 4- to 6-flowered; pedicels 18 to 24 mm. long; perianth violet, funnelform, the segments oblong-lanceolate, 6 mm. wide, 3 or 4 times as long as the campanulate tube; stamens in 2 series in the tube; filaments linear, 6 mm. long; style

[Moldenke—AMARYLLID GENERA AND SPECIES, continued on page 28.]

THE LECTOTYPES OF **AMARYLLIS BELLADONNA** L., AND **AMARYLLIS ROSEA** LAMARCK

HAMILTON P. TRAUB

Traub & Moldenke (1949, pp. 33-53) have designated the lectotype of *Amaryllis belladonna* L. (1753), and they (Traub & Moldenke, 1949, pp. 26-33) have also laid the foundation for determining the lectotype of *Amaryllis rosea* Lamarck (1753). The purpose of the present paper is to bring the typification of these two species up-to-date on the basis of the International Code (Lanjouw et al, 1952).

I. The lectotype of *Amaryllis belladonna* L. (1753)

According to Art. 21 (Note 2) of the International Code, in the case of a species without a type specimen, the type may be a description or figure to which the name is permanently attached. Linnaeus (1753) did not indicate a type specimen (holotype) for the name, *Amaryllis belladonna* L., and Traub & Moldenke (1949) therefore designated the illustration by Herman (1698, plate 194, "Lilium belladonna") as the type illustration (lectotype). This happens to be the very first illustration of this species, cited through Hortus Cliffortianus, 1737, page 35, by Linnaeus under *Amaryllis belladonna* L. (1753). It would have been equally valid if the choice had been made from other material considered by Linnaeus (1753) when he proposed the species. This material includes the illustrations by Merian (1705, plate 22) and Seba (1734, plate 17, fig. 1); and the detailed descriptions of the species by Herman (1698, p. 194) and Sloane (1707, 1: p. 244). However, the illustration by Hermann (1698, plate 194, "Lilium belladonna") is the first one published of this species, accompanies the first detailed description of this species, and is the first one associated with the species epithet, "*belladonna,*" and is thus without question the most appropriate choice, and this selection is confirmed in the present paper.

II. The lectotype of *Amaryllis rosea* Lamarck (1783)

Lamarck (1783) gave the first validly published name to the Cape Belladonna, *Amaryllis rosea* Lamarck. As pointed out by Traub & Moldenke (1949), Lamarck realized that this species had been omitted from Species Plantarum, 1753, and he proposed this species on the basis of an adequate description that leaves no doubt as to its identity. He also cited references to the Cape Belladonna in the pre-Linnean literature. In Lamarck's day the habitat of this species was not generally known. Although Hermann (1687) had correctly indicated its habitat, Lamarck in common with some other workers erroneously indicated it as "middle America on the Antilles and at Cayenne." Since the description is adequate, and the literature citations are correct, the error about

the habitat is of no consequence. On the species level therefore the epithet, *"rosea"* must be maintained for the Cape Belladonna irrespective of the genus to which it may be later referred unless the name is already occupied in such a genus.

Lamarck (1783) does not cite an herbarium specimen as the type (holotype), and actually says that he has seen a living specimen which apparently means that he did not have an herbarium specimen at the time. In contrast, he says under the following entry in the text that he has seen a dried specimen of this other species. In the absence of a holotype, it is in order to select a substitute type (lectotype) for the name, *Amaryllis rosea* Lamarck (1783) from the material actually studied by Lamarck (1783) at the time that the species was proposed. He refers to Ferrari (1633, p. 117, plate 121) through Morison (1680, p. 367, fig. 32) and Tournefort (1700, p. 385), and to Barrelier (1714, p. 70, plate 1040). Lamarck (1783) also cited Miller (1760, "Dict. ic. t. 24") which refers to the actual number on the plate as published. However, a mistake was made by the printer, and the plate should actually have been numbered "23." This excellent plate (Miller, 1760, plate 23, err. no. 24) is designated as the lectotype of *Amaryllis rosea* Lamarck (1783).

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3. GENETICS AND BREEDING

THIRTY YEARS WITH DAFFODILS

EDWIN C. POWELL, *Maryland*

My first introduction to daffodils was in 1921 when we moved from Massachusetts to Maryland. There was growing on the place that we rented a half dozen varieties including EMPEROR, EMPRESS, BARRII CONSPICUUS, VON SION, and two small Leedsiis. In 1925, just before the quarantine on *Narcissus* and other plants was made effective by the Federal Horticultural Board, I imported from Holland 5 or 10 bulbs each of 47 popular varieties including 8 species. The only ones remaining here are EMPRESS, MAXIMUS, SIR WATKIN, WILL SCARLET, BEATRICE, ELVIRA, BARRII CONSPICUUS, *N. bulbocodium conspicuus, N. cyclamineus major, N. triandrus albus, N. jonquilla,* and *N. odorus rugulosus,* all of which have been growing in the grass for many years. The others have been superseded by better varieties and few, if any, are now grown commercially.

The late Dr. David Griffiths suggested that I do some crossing and produce varieties better adapted to American conditions than many of those then grown. I got some experience in hybridizing in 1926 but no daffodils that were better than their parents. From KING EDWARD x BERNARDINO in 1927 and from ALBATROSS x MRS. ROBERT SYDENHAM I obtained two very good flowers with some red or pink in the crowns.

I imported each year under special permit for breeding a half dozen or more of the best new varieties that I could afford to buy. This new blood began to tell and, as I made many crosses each year, I obtained a few very good things. Until I quit hybridizing in 1947 I had made several thousand crosses, produced more than 60,000 seedlings of which 60 were named and introduced.

The most valuable parent by a long ways was FORTUNE and some of its progeny but it never produced anything worth while as a seed parent although other breeders have obtained some fine things from it; as a pollen parent it was unsurpassed. Bred to BERNARDINO it gave me FORBER, POCAHONTAS, NANSEMOND, and several other good ones that were not named. BOKHARA, a son of FORTUNE, on BERNARDINO produced BASHBISH, and on SUNSTAR, CATSKILL, possibly the most stunning bicolor medium trumpet that I have produced. Other outstanding progeny of FORTUNE were the bicolors ANOKA from SERAGLIO, IROQUOIS from PROSPERITY, KATHADIN and ONTARIO from ROBIN HOOD, and the big white trumpet NASHUA from KENBANE. NEVIS x NAXOS produced the early

white trumpet AGAWAM and NEVIS x GODOLPHIN the reversed bicolor trumpet ITASCA.

At one time I used *N. jonquilla* and *N. triandrus albus,* as pollen parents and from the latter obtained many attractive hybrids that were useful for decorative purposes. Unlike the experience of many English breeders they proved to be hardy and long lived. From BEACON x. *N. triandrus calathinus* I obtained HAVILAH, a tall white flower with many on a stem and very prolific. TREVISKY x JONQUILLA gave a red-eyed hybrid of good form and substance.

It is difficult to name favorites in a big family of fine children but a few unusual crosses have given progeny in which I take much pride. One is CHICOPEE, a first-early from *N. obvallaris* x. *N. cyclamineus,* a small flower but unlike anything that I have seen. Another is HIAWASSEE, a hardy tazetta from CASSANDRA x PAPER WHITE. About the latest to bloom in its class is NAKOTA from PHYLLIDA x GAZA, a fine large white medium trumpet. The older varieties PILGRIMAGE and WHITE EMPEROR as seed or pollen parents produced some progeny of very good form, clear color, and excellent substance.

When I began to use my seedlings as one or both parents the pedigrees became too lengthy and involved to record here but I obtained some of the finest things that I have produced. I made my last crosses in 1947 and am looking forward to see what many of the flowers will be when they bloom next spring. Some should be pretty good if good parents are responsible for good children, a proposition that has been borne out about 100 percent in my experience.

NARCISSUS BREEDING REPORT

W. R. BALLARD, *Maryland*

During the 1952 blooming season in my garden there were probably in the neighborhood of 800 seedlings in bloom. In general the best of these flowered in the early part of the period. It has been noted that in the last two years most of the more promising seedlings were past their prime at the time of the National Capital Narcissus Shows. However, in the spring of 1951 two seedlings entered in the Show scored 82 and 85 respectively. These were ALCIDA x MRS. BACKHOUSE and a BICOLOR x BEERSHEBA crosses.

One of the difficulties so far experienced is to find time to evaluate the seedlings, to make selections of the best and to describe them accurately. The task of making new crosses and keeping records is demanding. It would be easier if attention could be devoted exclusively

to the narcissus project, but always there is the pressure of other garden work to interfere.

When the next blooming period arrives it is planned to remove the more promising seedlings and to plant them together in a bed where they can more readily be compared. There will still remain the problem of deciding how to dispose of those left behind. Many, of course, are worthless and they will be destroyed. However, a considerable proportion have merit and, while not good enough to name and introduce, could furnish good cutting material or be used in landscape plantings. Some of them could possibly be turned over to public institutions such as parks.

Until a more careful study can be made of the seedlings it is not possible to report in much detail the results to date. Most of the more exciting forms have been bicolors or whites of various sorts. There are both short cups and long trumpet forms. Seedlings of John Evelyn seem to give a fairly high percentage of fringed cups. So far no pink seedlings have appeared but this is not surprising since most of the direct pink crosses are yet to bloom. One interesting seedling, a WHITELEY GEM x ROXANE cross has a broad symmetrical white perianth with a wide, rather flat, cup of buff. A few good yellow trumpets with excellent finish have appeared from Jonquil crosses.

Many of the seedlings have shown sufficiently good qualities to warrant their use in other crosses and several have been combined with named varieties as well as with each other. In addition to these selected seedlings a number of new named varieties have been added to my collection and these will be used in future crosses. Breeding of this sort is a continuing process and the accumulated stock becomes of increasing value with the passing of the years. With so many types to work with the possibilities seem endless. For this reason one worker can have only a very small part in the development of the narcissus of the future.

BREEDING NARCISSUS FOR VARIOUS CLIMATIC REGIONS

J. S. COOLEY, *Maryland*

The wild species of *Narcissus* occur in relatively restricted regions in Europe, Asia and Africa. The horticultural varieties of *Narcissus* however, are grown in many places over the world. This involves a wide range of climate and soil. Many of the varieties now available may be very satisfactory when grown under optimum conditions, but when grown in conditions that prevail in certain places may be very unsatisfactory.

A very encouraging thing for the daffodil fancier who may be located in some region where sub-optimal conditions prevail is the fact that *Narcissus* breeders are now located in many places over the world. These breeders are therefore breeding and selecting the progeny where diverse climatic conditions prevail.

Each of these breeders is selecting seedlings that show promise when growing in his particular locality with its climatic peculiarities. However, seedlings that might be meritorious in some other environment are discarded. Furthermore each breeder has his own particular objective in choosing his parents and in selecting the progeny. The ultimate outcome of all these divergent efforts will undoubtedly greatly enlarge the scope of this flower and also enhance its utility and appreciation.

The breeding of *Narcissus* has its tedious time consuming and laborious aspects as well as the long waits for results. It has also its thrills in watching a bed of seedling bloom for the first time—always with the hope and expectation that may be this bed will produce a highly superior flower.

Considering how satisfactory *Narcissus* are as garden plants and also as cut flowers, it seems strange that it is not more extensively used and appreciated by gardeners. No doubt the patient efforts of the many breeders located at various places over the world will help to increase the use and enhance the appreciation of this beautiful spring and autumn flower.

ADVENTURES IN BREEDING HEMEROCALLIS

Stanley E. Saxton, *New York*

The writings of most hemerocallis breeders show a fairly consistent developmental pattern. The breeder, after deciding upon certain objectives which he deems desirable, selects parent clones which exhibit the characteristics wanted to some degree, and crosses them. From the progeny he selects individuals that show advance in the desired characteristics and continues selective breeding between the offspring, or crosses them back on the parent stock to accentuate certain traits. This inter-breeding of the line continues until either (a) the desired plant is achieved, or (b) the line 'runs out'. Experience shows that continuous stress on a few features tends to weaken the strain, and sometimes it is not possible to continue such line breeding to success.

Whether it be with plants, animals or humans there seems to be a 'high point' in line breeding. How many times has history shown that genius of a certain type rarely begets similar genius in its offspring. J. S. Bach came from a long line of musicians and several of his children followed music as a profession; but none, either before or after Johann Sebastian, attained his high degree of musical skill. One could mention dozens of similar situations in the world of growing things.

It seems to me that too many daylily breeders have failed to realize this weakness in line breeding, and have continued with their favorites long after the best had been passed. Too many times have I visited seedling plots which seem ever to repeat those favorite characteristics in

Fig. 10. Hybrid Daylily—*Harvest Sunshine* (Saxton). A large light yellow self which blooms late—August in New York. It is well-branched, fragrant, with wide ruffled tepalsegs; about 3 ft. tall. Deciduous.

which a breeder has specialized for many years. What is the answer for him who would avoid this pitfall?

Luckily for the new daylily breeder, the 'high points' of other breeders' efforts are still available; and if the newcomer is observant he will know which of his own developments represent peaks in his own breeding program. He can, it seems to me, improve the quality of his seedlings, introduce new possibilities, and extend the best of his own

developments by judicious use of the best of his own in combination with the best of others.

It is not enough, however, to select a good clone from each of several breeders and hope to accomplish much by combining them. Possibly a hundred amateurs are doing the same thing. It is first essential to develop something special by selective breeding which is not available to anyone but yourself. Then combine this with the best from other sources. This has been my program and I think it is beginning to show results.

My first effort was to produce clearer colors by breeding out the ever present yellow base color in the hemerocallis. It is this yellow background which turns our reds into orange, our pinks into salmon and our purples into garnet or brown. In my first cross, many years ago, I used the lightest Betscher variety obtainable, and crossed it on a Stout variety with a very light yellow background. Luckily for me the Stout flower had some rose pigment in its makeup and this has proven dominant so that as the strain has developed I have obtained pinks with purer and purer color as the yellow was bred lighter. Once in a while, perhaps in 5% of the progeny, the rose is lacking and a clear light yellow or cream flower emerges. EVALINA was one of three such individuals in the last group of about a hundred seedlings out of this line. It is almost white excepting for the delicate red halo at the throat which I believe comes from ROSALIND introduced into this program a few generations back. All the rest were shades of pink, rose or rose-red with some bicolors, but all much clearer than previous progenies.

SATIN GOWN is the best of the clear selfs without eyezone; FIRST PROM is the cleanest pink and yellow bicolor; PINKIE the most dwarf; and EVALINA seems the best very light ivory self.

There has been no attempt to interbreed these further as it is doubtful if the gains would be worth the effort. From now on these pinks will be bred with the best pinks from other sources. This has already been done to some extent with such clones as MAID MARIAN, MARTHA WASHINGTON, PINK DREAM, PINK ANGEL and others. Improvement in some features has already appeared. The best of the 1952 pinks was a seedling involving MAID MARIAN. It is a lighter shade than MAID MARIAN and more pink but with good size and wide ruffled petals. According to the RHS color chart the predominant shade is "Shell Pink" No. 516. This clone has been named TAFFETA: [Medium size, compact, wide petaled flower with recurved segments. The petals are very broad at the center and somewhat pinched at the ends. Color is Shell Pink (RHS-516). Stems 38", Dormant. Midseason.]

Another line which has been followed leads toward wide, rounded, amaryllis like petals. MEDALLION and KARISTA show this development. Mr. Ralph Wheeler has produced many flowers with full petaled compact form, notably CELLINI. My best red seedling in 1952 was a cross from this line into the almost glaring red flower TYROL from Mr. Wheeler. I consider this new red as good as GARNET ROBE although it is a satiny finish rather than velvety like GARNET ROBE. It has been named

TANAGER: [Large full flower of bright glaring red. A self of satiny finish. 36″ stems, Midseason. Dormant. (TYROL X KARISTA)]. RED PERFECTION and GARNET ROBE will be introduced into this program rather than flowers like SCARLET SUNSET as I am trying to steer away from narrow petals.

Plants seem to take delight in upsetting the breeder's theories, but now and then he gets a pleasant surprise. About five years ago I was spending much time in study of color charts and color systems. It occurred to me then that a combination involving greenish-yellow and magenta should have a better chance of producing blue than the selection of continually deeper reds. At the time my best chartreuse seedling was No. 46-75 (since named MARCY). I also had a group of magenta toned flowers, the best being No. 46-69. I decided to try out my color theory and bred these two. Every seedling from this cross was decidedly purple in tone and a few had a definitely 'blue' tinge to the color. The best one was tall, well branched with up to four flowers open on a stem at once, predominantly "Beetroot Purple" (RHS) shading out to a lighter border of "Lilac Purple" (RHS). This seedling has been named FAR HILLS. The red in this flower tends to fade so that by evening the effect is often almost blue-gray. The next step seems to be to purify the color by combination with the light background pink line. Luckily 1952 produced several seedlings in this line with either a lavender flush at the throat or a lavender dusting. These will be bred with FAR HILLS in an effort to produce a clearer blue.

So here seems progress toward both white and blue, and who can say where the future leads?

DAYLILY BREEDING PROJECT

W. R. BALLARD, *Maryland*

Unfortunate circumstances have delayed results in the breeding of good late blooming daylilies. After selecting 200 or more seedlings from a lot of some 15,000, the person from whom the land was rented decided to sell the property. This necessitated removing the selected plants and a block of young seedlings to a more restricted area. The extra work required for this operation and the lack of space has made it impossible to transplant later seedlings so that they could develop into blooming plants. As a result seedlings from two years' crossings are still in the nursery rows, and seeds of the 1952 crosses have been planted and will be ready for transplanting next year. Fortunately additional ground has recently been secured so that it will be possible to transplant the accumulated seedlings next spring and thus speed up their blooming.

There is one block of about 500 seedlings which have been transplanted and these should be sufficiently advanced to bloom next year. These are mostly of *H. multiflora* extraction.

The season of 1952 was spent largely in evaluating selections previously made and in crossing the more desirable types. Combinations were made with a number of named varieties with larger flowers and a greater range of color. Crosses were also made between the better seedlings. This involved considerable time and effort in labeling crosses, keeping records and collecting seeds. Planting of the seeds was made in the fall in nursery rows. Fall planting has always given a higher percentage of germination than any other method tried.

One small block of seedlings which came into bloom during the past season produced a few desirable forms. About 30 were selected for their potential breeding value. Particularly noticeable were a number with wide branching habit of growth.

The results to date in this project relate more especially to the accumulation of promising seedlings as a basis for further breeding developments rather than to the production of outstanding seedlings. However, some of the late bloomers could be considered worthwhile additions to the available sorts in this field. There are a number of seedlings in the collection which bloom in August and September. The range of color is developing and the size of the flowers is slowly increasing. This material together with the fine named varieties available in the mid-season group would seem to provide the makings of distinct advances in the development of the late flowering daylilies.

Time, of course, is the element most needed in the accomplishment of this end. This is one of the reasons for the anxiety to get the accumulated seedlings into bloom. Progress in the future is necessarily dependent upon what has gone before. Results so far would seem to indicate that persistent effort can be expected to yield dividends in the course of time.

SEED-BEARING LYCORIS RADIATA*

"Regarding the seed-bearing *Lycoris radiata:* the Georgia lady from whom the stock came back in 1950 answered my inquiry. She says that hers bloom early in August (that is about a month earlier than the regular *L. radiata*—sterile form—usually blooms here), and that hers always bear numerous seeds. 'I have many volunteer seedlings to grow'.

*Excerpt from a letter by Mr. S. Y. Caldwell (Tennessee) to Mr. Wyndham Hayward (Florida).

she added. Also she says that hers are just like those grown by her neighbors and the form has been growing in her locality for "as long as I know". But she also speaks of a later blooming form which some people have, but she does not. Apparently it is the sterile form that most of us have been growing for years. Evidently the seed-bearing *Lycoris radiata* were never so scarce as we thought. I am surely glad to have some of them now. My tentative conclusions are that they are somewhat hardier and more certain to bloom here in Tennessee than the sterile *L. radiata* I have. The flowers are a little smaller, on slightly shorter scapes, but they are earlier and a brighter red. I am wondering if the bulbs of *L. radiata* now being brought out of Japan will be like one or the other of the two forms I now have. Have any of your Japanese *L. radiata* ever made seeds?"—*S. Y. Caldwell.*

EDITORIAL NOTE.—A *Lycoris* sp. collected at Kwanshien, China, by Miss Josephine Henry while on military duty in China during the last war, and sent to the writer by Mrs. Mary G. Henry in 1949, turned out to be a form of *Lycoris radiata.* It bloomed under greenhouse culture in 1951 and 1952. The flowers were smaller than the usual sterile form, but no seed set was obtained under greenhouse culture. It may be that seeds will be produced under out-door culture.—*Hamilton B. Traub.*

VARIATIONS IN CALOSTEMMA

D. J. W. CHANDLER, *Tecoma, Victoria, Australia*

A little known gem of the *Amaryllidaceae* native to Australia, is the *Calostemma.* A pretty, easily grown bulb, it seeds freely and, when growing wild, shows wide variety in color and size of flowers. This characteristic shows the possibilities open to an enthusiast to hybridise the three (?) known species and to produce a greatly improved type.

A few miles from Adelaide, capital city of South Australia, *Calostemma purpureum* is found growing freely, but in an inferior type. The color is a dingy purple, the stems are short, and the general appearance is unattractive. Further north, a superior form of *C. purpureum* is found growing wild. My first introduction to this bulb in its wild state was to see thousands of what appeared to be pink nerines growing on a gravelly rise. Closer inspection proved them to be a pretty purple, and a spectacular sight they were, growing in masses in the short grasses of the sheep-grazing areas of the outback country. On another occasion I found masses of *C. purpureum* well established in deep rich loam, and in this case the stems were longer, the flowers were larger, with more substance and with more flowers on the stem. The different type of soil would account for the improved growth.

The most important feature noticeable was the color. Some were deep purple, some were light purple, others pink, and there were even white flowers amongst them. This variation makes me feel there are great possibilities ahead for selection and hybridisation. In the gravelly location, the bulbs were only 3″ to 4″ below the surface, whereas in the rich loam they were 12″ to 15″ down.

Like the nerines, *C. purpureum* flowers in the Fall before the leaves appear. The climate in South Australia, where both lots were found, consists of a very dry summer with a mild winter without snow and with very little frost.

The thousands of seeds that fall after flowering grow readily in the Spring. A bunch of flowers picked in March-April (Fall) and put in water set seeds, and the seeds each produced a small root a month later while still on the stem. These were planted, and although it is only early winter now, they are just coming through the ground. The early sprouting was doubtless brought about by the fact that during their period in water they were kept in a warm room.

A point of interest is the fact that nerines in Australia can be treated with success in this same way. The nerine flowers are picked, hybridised, and the seeds set whilst they are in water. The seeds are not planted until they show their small root.

Although three species of *Calostemma* are listed as natives of Australia, I have the impression there is still another species growing in the extreme north in the Northern Territory. It is reputed to be a very large purple flower, and it may be only a good type of *C. purpureum*.

C. purpureum is found growing in New South Wales as well as in South Australia. Wherever they grow, the bulbs average 1″ to 2″ in diameter, producing long thin leaves which appear after the flowers. The length of stem varies according to locality, and the number of half-inch bell-shaped flowers to a stem vary from ten to twenty. The length of stem in some cases is up to 2 feet, depending on where they are grown.

C. luteum, in my opinion, is the best of the three. The flowers are a little larger than those of *C. purpureum,* and it is found in New South Wales and Queensland. The color is bright yellow, and up to 15 flowers are borne on a stem. This appears to be a very hardy species, as it flowers freely under cultivation as far south as Victoria, where winter is more severe than in the States to which it is native.

C. album is a native of Northern Australia, and is quite distinct from *C. purpureum* and *C. luteum.* The white flowers are borne in umbels half an inch long, and the leaves are bat-shaped. This species needs a higher temperature.

Perhaps this short article will induce some of the *Amaryllidaceae* enthusiasts in the United States to hybridise and improve this beautiful Australian bulb. Any further information required will be freely and willingly supplied.

THE BEAUTIFUL AMARYLLIS IMMACULATA

E. O. AND MILDRED ORPET, *California*

In the 1940 Herbertia, Mr. James writes and illustrates the outstandingly beautiful *Amaryllis immaculata* which he had recently im-

Fig. 11. *Amaryllis immaculata* Traub & Moldenke. Photo by Mildred Orpet.

ported from the Argentine. The writers have flowered it here in 1950 and 1951. It is really one of the most beautiful sights imaginable to

see a scape of these spotlessly white flowers as shown inadequately in Fig. 11. It flowers with the leaves which is a distinct advantage, and is on the whole a very fine garden subject. It has one disadvantage in not being very enduring as a cut flower. However, it may be that hybrids could be produced by crossing with other *Amaryllis* species which might be more lasting.

CRINUM SCABRUM

THAD M. HOWARD, *Texas*

The genus *Crinum* is a large one, with over a hundred species distributed in the tropical and subtropical regions of every continent. Although there is much variation in form and habit, their color range is somewhat limited. This is especially true in the section of crinums collectively known as "MILK-AND-WINE LILIES." In general, the crinums of this group possess flowers that are white with a center band of pink, rose or wine, a beautiful combination, but somewhat monotonous where many species are grown.

One particularly outstanding member of the MILK-AND-WINE group is so completely distinctive that one is almost startled when seeing it in bloom for the first time. This species, *Crinum scabrum,* is a gorgeous low growing variety with wide open flowers. Despite its showy blooms, handsome foliage and wonderful fragrance, it is little known. The flower may be compared to an *Amaryllis* L. in form. The broad, pure white tepalsegs are broadly banded through the center with a brilliant crimson stripe. The color scheme so strongly suggests a stick of peppermint candy, that it is commonly called "CANDY-STICK LILY."

While some *Crinum* fragrances are rather strong, *C. scabrum* is deliciously perfumed. A few CANDY-STICK LILIES in full bloom at night can perfume an entire garden. The flowers are quite large, being 8-9 inches in diameter. A full mature bulb will produce 2-3 stalks bearing 6-8 flowers per stem. The flower season is relatively short as compared to that of some crinums. Its usual blooming period is during the months of May and June. The flowers are of rather short duration, but its great beauty compensates for this.

Crinum scabrum produces large bulbs, 6-8 inches in diameter. In spite of the bulb's size, the neck of the bulb is short and narrow, and the plant itself is low growing as compared with most species. The flower scapes average about two feet in height. The attractive foliage is about 3 inches wide and very wavy.

[Howard—CRINUM SCABRUM, continued on page 63.]

4. AMARYLLID CULTURE

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

DAFFODILS IN PIEDMONT VIRGINIA

HARRY I. TUGGLE, *Virginia*

I became infected with the daffodil fever at the age of fifteen when I attended my first daffodil show. Since then I have grown over 550 varieties and have been a faithful exhibitor at Garden Club of Virginia's daffodil shows. My limited experience has convinced me that every gardener must determine for himself which daffodils are suited to his conditions—try them out for himself. It is also no startling conclusion to state that to grow daffodils well one must study his particular soil and climatic conditions. Located at the foot of the Blue Ridge, we are in the South's red clay hill region. Technically this red clay hill region is known as the "Cecil-Appling Area," and a gardener here usually has to contend with a red podzolic clay—a conglomeration of infinitesimal particles that is sticky and unworkable when wet and impenetrable when dry! If you want to grow daffodils in this red clay there is no alternative but to incorporate a copious amount of organic matter. Daffodils planted in unadulterated red clay will eventually suffocate. There seems to be no substitute for a soil well enriched with humus.

Devoting beds to daffodils exclusively has been found to be the simplest and best method of planting. Aside from organic matter, liberal quantities of sand and agricultural limestone have been added. A small amount of fertilizer has been used (chiefly 0-14-14), but fertilizers containing nitrogen have been avoided, for they encourage basal rot. Nothing, however, seems to take the place of a few inches of well-rotted manure under (not in contact with!) the bulbs. Manure makes an amazing difference in quality of bloom. After soil preparation, which is necessary primarily for aeration and drainage, or perhaps of equal importance, is mulching or planting a cover crop to keep the soil cool and moist in our hot, dry summer and fall. This may also be solved by a year-round mulch of sawdust which has additional advantages of preventing blooms from being splashed and spotted during heavy rains and eliminating the necessity of surface cultivation.

As to pests and diseases, there have been only three worth noting—virus, basal rot, and bulb scale mite. As the season advances aphids,

reported to be vectors of the various viruses (yellow stripe, mosaic, etc.) of the daffodil are in evidence. Planting as far apart as space permits is a safeguard against the spread of viruses or any other infestation, as well as means of improving quality of bulbs. I have been guilty of crowded planting and have felt it necessary to rogue and burn immediately any questionable plant. This has been expensive, but if only five healthy bulbs have been destroyed to each infected one, it has been worthwhile. Basal rot *(Fusarium)* may be a problem at times, but losses have been neglible under proper cultural and storage conditions. The only other pest noted here is the bulb scale mite *(Tarsonemus laticeps)*. This mite seems to thrive in our hot summers, and is usually responsible for those bulbs which are soft when lifted. Long necked and rough, scaley bulbs seem to be particularly susceptible to *Tarsonemus* attack.

Before attempting a review of daffodils, by R. H. S. Divisions, as they grow here, I should in fairness state my prejudices. I am an exponent of the British school which prefers a smooth perianth, good proportion or balance, and clear coloring *before* size and striking color which seem to be the main qualities sought by Dutch breeders. In my teens I was fortunate in being tutored by the writing of that great Irish grower and gentleman, Mr. Guy L. Wilson, V. M. H. I was able to visit the garden of Mrs. J. Robert Walker, who now supervises the Daffodil Test Garden of the G. C. of Va., here in Martinsville, and while in college at Charlottesville, I haunted the garden of Mrs. Fletcher D. Woodward. Both of these women have incurable cases of daffodil fever and are staunch advocates of the British or exhibition type daffodil. Mr. George Heath, of Daffodil Mart, Gloucester Co., who probably grows more varieties of daffodils than anyone, is the only person I know who seems to like one type as well as the other. I forthrightly prefer the exhibition type and grow but few of the decorative kinds.

For several years my main purpose in growing daffodils was to show them, but my interest in breeding daffodils now outranks showing them. Although there are many fine varieties that do well here, there is a distinct need for daffodils bred to meet the trying conditions of the red clay hill belt. I *hope* to be able to duplicate some of the foreign beauties in editions which will thrive here without extensive soil preparation and care. Now to the daffodils themselves—

King Alfred, Golden Harvest, and Unsurpassable were among the first varieties I planted, but I remained unimpressed by yellow trumpets until I came across Cromarty, a smooth, shapely deep gold. Garron, a large, pale lemon with splendid stem and foliage makes a vigorous garden clump. Hunters Moon looks and performs better than either parent—Brimstone and Moongold. Bastion, Braemar—said to have "jonquil" blood, Milanion—outstanding, and Royalist all do well here. Sulfur toned Mulatto wouldn't be exceptional later, but coming extra early it is valuable. A new Warnaar introduction, Joseph Macleod, has excellent form, carriage, and coloring—not like the somewhat typical Dutch trumpet which I had come to expect to have an

overly large trumpet in relation to the perianth. GRAPEFRUIT is promising, and PEKING, though smoothly colored, has poor balance. TINTORETTO is distinguished by a glimpse of pink in the base of its large sulfur trumpet. Large and vigorous, MOONSTRUCK has probably the most entrancing coloring of any daffodil—a symphony in cool lemonade tones. KINGSCOURT has been a good grower and increaser and is a superior exhibition flower, although our judges prefer the extra large 1-A's. KINGSCOURT could not have finer lines, or finish, but I must select GOLDCOURT as my favorite yellow trumpet. When well grown GOLDCOURT is only of moderate size. It is a precisely styled deep gold of leather like substance, the petals are tipped green and there is a suggestion of green at the base of the perianth segments. It is short necked, has a tall strong stem and superior carriage, and has a solid, clean bulb. What more could one ask?

There are few distinctly Bi-colored trumpets. Most of them have pale lemony coronas that fade almost to white in our sun—BRIDAL ROBE, GLENRAVEL, TROSTAN, etc. The earliest bicolor is BONYTHON which has good color, nice form, and is vigorous. It is followed by PREAMBLE and TROUSSEAU, the two finest. PREAMBLE is still in the settling stage here but has already exhibited fine form, good color contrast, and exceptional durability. TROUSSEAU is an entirely different type flower in form and color. Smoothly finished, TROUSSEAU has been a vigorous grower, and this spring as it aged displayed buffy cream coloring in the trumpet for the first time. EFFECTIVE has the most striking color contrast of them all—trumpet is bright chrome yellow. KILLYNURE, BALLYFERIS—with a white rim, CHATSWORTH, FORESIGHT—very short stem, GLENGARRIFF, and GREGALACH have all performed well. CONTENT really belongs in a class to itself,—a greenish tinted lemonade color on opening, but as it ages a whiteness suffuses the trumpet until only a lemon rim remains. In form it is a glorified BEERSHEBA, and it has a tall, strong stem, a factor lacking in SPITZBERGEN which could be termed squat as it grows here. DAWNGLOW has been lost twice which is regrettable, for it was better than PINK O'DAWN. OKLAHOMA has been described as a "smash hit" by one grower. It is to me, in the eye! It, like PRESIDENT LEBRUN, has what I once heard Mr. B. Y. Morrison call a "megaphone trumpet."

The white trumpets (and their close kin, the 2c's) are my favorites, but unfortunately they are not the best constituted to our conditions. Since BEERSHEBA there has been only one daffodil that surpasses it in every way—CANTATRICE. When in top form it can not be beaten on the show bench, and it would be difficult to imagine a daffodil with more grace or refinement. ARDCLINES and SAMITE are worthwhile, and DUNLUCE is a fine pure white that has not received its due on either side of the Atlantic. COOLIN is first rate (from NEVIS X BEERSHEBA), and just recently Grant Mitsch introduced an even finer flower named FAIRY DREAM with the same parentage. The dwarf stature of KANCHENJUNGA is inappropriate for its large, heavy blooms. It is eclipsed in every way by BROUGHSHANE which does not have the frilled trumpet, is just as

large, and has a much better stem. BROUGHSHANE often comes rough, but when in fine form is a magnificent thing. It hasn't reached the size here that it does in Ireland, but I like them smaller anyway. MOUNT HOOD is large and useful in the border, but is seldom fit for showing. CONTOUR is promising, and I'm looking forward to VIGIL (which has apparently inherited grace of its parent COURAGE) and PETSAMO this spring. HINDUSTAN, WHITE PROSPECT, WHITE MONARCH, and some of the other new, high priced KANCHENJUNGA or BROUGHSHANE offspring have not been too interesting from their pictures (a little *too much "Ajax"!)*, but the photos of Mr. Guy L. Wilson's new EMPRESS OF IRELAND look like this master has come up with a pure white of size that still has style. I am going to find it hard to wait for that one!

SPELLBINDER, the only 1D, is also in a class to itself from the standpoint of quality. The only other reverse, BINKIE, a 2D, is the most reasonably priced of all the sulfur-limey-green types and should become a popular garden flower. It withstands the elements, multiplies rapidly, and is most telling in the border.

The solid yellow large cups (2 A's) have some fine daffodils in their ranks, but unfortunately they have little or no chance on the show bench if they must compete with the yellow-reds. A judge will almost invariably select a variety with a highly colored cup over a yellow cupped variety in sections A & B of both the large and small cupped daffodils. Here might be as good a place as any to comment on my pet peeve about daffodil shows-judging. There are many excellent judges, but I feel that there are too many men and women judging horticultural classes in present day flower shows who do not have an intimate or first hand knowledge of the flowers they are judging. No short course at any college or judges' school can take the place of the school out in the back yard,—garden experience in growing the flowers they judge. Often in looking at some classes at daffodil shows in which I feel there has been an injustice committed, I figure that the judge may be well qualified as far as points on his or her diploma or certificate is concerned, but he or she has quite a limited knowledge of the fine points of the daffodil!

Back to the 2A's—almost of trumpet proportions GALWAY is among the daffodil elite. ST. ISSEY is a large, strong, tall stemmed, deep gold that blooms early and lasts. GOLDEN TORCH after settling down is proving to be another topnotcher, and I am still not prepared to give up BALMORAL, CROCUS, TRENOON, or ST. EGWIN.

Yellow-red large cups are legion, but I could never become enthused over them until I gazed in awe at the daffodils flown over by Mr. J. Lionel Richardson of Waterford, Ireland for the 1952 Garden Club of Virginia Daffodil Show in Staunton. I, like others I'm sure, had read the glowing catalog descriptions of these "flame-red, blazing orange-red, intense cadmium orange-red, etc." cupped flowers only to grow them and be disappointed with their color. I had begun to doubt the reliability of catalog descriptions, until I helped unpack those Irish beauties. Their color stunned me to such an extent that I was almost prepared to move to Ireland! After 30 hours in air transit, they were veritable

jewels! The large blooms, carried on stems up to two feet in length, had startling color. All the raving over KRAKATOA, FIREMASTER, CEYLON, SUN CHARIOT, etc. is justified, and if you are skeptical come to the 1953 show (to be held in Williamsburg in April) and see for yourself, for Mr. Richardson is honoring us with another exhibit.

Among the best of the yellow-red 2A's here are: ARANJUEZ—nearly every bloom of show quality, BAHRAM—good about every other year, CARBINEER—superior form but seldom colored, COTOPAXI, CORNISH FIRE—early, brilliant, and sunproof, DUNKELD—superb, but fades, DERVISH, DIOLITE—cool yellow except for red rim on cup, GARLAND—round perianth segments, INDIAN SUMMER, NARVIK—perhaps the best of the whole lot here, MEXICO, MAGHERALLY—small, brilliant almost ruby red cup at times, SALTASH, SUN CHARIOT—improves with age, and TAMINO. In four years KRAKATOA has had fair color once. Many more have been tried and discarded in this group which has a wide range of selection. ARMADA and CEYLON are looked forward to this spring.

Class 2B now serves as a repository for many different types which I subdivide white-buff, white-red, white-yellow, and white-pink. In the first group BIZERTA is on the order of POLINDRA only it has an apricot crown. It has exceptional durability. BUNCRANA, BREAD AND CHEESE, and PENVOSE are dependable. MONACO after four years was unusually good last season. RUBRA is hard to surpass for cutting. Its small size makes it unsuitable for showing, but it couldn't have finer form.

Noteworthy white-red large cups are scarce, and good early ones are virtually non-existent. The best one I've grown so far is KILWORTH, but it unfortunately sags its head. RED HACKLE is an exemplary late bloomer, becoming deeper with age. FLAMENCO had a bright orange-red crown last season, previously it was only orange. These three are valuable for they do not fade in our sun. FERMOY is good, but takes time to develop for it opens almost as a 2A. DICK WELLBAND, FRANCISCUS DRAKE, and most of the Dutch and Backhouse strain of highly colored red cups fade or burn badly. Reliable reports indicate that SIGNAL LIGHT is a milestone in this group. I must state an emphatic distaste for the whole series of JOHN EVELYN hybrids. They may be striking garden plants from a distance, but on close inspection they are coarse and ill proportioned.

The white-yellow large cups include many former Leedsii, one of the best of them for either cutting or the garden being BRUNSWICK. It opens with a pale lemon cup, but gradually fades to almost pure white. Tall stemmed, vigorous, a long laster, good increaser, fine bulb—for everything but showing BRUNSWICK is tops. There isn't enough contrast to make it a good show flower. Several daffodils have been rather hopefully described "improved POLINDRA" but it has been only wishful thinking! It would be hard to imagine an improvement on POLINDRA. STATUE is larger, and similar, but is by no means a replacement. GREEN ISLAND, after four years, has settled down and has faultless blooms. I was admonished by visitors for not saving several for the show, but this spring was the first full length daffodil season I'd enjoyed for five

years (a four year lapse for college), so I selfishly kept my favorites. CARAGH has a pretty apricot rimmed flat cup, and GREETING is another that will be hard to surpass. Its perianth tends to reflex, which only serves to set off the goblet shaped primrose cup. GUARDIAN is a near trumpet and a prolific seeder. It is the progenitor of the beautiful new white trumpet EMPRESS OF IRELAND. Special recognition is due TRYST which bloomed late during an 80 degree spell and seemed impervious to the heat! GENTILITY is a vigorous improvement on WHITE SENTINEL which has done miserably here. Incidentally I have yet to come across a clean (virus-free) stock of either WHITE SENTINEL or MITYLENE.

The pinks are *á la mode* these days. I wonder about the advisability of this public favor since *few* of them are of top quality—if you still demand other requisites before pink coloring. I have grown the whole lot of Dutch-bred MRS R. O. BACKHOUSE derivatives—ANTIBES, BIARRITZ, CANNES, CHAMPAGNE, PINK FANCY, PINK FAVORITE, PINK GLORY, PINK RIM, PINK SELECT, SIAM, etc. After several years' trial I did not plant any of them back last fall, for they are uniformly poor formed flowers—distorted cups, excessive frills, twisted perianths, etc., and their color has been poor here. The best of the Dutch pinks that I've come across are LADY BIRD and ROSY SUNRISE, but they leave much to be desired. ROSY DIAMOND is a small one with a real rosy-pink cup, a gem. MABEL TAYLOR is usually rough but has an intensity of pink in its trumpet-like crown that is seen in no other. LISBREEN, ANN ABBOTT, PICTURE, FOYLE, and WILD ROSE are good off and on. ROSE OF TRALEE is perhaps the best formed pink, but this late bloomer has a poor bulb and is temperamental here. MOYLENA and INTERIM show promise, MOYLENA being the best of the MITYLENE X EVENING series of pinks.

Opening the 2-C season is ZERO, of clarion quality, a faultless pure white. NAMSOS has been a poor grower, as has its parent NIPHETOS. NAXOS is reported to be "touchy," but it thrives. CLEENA—a white FORTUNE, COTTERTON—an immaculate icy white on short stems, COURAGE—very graceful, GLENDALOUGH, MORNING WINGS—charming, JUSTICE, KILLALOE—semi-ajax, MURMANSK—good off and on, ST. BRENDAN—almost of trumpet proportions, PARKMORE, SHINING WATERS—early and durable, and TEMPLEMORE are all noteworthy. LUDLOW is sometimes spoken of as an improvement on TRUTH, I wouldn't give up either. GREENLAND is attractive from the breeding standpoint for its triple substance and almost green-white color. MOVILLE has been weak, and SLEMISH has succumbed twice. TIBET should make a stunning border plant. A shapely white from Barr that is as good for showing as in the garden is SILVER BUGLE. There are many invalids in this group, and there should be a demand for vigorous 2C's bred to take our growing conditions.

When smooth, CHUNGKING is outstanding, but it is inconsistent. It is a rapid multiplier and has to be lifted every year or planted deeply to secure bloom. Superbly formed, late, small, with greenish yellow perianth, DINKIE couldn't be overlooked. CARRIGART is a fine decorative type, as is popular MANGOSTEEN, and THERM has a small, intense red cup.

With 20 inch stems, MISTY MOON is the best of the MYSTIC X DACTYL tribe of charming flowers now classified as 3-B's. SYLVIA O'NEILL and TINSEL are members of the deservedly famous SILVER COIN series. ANGELINE is white except for the penciled rim of copper on the small cup. There are many outstanding white-red 3-B's, but they have to be watched closely for all of them burn. The following are of ideal show quality, but judges lately seem to prefer larger flowers of the KANSAS type to these more polished ones: BLARNEY—flat salmon-orange crown, BRAVURA, CRETE, FORFAR, LADY KESTEVEN, LIMERICK—with cherry red crown, a refined and improved edition of HADES, MAHMOUD—superior in every way except that it has inherited SUNSTAR's long-necked bulb, MR. JINKS, MOINA, PERA, QUETTA, etc.

The 3C's aren't too vigorous here. CHINESE WHITE is of paramount importance in this group, in fact it is one of the notable daffodils of the century. FOGGY DEW is larger and more vigorous, but its form and color can't approach CHINESE WHITE. ALTYRE is a notable addition, and CUSHENDALL with its moss green eye is one of the most captivating of daffodils. PORTRUSH appears to be an enlarged edition of CUSHENDALL but is not as refined a flower. FRIGID blooms so late here that heat will not allow it to develop properly.

DAPHNE is one of the few doubles I ever cared for, but it is not easy to grow. SHIRLEY TEMPLE is a fine newcomer.

It is gratifying to see interest increasing in *N. triandrus* hybrids to such an extent that a stalk of SILVER CHIMES was selected as best flower in 1952 G. C. of Va. show. Its foliage is often bitten back here, but it blooms well. The charming APRIL TEARS *(N. jonquilla* X *N. triandrus concolor)* has retained some of the *"jonquil"* odor; HAWERA is similar to it. RAINDROP is a delightful midget but is tender. TRESAMBLE—an improved edition of ACOLYTE, THALIA, and RIPPLING WATERS are dependable. COBWEB is similar to one of my favorite daffodils—Rev. Engleheart's incomparable DAWN—flat cupped with petals pertly reflexed and waved, it looks ready to fly away. Unfortunately the *N. triandrus* hybrids, which are so admired by arrangers, are particularly susceptible to stripe.

The sensation among the *N. cyclamineus* hybrids is justly Mr. C. F. Coleman's fascinating series from MITYLENE X *N. cyclamineus*. JENNY and DOVE WINGS both have white perianths and limey-yellow cups, and CHARITY MAY is different from usual type of solid yellow *N. cyclamineus* hybrid. I am fortunate to be growing these and hope they will show more vigor when settled.

SHAH is a new, large cupped jonquil hybrid that looks like a smaller, yellow edition of DAVA. It will be hard for anyone to excell TREVITHIAN. A clump in the garden has had foliage and blooms almost waist high, and little trouble is experienced in selecting stalks to show. CORA ANN, HESLA, and TRIM are different types from the average 7-B and are usually single flowered. No collection would be complete without the unique, pink cupped CHERIE.

I have grown few tazettas or poetaz, and relatively few poets. Old ACTAEA is dependable (unusually long necked), and smaller SHANACH, CANTABILE, DACTYL, and SMYRNA are fine if planted deeply and not disturbed, but a combination of round perianth segments and a flat, deep green eye edged red make SEA GREEN about the finest poet.

Talking daffodils is apparently as engrossing as growing them. Just what is it that makes growing these patricians so fascinating? I think A. M. Kirby back in 1907 gave an admirable answer in his little book on the daffodil: "It is not alone the individual and collective beauty of their flowers that endears them to our hearts but the bravery of their advent, for 'the time of the daffodil' closes the gates on bleak winter and ushers in, with trumpets of gold, longed-for spring."

OLD NATURALIZED NARCISSUS IN THE SOUTH

JO N. EVANS, *Louisiana*

If you are driving through Louisiana, Mississippi, Alabama or Georgia during the winter months, you will see *Narcissus* blooming in almost every yard. You will often see old cemeteries that are carpeted with these bulbs; if you look you will see them blooming in fields where an old home once stood or they may have wandered off down the ditch banks, or even along the side of the road.

You will, perhaps, wonder who planted these bulbs,—how did they get there and what *Narcissus* could they be? They are the old *Narcissus* of early southern gardens, probably some of the very first flowers to be brought to this country.

The first of these old bulbs to bloom is a pure white Tazetta or cluster type, on a stem not taller than six inches and we can usually gather them at Thanksgiving. The next *Narcissus* to come into bloom has a taller white cluster, much like the paperwhite of today's commercial trade. By Christmas a tall, creamy white Tazetta is in bloom, this one has pointed petals and very tall stems; it is locally called Star or Christmas *Narcissus*.

The first of January finds PEARL in bloom. This is the most beautiful of all cluster *Narcissus*, it has large heads of flowers and tall stiff stems, the substance of the blossom is very heavy. When Jan de Graaff was a visitor at Haphazard Plantation recently he told me that PEARL was the same name that this bulb was called in some very old books on *Narcissus* that he owned. By the middle of January the little yellow trumpet—*N. minor* is in bloom, this one is a very sturdy little bulb, the weather never seems to bother it. It gives our southern gardens a lot more color than the early February Gold does.

In the latter part of January our true love comes into bloom, the little white trumpet SWAN'S NECK [Fig. 12]. This is not to be confused with the little white trumpet in the commercial trade, J. P. MILNER, because the former has much more character and charm.

During February the short cupped daffodils bloom. Some of these are just as beautiful as the modern named varieties—others are not so

Fig. 12. Hybrid Narcissus—SWAN'S NECK as naturalized in Louisiana. Photo by Lillian Grey.

good. There are no local names for these and one has to select them while in bloom. The little species *N. poeticus* is locally known as WHITE LADY, it is a very nice little bulb with blossoms about the size of a fifty-cents piece.

When we see these old bulbs blooming in such profusion, even where they have been left undisturbed fifty years or more, and growing under most any kind of conditions, one wonders what has happened that makes the large modern *Narcissus* so intolerant of our southern gardens. Perhaps the modern breeder has had no interest in southern gardens or, perhaps he did not realize he was taking the south out of the bulbs as he developed them for northern gardens.

DAFFODILS IN 1952

GRANT E. MITSCH, *Chairman, Narcissus Committee, Canby, Oregon*

"To go or not to go" is a question provided annually by various Daffodil shows in this area. The sponsors like as many exhibits as possible from commercial growers, and one who raises seedlings is loath to be absent from home when new crosses are coming into flower; particularly so when the blooming season is short, and is interspersed with inclement days, making the time to observe and study the flowers brief at best. Yet, in spite of one's reluctance to leave them, it is the ordinary procedure to spend a goodly percentage of time away from the flowers after spending months in anticipation of their opening!

Too frequently the weather is unpropitious during and preceding the blooming period. Following a series of severe winters, the past one proved more nearly normal for this section, and while we had our usual late fall frosts, they were insufficient to halt the blooming of Polyanthus Primroses and other flowers of the hardier clan. Damp mild weather continued until the first of January when the temperature dropped to about ten degrees below the freezing point and gave rise to fears that we might again be due for severe weather; but that was not to be, and there were comparatively few frosty nights after this date. There were two damaging frosts at about the end of the season but Daffodils suffered little.

As usual, our first flowers were from *N. asturiensis* opening in late December, a record with us. A few days later *N. bulbocodium* X NYLON opened, soon to be succeeded by *N. romieuxii;* the former is reminiscent of *N. bulbocodium* var. *monophylus,* one of its parents, I believe, and the latter carried some of the sulphur lemon tones so much sought after in large trumpet varieties. Not long after these bloomed, *N. cyclamineus* opened its jaunty, spritely blossoms which briefly preceded those of its descendants, MITE and FEBRUARY GOLD. The former is most cheerful with its perky little blossoms with perianth segments somewhat less reflexed than in its parent.

There were a number of potted large flowered Daffodils grown as well as the species and their first generation hybrids. CONTENT (Fig. 13) and TRUTH gave superb blooms as usual, and FAIRY DREAM and ROSTOV were very lovely, but these will be passed by to consider some of the later blooming species. *N. triandrus* var. *albus* is always delightful when well grown. *N. juncifolius* and its near-kin, *N. rupicola* are intriguing elfin flowers, but one of the loveliest of all was *N. watieri* as grown in a box of perhaps 50 bulbs, with many pure white, fairy-like blossoms bidding for notice.

Although there were few frosts, the temperature hovered just a few degrees above freezing so much of the time that plant growth advanced

but little for weeks after the turn of the year. None of the very early varieties came on until after the first of March in the open, unprotected field. The first blooms of FEBRUARY GOLD, MARCH SUNSHINE, MITE, CIBOLA, SACAJAWEA, and FORESIGHT opened almost simultaneously. The earliest of the large golden yellow Daffodils with us, CIBOLA is a flower

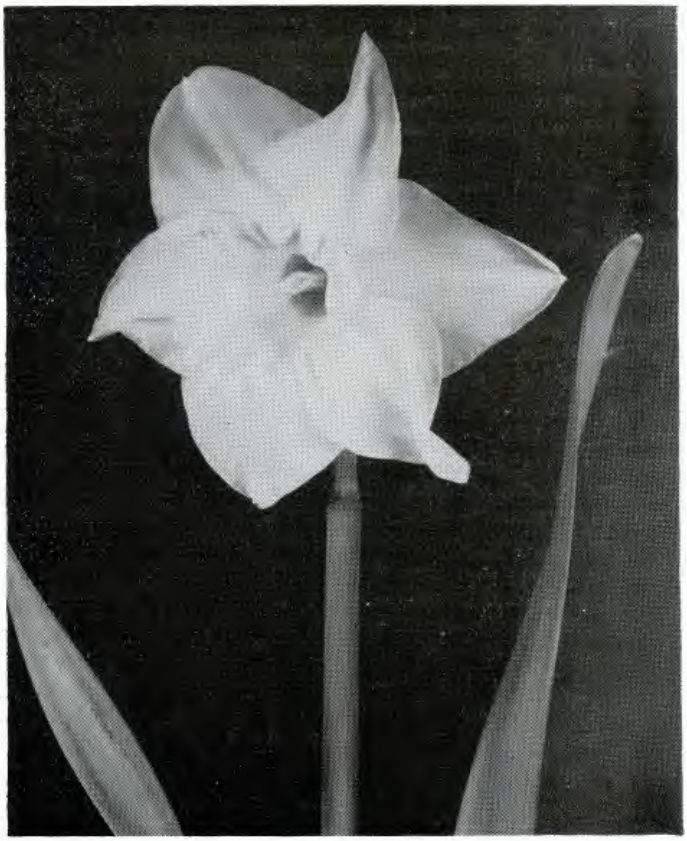

Fig. 13. Hybrid *Narcissus*—CONTENT. Photo by Grant E. Mitsch.

of excellent keeping qualities. It has quite a broad, flat, smooth perianth, and a large bell-shaped crown, broadly flanged and reflexing as it develops. It should prove an excellent cut flower. Just as early, and also a large flower, SACAJAWEA, a FORTUNE x KIMBA derivative, is somewhat reminiscent of WHITELEY GEM but twice as large and has preceded it in bloom here. Having somewhat more pointed perianth segments than FORTUNE, it is about the same size flower with clean yellow coloring except for a wide band of orange red on the crown.

While waiting for the first field blooms to open, we were enjoying some beautiful pot grown Daffodils, but one is never quite satisfied with only those grown under controlled conditions, however perfect they are, for the call of the out-of-doors cannot be evaded by the true gardener! One only wishes that the flowering season were longer! Counting some of the miniature species which open indoors, there are about four months of continuous bloom, but the bulk of the large flowering garden varieties come and go within a period of six weeks, and in even less time some years. Even though the winter was comparatively mild, our season was a brief one this year; for once the flowers were well started to opening, a succession of warm days brought on everything rapidly. Among the rather early flowers are some seedlings from MITE and MALVERN GOLD, one of which bears very perfect little flowers with smooth flat perianth, and rather a long, well balanced crown of clear lemon yellow throughout. A good increaser and free bloomer, it carries its flowers with good poise on stems more or less tinted with yellow. This dainty star-like Daffodil has been named ESTRELLITA. Another seedling of *N. cyclamineus* ancestry and of rich golden yellow coloring is usually the first of all to bloom, excluding the species; the seed parent in this instance being MAGNIFICENCE. Others of their clan to which we look forward to seeing each year include PEPYS, TREWIRGIE, GOLDEN CYCLE, and PEEPING TOM, the first named being particularly interesting and unique, but unfortunately, rather slow on increase. Even more distinct is CYCLATAZ which made its first appearance here this year.

The miniatures include some very fascinating members among their numbers, and we were much intrigued by the perfectly formed TANAGRA a larger descendent of *N. asturiensis.* The jonquil family includes several most delightful representatives, perhaps the finest of all being APRIL TEARS which gives generously its graceful stems carrying two to four exquisite pendant blooms of clear yellow with slightly paler coronas. To the same coterie belongs the somewhat paler and easier blooming HAWERA, and the smaller PEASEBLOSSOM; and of quite different form but still most appealing are BEBOP, SUN DISC, and LABELLE, each a little jewel. Of still different type and ancestry is HIAWASSEE, a "Paper White" hybrid, which appears quite hardy but is not always a free bloomer;—perhaps severe cold may be a deterrent to its flowering, as this year it performed better than ever before.

Although we had anticipated exceptional bloom this season, Daffodils on the whole were of about average quality. Many of the red cups were especially fine and came with stems of exceptional length, due perhaps more to soil and situation than to weather. Coloring was very good on DIOLITE, BAHRAM, ROUGE, and many others, and they were taller than I had previously seen them. There were many splendid large flowers of KRAKATOA with most vivid orange red crowns. ARDOUR was beautiful as usual and came relatively earlier than normal this year. Nigeria is always good but seemed to surpass itself, while CALIFORNIA GOLD stood out as a most strikingly colored flower and would have been near the very top in quality except for a long neck. Both ARMADA and CEYLON

are examples of the strides being made by breeders, the former being of excellent quality and a most striking flower, while the other approaches the ideal in quality and finish. Both develop much of their color after first opening and hold it well whereas so many red cups tend to fade out after being open a few days. There was some variation in the performance of the later blooming yellow-reds this year for GARLAND which ordinarily has a crown of quite solid coloring came with orange at the base of the cup and a distinct band of deeper shade, making it resemble a larger ARANJUEZ.

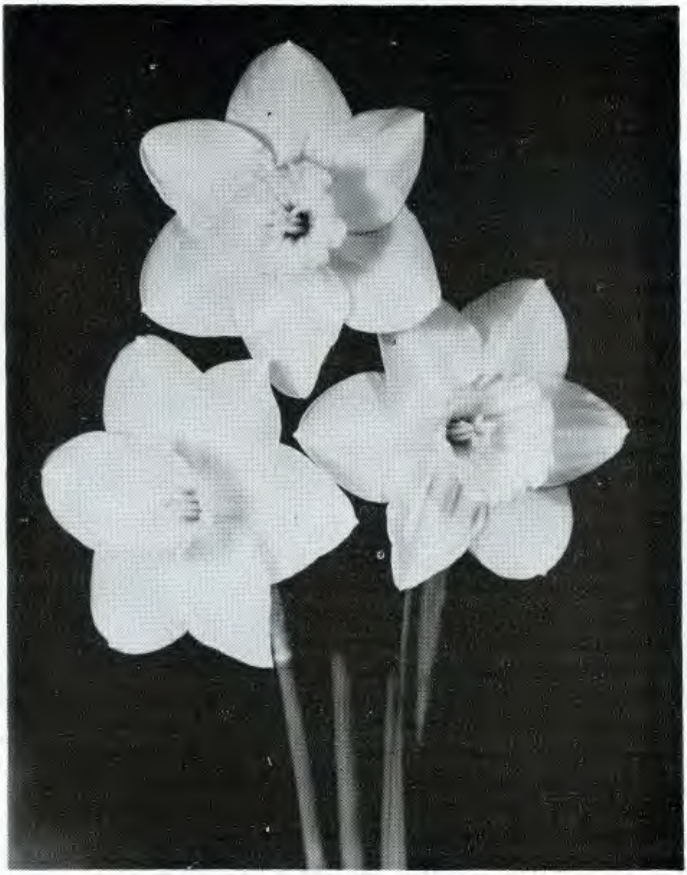

Fig. 14. Hybrid *Narcissus*—BINKIE. Photo by Grant E. Mitsch.

Improvements are now difficult of attainment in the class under consideration. A seedling described before and now named PARACUTIN, from KLINGO x ARDOUR came somewhat rough this year but still carried about the most fiery orange red coloring that we have observed in a

flower of this type, a shade more nearly approaching that found in some of the red and white daffodils.

Those varieties having white perianths and colored crowns were somewhat better on the whole this year than some seasons, even the older variety, LADY KESTEVEN having retained its brilliance for several days in warm sunshine. As usual, CRETE was one of the finest of this group being possessed of a most beautiful rounded perianth of much substance. MATAPAN, OTRANTO, PAPRIKA, and TEBOURBA came with beautiful form and intense brilliance. As a garden flower, there is certainly nothing to excel LIMERICK, which is quite late in blooming. A seedling from LADY KESTEVEN and HADES which has been carried for several years was quite impressive with its white rounded perianth and brilliant crown, nicely frilled at the edge. Among varieties with larger crowns, FERMOY, KILWORTH, and MONACO were impressive again this year, while SIGNAL LIGHT looked promising in its first blooming. Some years ago among our seedlings appeared a very frilly orange cupped flower from open pollenized JOHN EVELYN. This was crossed with SCARLET LEADER and from the few resulting seedlings two or three were exceptionally early blooming and had large rounded white perianths with good sized crowns of rich orange red. While the coloring is not very lasting and the flowers could stand additional polish, they provide a bright spot very early in the season.

Some of the best yellow trumpets came from KINGSCOURT x GALWAY, while from CAMBERWELL KING x MORTLAKE, and from CAMBERWELL KING x GALWAY there are several seedlings that look very promising after having bloomed two or three years . But it is the KING OF THE NORTH x CONTENT group that gives most of interest, including clear yellows, pale sulphur lemons, and reversed bi-colors. Three of the latter were the best in this class that we had this year, having well formed, smooth flat lemon perianths, and finely balanced, nicely flanged trumpets which, as they developed, became almost white inside. The clear lemon-self, FRONTIER, was the best we had ever seen it this year, and MOONSTRUCK gave superb giant size blooms. GRAPEFRUIT and MULATTO were not quite up to par, while SPELLBINDER and MOONRISE looked good on their first appearance. We have bloomed numerous seedlings from BINKIE (Fig. 14) but none to equal it.

In white trumpets, the very refined and highly polished CANTATRICE still maintains its position at the top of the list, although BROUGHSHANE and KANCHENJUNGA (Fig. 15) by virtue of their spectacular size and form elicit much more comment from visitors. A seedling from ADA FINCH x FORTUNE which we have grown for some years is considerably larger than either of the above, and while far from ideal in form and balance, it has many good habits, and is so striking that few visitors can see any other white when it is in bloom. From KANCHENJUNGA x ZERO and ZERO x CANTATRICE the average of good white flowers was exceptional. Good form and purity were the rule here but it remains to be seen whether they have sufficient stamina and vigor. With such good whites as ZERO, LUDLOW, TRUTH, KILLALOE and others available it is difficult to make improvements in their class.

GREEN ISLAND (Fig. 16) has again demonstrated its value for breeding as several of the finest flowers of the season came from it. BREAD AND CHEESE x GREEN ISLAND produced three or four very fine flowers of which the best had an exceptionally large, geometrically perfect white perianth and large bowl shaped crown. From POLINDRA x GREEN ISLAND there were numbers of satin smooth beautifully formed flowers with cups tinted lemon or apricot, and a large series from TUNIS x GREEN ISLAND included so many interesting flowers that it was difficult to make selections, so many inherited much of their pollen parent's

Fig. 15. Hybrid *Narcissus*—KANCHENJUNGA. Photo by Grant E. Mitsch.

form, with colorings in the crown associated with TUNIS seedlings, including buff, apricot, and salmony tones together with cream, ivory, and soft lemon. Many give promise of having immense vigor, and should be good garden or exhibition flowers. As reported before, the interesting series from GREEN ISLAND x CHINESE WHITE include some of the most satisfying, perfectly moulded flowers we have grown, but from such parents it is difficult to make improvements. Although variety in coloring can be added. The pink from GREEN ISLAND x GLENSHANE was not

quite so fine as last year but was still very nice, and several more with pink tintings appeared among its sister seedlings.

This was not a particularly good pink year as many of this color were lacking in their usual depth of tone. MABEL TAYLOR was less striking than a year ago and ROSARIO was paler than some seasons. Many others including WILD ROSE, most of the Australian, and the Dutch pinks did not find the season to their liking. The same was true with many of the seedlings although a few gave us better color than normal. Perhaps the most vivid, glowing, orange toned rosy pink came

Fig. 16. Hybrid *Narcissus*—GREEN ISLAND. Photo by Grant E. Mitsch.

in a flower from a seedling crossed with INTERIM. Another good sized, well formed flower from a ROSARY x MRS. BACKHOUSE seedling crossed with MABEL TAYLOR was nearly its equal in brilliance. Most of the pinks either do not hold their color long, are indifferent in form, or are fickle in performance; being good one year and not the next, or proving outstanding in one region and mediocre in another climate. Perhaps eventually, out of the many thousands of seedlings being grown by hundreds of fanciers, a really good pink of consistent performance will appear.

Good bicolor trumpets are not plentiful but among the large cupped varieties this is one of the strongest color groupings. PREAMBLE, SPITZBERGEN, TROUSSEAU, TROSTAN, and GLENGARRIFF are about the best of the trumpets, but only the first mentioned one is a strongly contrasted bicolor. Of the large cupped kinds, it will be long before POLINDRA and BODILLY are replaced although there are many fine new ones that are distinctive in form, among which is STATUE, an elegant, tall, giant white with lemon crown. At its best, SEBASTOPOL is well near perfect but in some seasons the perianth is not sufficiently clean, having a slight olive cast. TUDOR MINSTREL looked promising on its first blooming here, and a seedling which we call FESTIVITY has given us immense blooms with perianths of good substance and so flat they appear to have come from a press. Were it not for its habit of tilting downward at an angle when freshly opened it would, we think, be the peer of all in its class.

Among the most unique of the Daffodils we have bloomed is ARTIST'S MODEL, a large flower with white perianth and quite large nearly flat crown of salmon orange with a recurved flange pressed back against the perianth. Several other flowers from the same grower, Mr. Lewis, in New Zealand, mostly varieties on the border line between large and small cups, have proven good here. They have rounded white perianths with crowns of yellow or ivory, bordered with various shades of orange, lemon, and apricot. AUTOWIN, MARIE LOUISE, PAPANUI QUEEN, and SATIN QUEEN are a few that appear to be best and well worthy of growing, all of them being late flowering. The lovely GALILEE is of somewhat similar type; perhaps not quite as large but a bit smoother.

To finish the season we are treated with poets and the ethereal, cool green eyed flowers of which CUSHENDALL, DALLAS, and FRIGID are favorites with us. As we had quite warm weather after the early flowers opened, the season was short and there was too little time to fully enjoy the Daffodils, but like always, there were compensations for every disappointment.

DAFFODILS IN NORTHERN CALIFORNIA

HAROLD I. JOHNSON, *California*

The following comments on daffodil varieties, arranged according to originator, may be of help to those who wish to try out daffodils under conditions similar to those in Northern California.

Daffodils do well in this region, and my one recommendation as to growing them would be that not too much water be provided in the summer months, especially in the heavier soils. Thorough watering once a month should be sufficient. Winter watering however, is desirable, particularly in December, January and February, if good rains are not forthcoming.

The other main factor is choice of the variety. I have listed all that I have grown with special comments on the outstanding and good, and the rest clearly written between the lines.

P. D. Williams. If any one of these hybridizers can be said to have introduced the varieties most suitable for our conditions, it is P. D. Williams. His daffodils are of Cornish origin, in the southwest of England.

The varieties I have grown of his are: ALIGHT, BODILLY, BRUNSWICK, CARLTON, CONTENT, CORNISH FIRE, CROCUS, DAMSON, GODOLPHIN, GREETING, HAVELOCK, JUBILANT, KENNACK, KILLIGREW, LANARTH, MEDUSA, MESSINA, NIPHETOS, PENBEAGLE, PENQUITE, PENTREATH, POLINDRA, PORTHILLY, ST. AGNES, ST. EGWIN, ST. IVES, SALTASH, SCARLET GEM, TREVISKY, TRIM, TROUSSEAU, TUNIS and WARLOCK.

Of these, CONTENT (Fig. 13) is the most outstanding in size and quality, and seems reasonably well adapted to our climatic conditions.

The most prolific and easiest to grow is CARLTON.

The good garden flowers are: ALIGHT, BODILLY, GODOLPHIN, LANARTH, PORTHILLY, ST. AGNES, ST. EGWIN, SCARLET GEM, TRIM, TUNIS and WARLOCK. All of these are strong growing with good stems; and in the now several years I have had them, have shown no signs of temperament. BODILLY, PORTHILLY and ST. EGWIN provide the most in garden value, though I would not want to be without the cluster-flowered SCARLET GEM or the jonquils, LANARTH and TRIM.

Flowers of great beauty, but not too satisfactory as growers, are BRUNSWICK, CROCUS, GREETING, POLINDRA and TROUSSEAU. They can well be tried, and I know POLINDRA grows beautifully along the immediate coast, judging from Mr. Reinelt's garden; but in my experience, they are touchy.

The rest are in most respects superseded, although PENBEAGLE and PENTREATH, because of their fine bulbs should be considered for breeding purposes.

BRODIE OF BRODIE. Of many flowers introduced from the garden of Brodie of Brodie, very few are truly outstanding under my conditions. His garden was in Northern Scotland.

Among those I have grown are: BOKHARA, CAPRI, CHEERIO, CHRISTIAN, COURAGE, CROMARTY, DAVA, DUNKELD, ELGIN, ESKIMO FAIRY CIRCLE, FIREWATER, FOREST FIRE, FORTUNE'S BLAZE, FORTUNE'S BOWL, FORTUNE'S CREST, FORTUNE'S SUN, KING OF THE NORTH, MARKET MERRY, MARMORA, MR. JINKS, NISSA, PAINTED LADY, POLDHU, PORTLIGHT, QUETTA, TOPIC and WHITELY GEM.

The good garden flowers have been: BOKHARA, COURAGE, FOREST FIRE, FORTUNE'S BLAZE, FORTUNE'S SUN, MARKET MERRY and WHITELY GEM. Of these, MARKET MERRY is the most outstanding in good years, but I would settle for BOKHARA as being the most satisfactory from all-round garden value.

ELGIN, FIREWATER and PAINTED LADY may be tried, because they will provide beautiful flowers under the best conditions, but the others I would not buy again.

A. M. WILSON. A. M. Wilson introduced very few but some quite fine daffodils. Those I have grown are: ANGELINE, CARBINEER, CICELY, DIPLOMAT, GARIBALDI, KING OF HEARTS, LUDLOW, OSLO and SCANDAL.

Of these, LUDLOW is the most outstanding because of its lovely white color and good carriage. CARBINEER is a very strong grower, but the color is not outstanding. ANGELINE and CICELY are fine cutting flowers particularly suitable for flower arrangements. OSLO is lovely, but dies out. The others are probably now superseded.

De Graaff. Of Dutch varieties introduced by De Graaff, I grow: CALORAMA, CRITERION, DAISY SHAFER, GOLDEN PERFECTION and PEKING.

GOLDEN PERFECTION is fine from all standpoints. DAISY SHAFER can be pleasing, but the others are either superseded or unsatisfactory.

GRANT E. MITSCH. Grant E. Mitsch of Canby, Oregon is one of the younger hybridizers, and undoubtedly there will be many fine intro-

Fig. 17. Hybrid *Narcissus*—PAUL BUNYAN. Photo by Grant E. Mitch.

ductions from his garden in future years. His introductions so far are primarily intended for garden rather than exhibition use, and I grow CASABIANCA, CHINOOK, CIBOLA, FAIRY DREAM, GOLD CROWN, LEMON DROPS, LINN, PAUL BUNYAN, SANTIAM, and ZEST.

The best of these is PAUL BUNYAN (Fig. 17) with enormous size and fine carriage. LEMON DROPS is a very distinctive triandus type.

The fine garden flowers are: LINN, SANTIAM, CHINOOK, CIBOLA and CASABIANCA.

The others are not particularly distinctive but except for FAIRY DREAM which appears to require more rainfall than California usually provides, they are all good growers.

KENYON REYNOLDS. Some originations of Kenyon Reynolds of Southern California were introduced by Mrs. Lena Lothrop some years ago. I have grown COMANCHE, GAY DANCER, MARIPOSA, TEMECULA, and Seedlings No. 9, No. 31, No. 65 and No. 212.

COMANCHE is a very good variety and the Seedlings numbered 9, 31 and 65 are all good garden flowers.

MRS. R. O. BACKHOUSE. Of the Mrs. Backhouse introductions, I have grown, including CORONACH, ECLAIR, HADES, ISIDOOR, MRS. R. O. BACKHOUSE, NORFOLK, PEERLESS and WHITE CONQUEROR, only HADES seems worth growing, and that primarily for color.

CORONACH can be tried for hybridizing, but it is a poor doer.

VARIOUS GROWERS. I have grown miscellaneous daffodil varieties from various growers as follows: ALBERNI BEAUTY (Hilton), ARANJUEZ (Warnaar), BEERSHEBA (Engleheart), BRIMSTONE (Engleheart), CHERIE (W. F. Mitchell) DIOLITE (Miss Evelyn), FORTUNE (Ware), JOHN EVELYN (Cope), KING ALFRED (Kendall), MITE, NIVETH (H. Backhouse), PENCREBAR, RIO RITA (Warnaar), ROYALIST (Lower), RUSTOM PASHA (Miss Evelyn), SILVER CHIMES (Martin), and SILVER PLANE (A. E. Lowe).

Of these, FORTUNE is still the most outstanding and useful in the garden, while KING ALFRED, although completely superseded as a specimen stalk, seemingly enjoys our climatic conditions. Others in the outstanding class are DIOLITE and RUSTOM PASHA.

Good garden flowers are ROYALIST and CHERIE.

ARANJUEZ, MITE, PENCREBAR, and SILVER CHIMES are sufficiently distinct to be tried, but the last named has proved difficult. The others are either superseded or unsatisfactory.

AUSTRALIAN—NEW ZEALAND GROWERS. The Australian-New Zealand introductions I have tried are AVENEL, BINKIE, BONNY, CAMBERWELL KING, CARMOA, CARNGHAM, CHARIS, CORONELLA, CRANBOURNE, CRUSADER, DAVID WEST, EVANSFORD, FAHAN, FIDELIS, GLENALBYN, GLEN ALVIE, ISOLA, JEAN HOOD, KIMBA, MABEL TAYLOR, MAKEUP, MALVERN GOLD, MELVA FELL, MORTLAKE, RED RADIANCE, RUBRA, SCARLET QUEEN, SHIRLEY WYNESS, TANGERINE, TELOPEA, VERA WEST, WALTER J. SMITH, WARATAH, WARFLAME and ZOE.

Nearly all of these are quite vigorous under our conditions. Unfortunately, many of them are not very distinctive, and are hardly the good quality flower we have been led to expect from the major hybridizers.

The most outstanding flowers are MORTLAKE and FAHAN.

For color, MABEL TAYLOR and BINKIE (Fig. 14) are fine; and the first named may be the best pink for our conditions.

Good garden flowers are WARATAH, RED RADIANCE, and VERA WEST.

Worthwhile trying are FIDELIS, JEAN HOOD, MALVERN GOLD, RUBRA and SHIRLEY WYNESS. The others are superseded but because of their vigor, they provide good garden value if obtainable at a reasonable price.

J. LIONEL RICHARDSON. J. Lionel Richardson of the Irish Free State has been responsible for some of the greatest "name" daffodils exhibited in recent years. However, garden value and exhibition

value are two different things. Of his introductions I have grown: ALEXANDRIA, BALLYFERIS, BEIRUT, BIZERTA, BLARNEY, BUNCRANA, CASTLEDERMOT, CLEENA, COTOPAXI, FERMOY, FIREMASTER, FLAMENCO, GALWAY, GREEN ISLAND, HARRIER, HONG KONG, JERPOINT, KINGSCOURT, KRAKATOA, LIMERICK, MEXICO, MONACO, NANKING, PEIPING, ROSE OF TRALEE, ROYAL MAIL, ROYAL RANSOM, SEBASTAPOL, SUDAN, TUSKAR LIGHT.

Oustanding is GALWAY, one of the best of all daffodils.

Vigorous or otherwise fine are BUNCRANA, FLAMENCO, MEXICO, ROYAL MAIL and SUDAN; and CASTLEDERMOT and MONACO look promising. Others have been definitely disappointing, among them highly commended varieties like CLEENA, GREEN ISLAND, KRAKATOA, KINGSCOURT, ROYAL RANSOM, and ROSE OF TRALEE. Also some of them seem most unhappy under our conditions, and I have lost BALLYFERIS, FERMOY, LIMERICK and most of TUSKAR LIGHT.

GUY L. WILSON. Guy L. Wilson of Northern Island, has introduced many fine varieties, and I have grown: ARMADA, BANN, BREAD & CHEESE, BRANIEL, CANTABILE, CANTATRICE, CARNLOUGH, CARNMONEY, CHUNGKING, CLONARD, CLONTARF, CORRYMEELA, DREAMLIGHT, EVENING, GARRON, GOLDEN MELODY, GREENLAND, GREY LADY, GUARDIAN, HOME FIRES, INDIAN SUMMER, JACK SPRATT, KANCHENJUNGA, KIBO, KLINGO, KWANNON, LISBREEN, MARAVAL, MAY MOLONEY, MOONGOLD, MOONSTRUCK, MYSTIC, PINKEEN, PREAMBLE, PROMPTITUDE, QUIP, ROUGE, ST. BRIDE, SAMITE, SHANACH, SHINING WATERS, SHIPMATE, SILVER WEDDING, SUN DANCE, SUNKIST, SYLVIA O'NEILL, TIBET, TRUTH, ULSTER PRINCE.

Outstanding are ARMADA, MOONSTRUCK, and HOME FIRES.

Vigorous and fine garden flowers are BREAD & CHEESE, BRANIEL, GARRON, GOLDEN MELODY, and MARAVAL.

Very distinctive, but less vigorous are INDIAN SUMMER, KIBO, LISBREEN, CHUNGKING, and ROUGE.

I would not want to be without the rough but tall TIBET, and the short-lived but beautiful TRUTH. SUN DANCE with its suggestion of red on the trumpet flange is another fine flower even though it is weaker than many of the trumpets. The others so far are either less satisfactory or less distinctive. Their quality is generally very high, but many are late blooming flowers which generally are poor doers in this region.

KRILLIUM AND HEMEROCALLIS CULTURE

GEORGE GILMER, *Virginia*

My garden is heavy clay. Where I set some of my finest plants in 1952, I removed 10 inches of top soil and pulverized the next 10 inches and worked in krillium. Then I returned the top 10 inches pulverizing

it as it was replaced, and then worked krillium into this 10 inches. This gave me soil of the finest texture 20 inches down. *Hemerocallis* planted in it showed unusually large root growth, and considerably deeper rooting.

I thought that I noticed also more top growth. With such roots I feel sure the tops will be larger and better, and that dry spells should not halt the growth.

Krillium is too expensive to be used extensively. It keeps the soil around potted plants in excellent condition at small cost. Before any application the soil must be fairly dry and pulverized. The krillium must be well worked into the powdered soil. If the soil is wet or coarse the krillium cakes and does little good.

VEGETATIVE PROPAGATION OF HAEMANTHUS

The following references concerning the vegetative propagation of *Haemanthus* were brought to the attention of the editor by Dr. V. T. Stoutemyer.

(a) Wildeman, E. de. Bourgeous adventifs *Haemanthus.* Bull. de l'Acad. Roy. de Belg. Classe Sci. Ser. 5. *21:* 590—591. 1935. In the case of a sterile hybrid Wildman observed budding at the summit of the floral stalk, and also at the base of the stalk after flowering.

(b) Pynaert, L. Le bourgeonnement adventif des *Haemanthus.* Bull. Agric. Congo Belg. *27(2):* 255—269. 1936. Using 3—4 cm. long cuttings of the petiole, and leaf blade portions, of a sterile *Haemanthus* hybrid, Pynaert placed these in spaghum moss in July and obtained sprouting within 5 months.

LYCORIS FOR ENJOYMENT

Wyndham Hayward, *Florida*

The Gulf coast area, possibly of similar climatic conditions to those found in South Central China and the lower China coast, including lower Japan and Island of Formosa, has proved to be a hospitable host to the various species of *Lycoris,* especially those preferring warm climate regions.

In the range from lower Texas to Florida around the Gulf of Mexico and extending a few hundred miles into the interior may be found the great majority of *Lycoris* bulbs now grown in the United

States, with the exception of the hardy species, *Lycoris squamigera* and *Lycoris incarnata.*

Lycoris squamigera and *Lycoris incarnata* are hardy into the New England states, and also thrive from Nebraska to Ohio and New York state. The species *L. squamigera,* with its wider leaves, seems less at home in the South, although occasional reports have reached the writer of good results in upper Louisiana, Tennessee and the Carolinas.

Lycoris aurea is entirely at home in the Gulf coast area, but is limited to the warmer regions. It may be found growing with success into Tennessee, Louisiana and the Carolinas in protected locations.

Lycoris radiata, which masqueraded for many years as *Nerine sarniensis* in Southern Gardens until exposed a dozen years ago by the investigations of members of the American Plant Life Society, is thoroughly happy in the lower South, too, especially in heavier type soils. It seems only partly satisfactory in the sandy soils of peninsular Florida although it thrives in North Florida and Georgia where the soils are heavier.

Lycoris aurea is known as the HURRICANE LILY around St. Augustine, Fla., where it is most abundant of any location yet observed. Other plantings may be found on old plantations in Louisiana, Southern Mississippi and West Florida. It thrives down into Central Florida, but sometimes fails to bloom regularly every year. The aristocratic beauty of its fairy-like, sparkling, gold-dusted blooms makes it well worth waiting for, however. Nature has few such glorious rewards for the garden lover as the bloom of a well grown bulb of *L. aurea.*

L. radiata thrives almost to the point of becoming a weed in some old gardens in the lower South. In Southern Alabama, Mississippi and Louisiana, it exists in large colonies to the total number of doubtless millions of bulbs. It too, does not always bloom regularly every year, but the bulbs are so abundant and multiply so rapidly that this is no great problem and there is always a yard full of this *Lycoris* in late Summer and Fall where they are commonly found.

The rarer species of *Lycoris* are also found occasionally in the gardens of fanciers, in the lower South, in central and south Texas, and in southern California. These include *Lycoris sprengeri, L. incarnata, L. alba* and *L. straminea* Lindl. (?) (see Plate 8 Herbertia 1952) about the identity of which there exists some confusion.

Traub and Moldenke monographed the genus *Lycoris* in AMARYLLIDACEAE: TRIBE AMARYLLEAE, published by the AMERICAN PLANT LIFE SOCIETY, 1949, pages 165-182. They recognize eleven species, with several varieties. Some of these are unknown to cultivation, and because of the success of the *Lycoris* in American gardens of the South, every possible effort should be made to have them introduced by plant explorers as soon as conditions in South China permit.

Species No. 1, as listed by Traub & Moldenke, is *L. argentea,* described by Arthington Worsley from upper Burma, from bulbs sent to Kew Gardens by a Mr. Clapham Jukes, in 1904. So far as known this is not available in the United States. The color is described as bluish

mauve, with a silvery sheen and sparkle, and a mauve keel. The flower resembles a small *L. squamigera,* according to Worsley's description.

Species 2 of Traub & Moldenke's monograph is the rare *L. sprengeri,* which Charles Sprenger reported in 1906 was sent to him from Hupeh, China by his collector about 1900. Sprenger cites the coloring as quite amazingly polychromatic in character, rosy pink, vivid rose in the throat, "otherwise purple and carmine with Prussian Blue petals." This species has been reported from California gardens, so is at least in limited cultivation here.

Lycoris incarnata, a lovely light-rose or flesh-colored species from Hupeh Province in Central China, was also first described by Sprenger at Naples. It is available in limited supply in the American trade and was imported by the writer from China in 1948. It has been reported as blooming for Louisiana garden lovers, so should be tried in other parts of the South. I received it under the name, "*Lycoris squamigera purpurea.*" It grows well in Florida, producing its rather narrow leaves in fall and winter and blooming with an upturned umbel of light lavender-rose-pink blooms in late summer. It requires good culture, fertile but sandy well drained loam, and expert weeding to thrive and increase. It likes part shade and adequate watering, but will survive a long time under difficult conditions.

Lycoris squamigera is too well known to need discussion here except to say that it is known in horticulture as HARDY AMARYLLIS, and AMARYLLIS HALLII. It was first described by Maximowicz in 1885 and is a native of Japan and probably China. Apparently two gentlemen named Hall, were responsible for its first introduction into the United States, according to investigations into the literature by Miss Dorothy Manks, Librarian of the Massachusetts Horticultural Society, and reported by Traub & Moldenke. One was a Mr. I. D. Hall of New Bedford, Mass., who is supposed to have obtained bulbs from a sea captain who brought it from the Far East, and the other a Dr. Hall of Bristol, R. I., who first grew it in his garden in Shanghai, China when he was in the American diplomatic service there. Dr. Hall is said to have had it in his garden in China before 1860.

L. squamigera will grow in the South, but in the sub-tropics tends to waste away and seldom or never blooms. It seems to want a colder climate than Central Florida. It does famously in well-drained gritty garden loam in sheltered positions in the North, but sometimes skips a year's blooming due to weather conditions.

The remaining species of *Lycoris* in the monograph which we have not previously mentioned are *L. sanguinea,* the variety *alba* of same, the variety *cyrtanthiflora* of same, *Lycoris koreana, Lycoris rosea,* and *L. straminea.* These are not known in cultivation in the United States, so far as the writer is aware, excepting possibly the last named as already indicated.

Two varieties of *L. radiata* are mentioned, var. *Terracciana,* and var. *pumila,* a dwarf form, which are listed in Col. R. H. Grey's Hardy Bulbs, Vol. 2, but otherwise little known in recent literature. *Lycoris*

rosea may be a natural hybrid, Traub & Moldenke report. It is a species which bloomed at Kew in 1895, but like so many other good things has never arrived in America.

Whether the white forms of *Lycoris* found in this country are *L. sanguinea* var. *alba* or *L. albiflora* is not yet known. The bulbs as they have bloomed for Cecil Houdyshel, well known California bulb specialist, are small in size, but the flowers are handsome and nearly a clear white in color of flower. Dealers have listed these as *L. radiata* var. *alba.* The writer received some bulbs of a species marked "*L. alba*" from China in 1948 which he hopes to bloom next season. They are being nurtured with tender care.

The habitat of *L. sanguinea* var. *alba* is not listed and *L. albiflora* was described by Koidzumi in 1924 as cultivated in Japan and perhaps native to the Island of Amomoshima.

Lycoris straminea is stated to be a straw-colored type of the *L. aurea* order, with range in China. It is not known in cultivation in this country, unless it is the one parading under the name *L. albiflora,* although sent to Kew Gardens by Fortune from China in 1845. It is reported to be highly fertile. The writer has seen seeds of *L. squamigera* obtained from Japan before the World War II. *L. radiata,* at least the type as usually in cultivation in America, is a triploid, cytologically, and does not set seed. Recently Mr. Caldwell has located a source of the fertile strain of Lycoris radiata as reported in this issue of HERBERTIA. A Macon, Ga. horticulturist, W. T. Wood, has reported seed set on *L. aurea* with *L. radiata* pollen. The writer has never seen seed set on *L. aurea* in many hundreds of blossoms over more than a dozen years of growing the bulbs.

Propagation of *Lycoris* is by offsets which are abundant in the case of some species. Other species may be propagated by cuttage, either sectioning the bulbs upward through the base like cutting a pie, and replanting, which will give a slight increase in a year, in sand and peat, or growing the cut quarters and eighths of the bulbs sliced vertically through the base, as in Hybrid *Amaryllis* propagation described in early numbers of HERBERTIA.

If there exists a real opportunity to produce *Lycoris* hybrids, bulb fanciers should turn to this phase of Amaryllid culture without delay. In any case, every effort should be made by horticultural groups to bring in larger stocks of the rarer *Lycoris* species and varieties for trial in favorable climate areas of the country.

Lycoris aurea, perhaps the most lordly and majestic of the genus, was first introduced to England and Western culture by "Dr. Fothergill," as early as 1777, according to the literature. When it and *L. radiata* were brought to the American shores is doubtful, but it must have been more than a hundred years ago, possibly much longer, because of the wide distribution and available stocks now found growing in the Lower South.

Lycoris like a loamy-sandy soil, probably with some lime content, as most of the species seem most at home in such areas. St. Augustine

where *L. aurea* thrives and blooms so freely has a high coquina and coral rock content in its garden soils. West Florida has a limerock content in many areas where *Lycoris* succeed. The presence of clay and other heavy soils may be a factor in the success with *L. radiata* in Georgia, Alabama, Mississippi and Louisiana.

The bulbs stand considerable frost, *L. radiata* being somewhat more hardy than *L. aurea* in this regard. The foliage of these two species as well as *L. incarnata* and *L. squamigera* var. *purpurea* starts in Florida just after blooming time and grows all winter. The leaves die back in late spring and the bulbs are wondrously dormant all through the warm, humid, rainy summers of the Sunshine State with no injury. They evidently have no wish to be "dried off" like the Nerines. The blooming period for all *Lycoris* comes after their dormant stage, and the leaves begin to grow simultaneously, or after flowering.

In Florida sandy loams the *L. aurea* bulbs grow to large sizes, nearly or quite three inches in diameter sometimes, at best, with long necks. They pull themselves deeply into the light soils. In Louisiana, they form a clump in a few years practically at the top of the heavy clay type soils, virtually forcing themselves out of the ground in a few years, according to Miss Camilla Bradley of New Orleans, well known horticultural authority who has grown the bulbs in her country garden for some years. They do not make as large a bulb there but bloom well, she reports.

The rate of natural increase from offsets is not as fast in the case of *L. aurea* as in *L. radiata*. The bulbs of *L. aurea* are scarce and will remain costly to garden lovers for many years, unless new supplies are soon forthcoming from the Far East. *L. aurea* is one of the great classics of all bulbs, having been described by such great botanists as the Chevalier de Lamarck, Dean Herbert, Jaquin, painted by Josephine's eminent court floral artist, P. J. Redoute, "Liliacées" (plate 61, Vol. 2,), and Mrs. Bury included it in full color in her remarkable volume on Hexandrian Plants, in 1836 in England.

HYMENOCALLIS LONGIPETALA AND H. FESTALIS

LEN WOELFLE, *Ohio*

A few years ago in one of our more popular garden periodicals, a rather prominent writer suggested that after growing *Hymenocallis longipetala* (Lindl.) Macbr. he had about decided to relegate the same to the junk heap because he was disappointed with the small bloom and yellowish coloration of the flower. Surely if he had bothered to examine the bloom more closely he could not have written so harshly about such

a lovely plant. But then he may be one of those horticulturists who can appreciate only size of blooms overwhelmingly large, which dominate the scene by their sheer immenseness.

Hymenocallis longipetala develops one or two scapes of bloom to 30″ tall, five to eight blooms per scape on short pedicels. The declinate cup is about 2″ deep by 1″ wide, somewhat oval at the mouth. Lobes are about ¾″ long, much fringed and rolled backward against the outside of the cup. Petals are pure white about 4″ long, quite narrow, but very gracefully curved, giving the individual bloom a rather odd, tremulous appearance. The filaments are free beyond the cup for about 2″, white, and are exceeded about 1″ by the curved white style. The umbel opens radially over a period of about a week, in the garden. Foliage is rich green, leaves about 24″ long by 2″ wide. It may be grown in pots, or planted in the garden in spring and dug and stored dry over winter like the other members of the ISMENE section of the genus *Hymenocallis.*

Hymenocallis longipetala having short pedicels would allow the individual bloom to be cut for miniature arrangements. I wonder if anyone has ever tried the bloom for corsage work. The ivory coloring of the cup and petals soon changes to pure white after opening. It is the pollen parent of a fine white hybrid form, namely FESTALIS, with its delightful fragrance and waxy-white coloration.

This hybrid, a cross between *Hymenocallis narcissiflora* (syn.-*I. calathina),* and *Hymenocallis longipetala,* is just about intermediate between the two parents in appearance, but seems to have inherited the best characteristics of both.

The plant develops one or two scapes of bloom, taller than either parent, with five to eight blooms per scape. Individual blooms have short pedicels like *Hymenocallis longipetala,* making it adaptable for single bloom use. The pure white cup is about two inches deep and nearly as wide, (intermediate between the parents), the lobes of which are fringed and strongly recurved or rolled back against the cup. Petals are pure white, linear, to 4″ long and gracefully curved like the *H. longipetala* parent. Filaments again, are like those of *H. longipetala,* erect and free about 1½″, exceeded by the long white style about 2″. Foliage is a rich green, about 24″ long, by 3″ wide, (again intermediate). The blooms of the hybrid also open radially like the *H. longipetala* parent, rather than all in one direction like *Hymenocallis narcissiflora.* I would really consider *xHymenocallis* FESTALIS one of our finest white flowers. FESTALIS is not as readily obtainable as some of the other hybrids in this group, but a number of growers offer it. *Hymenocallis longipetala* seems to be rather scarce and I know of only one source of supply for this bulb.

After a number of years of growing these two plants and many attempts to obtain seed I am sorry to report I have been unable to get either to set seed, by their own or other pollens. However, the pollen of both seems viable and I have had a number of successful crosses on other varieties with them. It may be that I have been unable to determine the fertility period of these two varieties. Further experimentation along these lines may turn up something worth-while.

VIABILITY OF SEEDS OF WHITE-FLOWERING AMARYLLIS STRAINS

HAMILTON P. TRAUB, *California*

On July 11, Mr. Wyndham Hayward, of Lakemount Gardens, Winter Park, Florida, sent to the writer a packet containing 28 fresh seeds of hybrid *Amaryllis* of the Ludwig pure white-flowering strain for use in a germination experiment. The seeds had been recently received from the grower and were in the original cellophane cover as packaged by Ludwig in Holland.

The seeds were planted on July 16. The procedure was as follows: Krillium was added to dry clayey garden loam according to the directions of the manufacturer. To one part of this mixture equal parts of medium coarse sand and carex black peat were added. A 5-inch pot was filled ¾ from the top with this final mixture, and about a half inch depth of medium coarse sand was placed on top it. The soil with sand on top was carefully watered and the seeds were planted evenly over the available area. *Amaryllis* seeds are usually described as discoid, but the shape is usually more nearly D-shaped. Evenly spaced depressions were made with the pointed end of a pot label and the seeds were placed in these with the flattish edge downward, and with a small part of the upper rounded edge protruding from the medium coarse sand. A piece of narrow mesh window screen wire a little larger than the area was then firmed down over the seeds so as to come into contact with the sand. This is necessary to prevent loosening of the seeds during regular watering. As soon as the seeds begin to sprout the wire screen is raised sufficiently so that the sprouting leaves do not touch it. After the seedlings are well established, the wire screen is removed.

In 14 days after planting (July 16), the seeds began to sprout, and 8 seedlings had appeared above the surface by August 8. This was increased to 21 seedlings by August 15, and a final total of 23 seedlings by August 23. Thus an approximate total of 82% of the seeds germinated. The seedlings were fertilized at fortnightly intervals with a sprinkling of Vigoro which was immediately washed down after application. The seedlings grew rapidly and all survived.

Many *Amaryllis* enthusiasts have reported failures with *Amaryllis* seeds of pure white-flowering strains. Such seeds apparently soon lose their viability after harvesting. Seeds of the colored strains appear to hold their viability somewhat longer, but it is advisable to plant all *Amaryllis* seeds as soon as possible after harvesting when produced in humid regions. Hermon Brown (HERBERTIA 1952, page 112), in the central valley of California reports that seeds harvested in May—July gave good germination when planted in the following January. This apparently might not apply to seeds produced and stored in humid

regions, unless the seeds were stored under the required conditions of atmospheric temperature and humidity. What these conditions might be could only be determined by experimentation.

POT CULTURE OF AMARYLLIS BELLADONNA L.

Hamilton P. Traub, *California*

Although the brilliant scarlet-flowering *Amaryllis belladonna* L. var. *major* is naturalized in Florida, this fine subject has not been cultivated indoors in pots to any great extent in the North. This is due to the fact it requires very good soil drainage. The root system under pot culture is not very extensive and unless special precautions are taken, the soil becomes sour (pH too low), and the roots become reddish and die off so that finally the rootless bulb showing red-rot and reduced leaf top (also red-streaked) can be lifted out.

The writer has carried on cultural experiments with this subject over several years and has had satisfactory results with the following pot culture method. A half to one inch layer of crock chips or gravel is placed on the bottom of the pot, and it is filled 2/3 from the bottom with coarse sand. The bulb is placed on top of the sand if rootless, but if roots are present these are worked into the sand so that the base of the bulb is on top of the sand. A soil mixture of 1/3 loam, 1/3 coarse sand and 1/3 black carex peat is placed around the bulb to within an inch of the top. The plants are fertilized regularly with Vigoro, or other suitable fertilizer. The plant is evergreen, but it is best to reduce the water applied and omit fertilizer from November to February.

Bulbs of *Amaryllis belladonna* L. var. *major* potted and treated in this way have now been grown for three years and have made excellent root growth and have flowered regularly each year, and show no root diseases such as red-coloration and die back.

It is hoped that bulb dealers will now include *Amaryllis belladonna* L. var. *major* among their offerings and thus make this fine subject available to all since a steady supply of bulbs can be obtained by arrangement with Florida growers.

The writer has five varieties of *Amaryllis belladonna* L., in addition to the type. It is noteworthy that two of these will thrive under ordinary pot culture. Some of these forms are described in Traub & Moldenke's *Amaryllidaceae:* Tribe *Amarylleae.* 1949 (Publ. by The American Plant Life Society, 26 E. Camino Real, Arcadia, Calif.):

1a. Varieties requiring special pot culture as outlined above:
Amaryllis belladonna L. var. *major* (2-fld, Scarlet; West Indies)

Amaryllis belladonna L. var. *minor* (2-fld., scarlet; West Indies)
Amaryllis belladonna L. var. *sebaiana* (3—4-fld., scarlet; West Indies)
Amaryllis belladonna L. var. *barbata* (2-fld.; creamy white; Surinam)

1b. Varieties not requiring special pot culture:

2a. A variety that makes fair growth without special treatment, but which responds with better growth if the special pot culture is used:

Amaryllis belladonna L. var. *haywardii* (2—3-fld.; carmine pink; Bolivia)

2b. The type which produces extensive roots and never requires special pot culture:

Amaryllis belladonna L. (type), Barbados Lily (2—3-fld., scarlet; West Indies). The extensive root system keeps the soil sweet, but the roots and offsets soon fill the pot, and the bulbs rarely if ever flower under pot culture. Recommended for out-door culture in sub-tropical climates.

All of the forms listed make offsets profusely, except *Amaryllis belladonna* L. var. *haywardii* which makes only a moderate number. When profusely produced, the offsets should be removed every six-months or oftener if required in order to keep the parent bulbs (3 to a 6″ pot) in good condition.

It is of interest to note that the special pot culture method has also been used for some other amaryllids difficult to handle. More detailed reports on these will be made in the future. The use of Krillium and similar soil conditioners may make it un-necessary to resort to special pot culture methods but such recommendations will have to be based on experimental data.

AMARYLLIS BELLADONNA LINN. IN FLORIDA

C. L. Burlingham, *Florida*

My beginning with the American Belladonna, *Amaryllis belladonna* Linn. is rather amusing to me now. I ordered six Amazon Lilies from a lady in Georgia. I know now that I received three bulbs of *Amaryllis belladonna* Linn., two of *xAmaryllis johnsonii,* and another bulb I have never identified. I planted them April 29, 1948, three to a row, in a raised bed of sandy soil. The bulb I never identified, I planted too close to the edge of the bed, where it did not get enough water during the dry

[Burlingham—AMARYLLIS BELLADONNA, continued on page 152.]

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PREFACE

The AGAVE FAMILY *(Agavaceae)* includes species that are important from the standpoint of industry: BOMBAY FIBER *(Agave vivipara* L.), BOWSTRING HEMP *(Sansevieria zeylanica* Willd.), DRAGON'S BLOOD (resin from *Dracaena cinnabari* Balf. f.), DRAGON TREE of Canary Islands *(Dracaena draco* L.), HENNEQUIN *(Agave fourcroydes* Lem.), MEXICAN FIBER *(Agave heteracantha* Zucc.), KERATTO FIBER *(Agave morrisii* Baker), MAURITIUS HEMP *(Furcraea gigantea* Vent.), NEW ZEALAND HEMP *(Phormium tenax* L. f.), and SISAL HEMP *(Agave sisalana* Perr.). The AGAVE FAMILY also includes many species of great importance as ornamentals useful in landscape design, and as garden, window, conservatory and patio subjects. Unfortunately, the popular information about these plants is quite limited, and it was to make good the deficiency that in 1952, an AGAVACEAE COMMITTEE was organized with Mrs. Morris Clint as Chairman.

In the present FIRST AGAVACEAE EDITION of PLANT LIFE an attempt has been made to present articles on *Agavaceae* of interest chiefly as garden, window, conservatory, and patio subjects, and also one species of value in landscape design. This issue includes articles on *Dracaena* and *Cordyline,* the tribes and genera of the AGAVE FAMILY *(Agavaceae), Beaucarnea recurvata,* and *Polianthes tuberosa.* The AGAVACEAE COMMITTEE plans to continue this start with additional articles in future issues of PLANT LIFE.

The present issue also includes book reviews (PLANT LIFE LIBRARY), description of the Society publications, a listing of plants receiving APLS awards in 1952, and seeds and plants directory. At the end of the issue will be found a complete table of contents to Plant Life, Vol. 9. 1953 to be used in binding the volume.

1531 Rodeo Road,
Arcadia, California,
January 5, 1953

Harold N. Moldenke
Hamilton P. Traub

CORRIGENDA

PLANT LIFE, VOL. 9, 1953

Page 83, division "1b" in key, first line, delete "basifixed". Study of living material for a number of species in the Subgenus COOPERIA has shown that the stamens were not basifixed.

HERBERTIA, VOL. 12. 1947

Page 60, 23rd line from top, change "probably in Argentina and Chile" to read "in Texas, near New Braunfels.".

HERBERTIA, VOL. 15 (1948) 1949

Page 78, 2nd paragraph; delete that portion which states that "Bot. Reg. pl. 382. 1819" represents *Haemanthus clarkei* Hort. It should be noted that the illustration "Bot. Reg. pl. 382. 1819" represents *Haemanthus pubescens* Ker-Gawl., non L. f., now considered as a synonym of *Haemanthus albiflos* Jacq., and is not a hybrid as indicated by the writer in HERBERTIA 15: 78. 1948, through an error.—*L. S. Hannibal*

DRACAENA AND CORDYLINE IN THE LOWER RIO GRANDE VALLEY

MRS. MORRIS CLINT, *Texas*

Of the many beautiful tropical foliage plants that are grown today, few can rival *Dracaena* and *Cordyline* in beauty, ease of cultivation and variety of use. Though both are popularly known and usually sold under the name *Dracaena,* the two genera come from the opposite sides of the world; *Cordyline* being found in Australia, New Zealand, East Indies, Malaya and the South Sea Islands, while most of the *Dracaena* species are native to tropical Africa. The two groups are very close horticulturally, differing technically in size and character of flower and fruit, but even an amateur can easily learn to tell the two apart by the general appearance of the plant. The leaves of *Dracaena* are softer and more succulent, and variegation, when present, is more regular and persistent. In *Cordyline,* with few exceptions, the leaves are narrowed into a definite, deeply channeled petiole and are arranged on the stem in an ascending spiral. Variegation is not usually constant, but appears in flushes and streaks and varies with the season and the age of the leaves. As a rule, the young center leaves have the most brilliant hues, the color reaching a peak during the fall and winter. However, here in the Valley, well cared for plants are well colored all or most of the year.

CORDYLINE [FIG. 19; PLATE 11, LOWER; PLATE 12]

The genus *Cordyline* is rapidly gaining in popularity over the country, due apparently to the increased use of the beautiful leaves in flower arrangements. Hawaii seems to have been the center or impetus of this recent "boom". Several years ago, growers there began shipping large boxes of "colored leaves" to the florists on the American mainland. As they filled a very decided need, they were welcomed with open arms. It soon became known that the leaves were from the "Ti" plant, as *Cordyline* is called in Hawaii; so a new name and a new rage were born overnight. Word of the Hawaiian "Ti" must have spread through the garden clubs, as so many of our recent, out of town visitors invariably ask to see the "Ti" plant, desiring to know the correct name, where plants may be obtained and how to care for them. Gardeners in Hawaii and the warmer parts of this country have long been aware of these beautiful plants and their extreme usefulness, and they deserve to become better known over the rest of the country. In Brownsville, we use both *Cordyline* and *Dracaena* in the garden for landscape effect, and in pots and tubs for porch and patio. With the increased use of glass in modern building, gardeners in the colder sections should have no difficulty in caring for these lovely tropicals.

Most of the Cordylines seen today are hybrids originating from a few species, the highly colored *C. terminalis* [Fig. 19] being the most widely used. Many of these hybrids have been named, but nomenclature is in such hopeless confusion that I do not feel qualified to attempt any descriptions. We find the same plant masquerading under several names and we may buy different plants under the same name. However, all are very beautiful, with colors ranging through various shades of purple, rust, bronze, green, red, crimson, pink and white, and combinations of these.

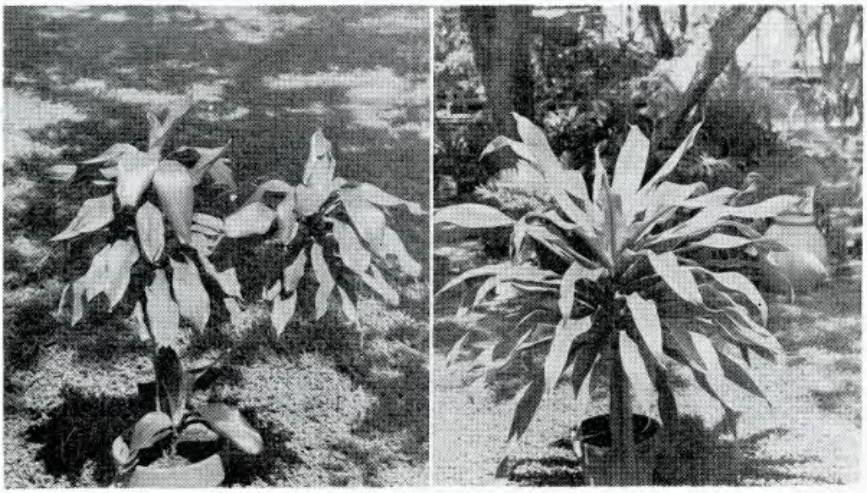

Fig. 18. *Left, Dracaena* hybrid *(xDracaena masseffiana)* in 8-inch pot; *right, Dracaena rothiana* (?); (in background, on tree is unidentified *Monstera* sp. from Mexico. Photos by Mrs. Morris Clint.

DRACAENA [FIG. 18; PLATE 11, UPPER]

Nomenclature of *Dracaena* seems more stabilized in the trade, and horticultural forms as well as species are usually dependably listed. In only one instance have we received a plant that we feel may be incorrectly classified. The plant in question is *D. rothiana,* supposedly a variety of *D. fragrans.* Our plant is entirely unlike *D. fragrans* and seems to more closely fit the description of *D. hookeriana.* It is a very slow growing but most satisfactory plant, having very heavy, dull green, arching leaves with a fine, white pellucid border. *D. fragrans,* with plain, arching leaves of shining green, and its varieties are desirable and lovely plants. *D.* Janet Craig *(craigii)* is similar to the species, but has darker green, slightly ridged leaves. This is a fast grower with us, our two and a half year old plant now being almost five feet tall. *D. massangeana* is perhaps the best known of this group. It has a broad central stripe of yellow, while *D. lindeniana* is the reverse, with leaves of yellowish green and central band of darker green. *D. victoriae* is

truly a gorgeous plant, having cream white leaves with center of deep green, but is rather a difficult subject, requiring perfect care and growing conditions. Growth is slow with us, and we experience difficulty in the summer in preventing the creamy portion of the leaves from burning. One would hardly recognize the species *D. godseffiana* as a *Dracaena.* It is quite shrubby in character, with small leathery leaves of deep green, heavily spotted with yellow, which turns cream white upon aging. There is also a variety of this having a heavier variegation, but we find it so slow in growth that it is hardly worth while. A very lovely hybrid between *D. godseffiana* and *D. massangeana,* called *D. massefiana,* is a

Fig. 19. *Cordyline terminalis* (var. Ti) in flower; plant 4½ feet tall (12-13-52) 2 years growth since the last freeze. Photo by Mrs. Morris Clint.

strange mixture of the two species. It is semi-shrubby, with medium sized, drooping leaves, lightly spotted yellow. *D. deremensis* var. *warneckii is* a slightly smaller plant than *D. fragrans* and its varieties. It has narrower, arching leaves banded longitudinally with green, gray and white. *D. longii* is possibly a sport of this, having bands of pure white and dark green. It is a very striking plant, but we have much the same trouble as in *D. victoriae* during the hot months. *D. marginata,* sometimes called *D. gracilis,* is a very graceful species with long, narrow leaves edged with reddish brown. *D. sanderiana* is a tall, slender plant with small, narrow, wavy leaves of green and white set far apart on the stem. It is useful when small for dish gardens, but potted specimens must be cut back at intervals to prevent them from becoming too tall

and leggy. This species of *Dracaena* seems to stand more sun than most. *D. virens* is a plain green form of this. Distinctly different from any of the above and the most beautiful of all, is *D. goldieana.* Leaves are broad and spreading, narrowed into a deeply channeled petiole, and are horizontally barred with irregular bands of gray. Unfortunately, this species is very rare and hard to obtain, as it is both delicate and slow. Our plant of *D. goldieana* was severely damaged in the 1951 freeze, losing most of the leaves and the entire root system when temperatures in the greenhouse skidded to a few degrees above freezing. We were fortunate enough to root the tip cutting, which has since made a truly remarkable recovery.

CULTURE

Culture of *Dracaena* and *Cordyline* is similar, though *Cordyline* will stand considerably more abuse. Both are tender tropicals, but *Dracaena,* whose leaves are more succulent, will often spot and burn long before temperatures reach freezing. However, in our garden, well established plants of both genera survived a week-long freeze, with a minimum temperature of 19 degrees. True, the tops were killed to the ground, but most of the plants had completely recovered and had reached their former height within a year. More care is necessary with plants in pots and tubs, of course. In the same freeze, we lost many fine species and hybrids of *Cordyline* in our open patio, and one unidentified species of *Dracaena* we have so far been unable to replace.

We have not found any of these plants particularly fussy as to soil, but they do respond to moderately rich, well balanced soil mixtures and regular fertilization. Moisture requirements, particularly during the warmer months, are a little above the average, but good drainage is essential. It is especially necessary for plants in containers to be provided with adequate supplies of food and water, so as to prevent loss of the lower leaves and to preserve their beautiful color. We have had *D. lindeniana* revert completely, due entirely to lack of fertilizer. This is of course true of many variegated foliage plants, and is particularly hard to cope with where there is high alkalinity of soil and water, as in our case.

Our specimens in the garden endured a grueling experience this spring, when an acute water shortage hit this area, due to a record drought over the entire water-shed of the Rio Grande River. For about two months, our plants received not one drop of water. They came through the ordeal very much the worse for wear when in too much light, but held up fairly well when in the proper amount of shade. To grow them to the degree of perfection they deserve, give as much light as the plants can stand without burning, choosing a spot that is sheltered from strong winds. Insects and pests give very little trouble on healthy plants, except when very young. Our chief problem has been a fungus which attacks the edges of the leaves. Fermate will give complete control, if used with a good spreader at intervals of ten days. Unfortunately, with us the ten days rolls around too often.

(Upper) Bench in greenhouse showing Dracaenas and so-called Aralias. (In background, left to right): **Dracaena rothiana** (?); **D. marginata; D. lindeniana;** (Foreground, left to right): **D. sanderiana; D. godseffiana; D. longii, D. virens, D. warneckii,** (Lower right hand corner): **D. goldieana.**

(Lower), Cordyline terminalis (var. Ti). Windows in picture are very high from ground.

Photos by Mrs. Morris Clint.

Plate 11

(Upper left) Unidentified **Cordyline** sp., leaves dark purple, in 8-inch pot. (Upper right) In background, very robust plain green **Cordyline sp.**; right foreground, **Cordyline** hybrid, dwarf form; left, unidentified **Maranta** sp. from Mexico, dark green, lots of white flowers in summer.

(Lower left) **Cordyline** sp.; **Polyscias balfouriana** and **Castus igneus** in background.

(Lower right) **Cordyline** sp.; poinsettia; **Cadiaeum** sp., (more commonly, **Croton**); **Pandanus sanderi; Jasminum rigidum** (?); **Crinum** sp. in foreground, interplanted with hybrid **Amaryllis.**

Plate 12

PROPAGATION

Propagation of both *Dracaena* and *Cordyline* may be accomplished by rooting the tender tip shoots, air-layering, or by cuttings of the canes. Thus, when a plant has outgrown its beauty and has a length of bare stem, you may air-layer the top, using a match or something similar to keep the wound well open till roots have formed in the moss; then cut the stem into pieces from two to six inches long. Weather should be warm enough for good general growing conditions. We have found March and April to be the best time here, as our spring is early and all too short.

Several years ago, we successfully rooted in open flats of sand and peat in equal portions, canes of *D. fragrans, D. massangeana, C. terminalis, C.* FIREBRAND and *C.* MRS. EUGENE ANDRE. Our percentage of loss was not heavy, but we were not entirely satisfied; so when, on March 2 of this year, we received a number of canes of *C.* RUFUS SCOTT, *C.* LORD WOLESEY, *C. tricolor* and *C.* JANET CRAIG, Mr. Clint decided to experiment, using different methods and rooting mediums. Into a glass covered propagating frame, one section containing Sponge-Rok, the other a 50-50 mixture of Sponge-Rok and German peat, he placed 4″ to 5″ pieces of stem, lower half treated with a rooting hormone. Cuttings were inserted upright about halfway in the mediums. In two seed flats, one containing equal portions of Sponge-Rok and peat, and the other a mixture of vermiculite, sand and a sprinkling of peat, 2″ cuttings were laid flat, just being covered with the mediums. Over the Sponge-Rok and peat went a mulch of red-wood fibre, over the vermiculite damp sphagnum was used. Both were covered with glass. One cutting, 5″ long, of each variety was suspended in distilled water and placed in the greenhouse, another set was planted in the ground and mulched with red-wood fibre. Sprouts appeared from the dormant eyes on most of the cuttings, in all mediums, within a few days. Roots developed on those in the distilled water shortly afterwards, and the shoots on these appeared to grow faster, but those in the Sponge-Rok soon passed them and about 50% of the latter were potted up just a month after planting. Cuttings in the other half of the propagating bed were considerably slower, and the experiments in the two flats were a comparative failure, due to the fact that boxes were kept in too much sun. Rooting was slow and uncertain and the little shoots burned badly as they grew up through the mulching material. In an attempt to keep the sphagnum damp and prevent this, most of the cuttings in the vermiculite were lost due to over-watering.

To sum up the results: Sponge-Rok seems to be the best rooting medium, with quickest results and less loss; cuttings of about 4″ are the best length, giving good, strong shoots; care should be taken to keep cuttings damp but not wet; loss after potting is liable to occur if shoots are insufficiently developed when cuttings are potted, or if soil in pots is over dry or too wet. As roots form only at the base of the old stem,

[Clint—DRACAENA AND CORDYLINE, continued on page 152.]

THE TRIBES AND GENERA OF THE AGAVACEAE

HAMILTON P. TRAUB, *California*

During 1952 an AGAVACEAE COMMITTEE was formed with Mrs. Morris Clint as Chairman, and therefore it is desirable to publish an outline of the field to be covered by this Committee. The key to the tribes and genera of the *Agavaceae* to be presented in this paper has been based mainly on the excellent text in Hutchinson's Families of Flowering Plants (Vol. 2. 1934) which the reader should consult for the study of the relationship of the *Agavaceae* to the other families of the MONOCOTYLEDONS. The enlarged key to the genera *Nolina, Calibanus* and *Beaucarnea* of the Tribe *Nolineae* has been taken from Standley (1920). The new Tribe *Hosteae* is proposed for the first time.

Hutchinson (1934) presented a new classification of the MONOCOTYLEDONS in which the new Family *Agavaceae* was proposed "as a halfway house between the Liliaceous stock and the climax group of the *Palmae*. . . . It may be regarded as a family composed of the most advanced tribes formerly included in the *Liliaceae* and *Amaryllidaceae,* the ovary being either superior or inferior. The rootstock is never bulbous, the habit is usually arborescent, whilst the inflorescence is never umbelliform as in the *Amaryllidaceae (sensu stricto).*" Hutchinson proposed this classification on wholly morphological grounds, but McKelvey and Sax (1933) working independently at about the same time corroborated this arrangement in part on a cytological basis. They showed that *Yucca* and *Agave,* and also *Hesperoyucca, Hesperaloe* and *Samuela,* and at least one species of *Furcraea* are apparently related on the basis of the resemblance of their karyotypes. Whitaker (1934), also working independently of Hutchinson (1934), combined the cytological results of previous workers with his own and showed that the five genera in the *Liliaceae (Yucca, Hesperoyucca, Hesperaloe, Cleistoyucca, Samuela)* and four genera in the *Amaryllidaceae (Agave, Furcraea, Polianthes, Beschorneria)* form a distinct unit and as such should be united in any future revision of these two families. Thus the morphological and cytological data provide a firm basis for the new Family *Agaveceae.* Granick (1944) studied the karyotype in 36 species of *Agave,* and thus corroborated and extended the work of previous workers, and on evidence obtained in a study of the karyotypes of various genera of the *Monocotyledons,* a line of ascent was "postulated from the primitive Monocotyledons such as the *Butomales* up through a rhizomatous liliaceous stock like *Hosta,* to the *Agaveae.*" This answered the objection of Watkins (1936) that the evidence presented was not extensive enough. Since the unique "*Yucca-Agave* karyotype consists of a pattern of ten large chromosomes on the periphery of the metaphase plate and fifty small ones differing slightly in size grouped in the center," a karyotype

"also found in *Yucca, Furcraea* and *Hosta*" (Whitaker, 1934; Granick, 1944), we may consider *Hosta* as allied to the *Yucca-Agave* group. Although the leaves of *Hosta* differ from those of most *Agavaceae* as recognized by Hutchinson (1934), there is similarity between its flowers and those of the Tribe Yucceae. Such a difference in vegetative anatomy might be explained on the basis that the species of *Hosta* have evolved in a mesophytic climate.

Hutchinson (1934) grouped the genera *Hemerocallis, Hosta, Hesperocallis,* and *Leucocrinum* under the tribe *Hemerocalleae.* Cave (1948) has shown that *Hesperocallis* and *Leucocrinum* should be excluded from the tribe *Hemerocalleae.* This tribe had been transferred to the *Amaryllidaceae* by Traub (1938), with confirmation by Traub & Moldenke (1949), on the basis of the chromosome complement, 2n = 22, of the type genus *Hemerocallis,* and similarity in flower morphology. Thus the residual genus *Hosta,* apparently unrelated to the genus *Hemerocallis* has to be considered as the type of the separate tribe *Hosteae.* This tribe is apparently nearest to the *Agavaceae* as already indicated, and in the present treatment is included as the most primitive tribe of that Family.

No chromosome studies for the Tribe Phormieae are available. Whitaker (1934) and Granick (1944) have pointed out that *Doryanthes,* from the standpoint of karyotype and geographical distribution, does not belong in the *Agaveae,* and that there is no apparent resemblance of the karyotypes of the *Nolineae* and *Dracaeneae* to the *Yucca-Agave* chromosome complex. For the present, however, awaiting further study, these groups are retained in the *Agavaceae* on morphological grounds as proposed by Hutchinson (1934).

The key to the tribes and genera of the revised Family *Agavaceae* follows:

KEY TO THE TRIBES AND GENERA OF THE AGAVACEAE

1a. Ovary superior:
2a. Flowers hermaphrodite; fruit usually capsular:
3a. Anthers not foveolate (pitted) at the insertion of the filaments:

4a. Plant a perennial herb ..... I. Tribe HOSTEAE[1]

Flowers white, lilac or blue, trumpet-shaped or campanulate, in short or open raceme terminating the scape (Siberia, China and Japan)
Genus 1. HOSTA

4b. Plants with stem woody, short or tall:

5a. Tepals free or rarely connate ..... II. Tribe YUCCEAE
6a. Tepals connivent into a cylindrical "tube"; flowers large, in a single raceme (Calif.) ..... Genus 2. HESPERALOE

[1] Tribus **Hosteae Traub, tribus nov.** (descr. et typ.—**Hosta Trattinnick,** Archiv. der Gewaechskunde I, pt. 2. p. 14, nr. 89. 1812.). **Genus typicum: Hosta Tratt. (1812).**

6b. Tepals connivent into a globose or campanulate "tube":
7a. Style absent (Calif.; Ariz.) ..... Genus 3. CLISTOYUCCA
7b. Style present; tepals free or united:
8a. Tepals free (N. to Cent. Amer.) ..... Genus 4. YUCCA
8b. Tepals united (Texas, Mex.) Genus 5. SAMUELA (HESPEROYUCCA)

5b. Tepals variously connate ..... III. Tribe DRACAENEAE
9a. Ovules numerous:
10a. Style well developed; tepals united into a short tube (Tropics, except Afr.) ..... Genus 6. CORDYLINE
10b. Style short; tepals united at the base only (Masc. Isl., N. Caled.) Genus 7. COHNIA
9b. Ovules solitary:
11a. Stem present, woody; fruit a berry (Warm regions) Genus 8. DRACAENA
11b. Stem absent or very short, often fibrous; leaves thick and leathery; fruit a thin pericarp falling away from the berry-like seeds (Trop. & S. Afr. & India) ..... Genus 9. SANSEVIERIA

3b. Anthers foveolate (pitted) at the insertion of the filaments IV. Tribe PHORMIEAE
Tepals united in the lower part, fruit a loculicidal capsule (New Zealand) Genus 10. PHORMIUM

2b. Flowers polygamo-dioecious or dioecious in panicles; fruit indehiscent ovules 2 or 3 in each cell ..... V. Tribe NOLINEAE
12a. Ovary 3-celled; fruit exaltate:
13a. Fruit deeply 3-lobate, often inflated (S. W. U. S. & Mex.) Genus 11. NOLINA
13b. Fruit not lobed or inflated (Mex.) ..... Genus 12. CALIBANUS
12b. Ovary 1-celled:
14a. Fruit 3-winged; tepalsegs entire; leaves somewhat ribbed, the margins not prickly (Mex.) ..... Genus 13. BEAUCARNEA
14b. Ovules 3, erect; flowers in dense narrow panicles (N. Amer.) Genus 14. DASYLIRION

1b. Ovary inferior:
15a. Flowers actinomorphic; inflorescence usually paniculate VI. Tribe AGAVEAE
16a. Stamens longer than the perigone; style filiform (Amer.) .... Genus 15. AGAVE
16b. Stamens shorter than the perigone:
17a. Filaments and style thickened below the middle; panicle very large (Trop. Amer.) ..... Genus 16. FURCRAEA
17b. Filaments and style not thickened:
18a. Anthers dorsifixed; tepalsegs erect (Mex.) ..... Genus 17. BESCHORNERIA
18b. Anthers basifixed; tepalsegs spreading from the base (Austral.) Genus 18. DORYANTHES

15b. Flowers zygomorphic; inflorescence spicate or racemose VII. Tribe POLIANTHEAE
19a. Flowers usually paired:
20a. Tepaltube cylindrical, expanded at the top (Cent. Amer., Mex., Trinidad) Genus 19. POLIANTHES
20b. Tepaltube widened in the middle (Mex.) ..... Genus 20. PROCHNYANTHES
19b. Flowers usually solitary (Mex.) ..... Genus 21. PSEUDOBRAVOA

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NOTES ON BEAUCARNEA RECURVATA

Mulford B. Foster, *Florida*

My introduction to *Beaucarnea recurvata* coincided with my first tour of Florida nurseries in 1924 in the days when this plant was known as *Nolina recurvata*. It was in the garden of the old Royal Palm Nursery at Oneco, Florida. Only by chance was my eye attracted to a rather odd looking plant quite different than any of the familiar tropical plants. Its large tuft of narrow leaves gracefully spilling out of the top of a spindly trunk which emerged from an overstuffed bulbous base intrigued me immensely. Although it was eighteen feet high and I considered it good size at that time, its proportions were dwarfed when I beheld the same species growing in its native habitat eleven years later.

It was in 1935, near the Gulf Coast, in the eastern part of the state of San Luis Potosi, Mexico, on my first plant collecting trip there that I saw a single, lonely mature plant of *Beaucarnea recurvata* growing in its rocky habitat. This was a magnificent giant whose unusual character now fascinated me even more and I could scarcely contain my eagerness in anticipation of seeing more than this one specimen, a wish granted a few days later when, with my artist friend, I crossed the Huasteca mountains on the way to the city of San Luis Potosi. It was impossible to proceed on the new Pan American Highway which was just being completed at that time, on account of a huge landslide that had occurred a hundred miles ahead on the mountainous road to Mexico City.

Crossing the Huasteca was a very rough and arduous trip. One day we were able to make only twenty miles but this slow pace gave me a chance to observe more closely than I could have otherwise, the interesting desert and mountainous vegetation. Also, in this direction we chanced upon a forest, no less, of Beaucarneas growing between and over the great boulder-strewn sides of a mountain.

Fig. 20. *Beaucarnea recurvata* as grown in Florida. Photo by Mulford B. Foster.

The photos my camera took were lost but the indelible impression and mental picture of this great sight has never left me. There were literally thousands of these fantastic bulbous giants growing where it would seem that nothing else could grow. Whenever I attempt to describe the dimensions of the largest specimens that were observed on this trip, few people believe that a story teller's license has not been liberally taken. But no exaggeration is intended.

The huge bulbous base was twenty-nine feet in circumference at the ground; it gradually sloped into the trunk which rose into a branched tree-like form to thirty feet in height; the trunk was but eighteen inches in diameter six feet from the ground—a fact which emphasized more sharply the unusual bulbous base. My enthusiasm immediately made my imagination transport this magnificent specimen to our garden in Florida—what a prize it would be!

I was determined to climb up into this tree to procure seeds but it was like trying to climb over a huge ball without anything to hang on to. We had to cut down a small tree to use as a ladder for climbing up over the base to the trunk. From there I climbed up to where the lower branches were formed, and then I went on up into the maze of long ribboned leaves. I felt as though I was caught in a series of green fountains for the top and all of the branches were tipped with drooping fountain-like heads that continuously bubbled over with gracefully streaming leaves.

A year later in 1936 I returned to this area again and was able to collect a nice quantity of viable seeds which were planted upon my return to Florida. The plants in their infant stage resemble a tuft of grass growing from a little bulb but in a few years they take on the character of the adult; they are always intriguing at any stage. Some of these seedling plants are now eight or nine feet high but some of them are not more than two feet high . . . even though they are all the same age.

For the home gardener the culture of these plants is certainly very simple. The soil should, naturally, be well drained whether sandy or rocky. They do exceedingly well in a large pot or tub as an ornamental patio plant but as a specimen in the ground for a feature it is nonpareil. They are not adverse to cool weather but do not enjoy a temperature much below freezing.

The fruit which resembles a small cylinder with three flange-like wings tightly enclose a globular hard seed having three rather indistinct lobes. These fruits are borne on a much branched inflorescence two to three feet high which contains hundreds of small whitish flowers. As soon as the fruits are mature they dry on the branches and are shaken loose by the wind and are carried on their three wings to a new landing or sprouting platform.

The Beaucarneas like so many other exceptionally decorative plants that are slow growing will always be a feature in any garden fortunate enough to possess one.

POLIANTHES TUBEROSA

HAMILTON P. TRAUB, *California*

Polianthes tuberosa L., is widely cultivated in the United States. The usual forms met with are the single ones with entirely green leaves or with white or yellowish margined leaves, and the DOUBLE PEARL form. Forms with reddish flowers have been reported but in each case that the writer investigated it was found that the plants produced white flowers. It is of interest to note in this connection that the colored plate by Drapiez (Herb. L'Amat. Fleurs. *4:* pl. 272. 1830) shows a form in which the buds are suffused with red and a little blue. The open flowers are reddish on the back of the tepalsegs. If such a form really exists, it would be highly desirable to search for it again. With a distribution from Mexico, Central America and Trinidad, it would be surprising if color variations would not be found. Species of the related genera *Prochyanthes* and *Pseudobravoa,* also in the Tribe *Poliantheae,* should be brought into cultivation. Possibly bi-generic hybrids could be made in this Tribe.

PLANT LIFE LIBRARY

OUR GARDEN SOILS, by Charles E. Kellogg. The Macmillan Co., New York. 1952. pp. 232. $4.00

At last we have the long awaited concise, easily readable book on soil science by an eminent authority on the subject. He "tells you, in non-technical language, how to determine soil types, how to maintain proper amounts of organic matter and moisture, how to control soil acidity and how to balance plant nutrients. Numerous tables recommend specifically the plants that are best for your soils." Discussions of tillage, site relations, protection, lawns, potting soils, transplanting and garden planning are also included. Every gardener should own a copy of this excellent book.

THE PRINCIPLES OF GENERAL BIOLOGY, by Mary S. Gardiner. The Macmillan Co., New York. 1952. pp. 657. illus. $5.25.

This easily readable and attractive text by an experienced teacher will be welcomed by students as well as adults seeking a liberal education. The first section of the book is devoted largely to the concepts and techniques of physics and chemistry upon which biology is primarily dependent. In the second section the organization of living things is

considered on a comparative basis. It should be noted that at the lower levels of structural organization, and differentiation of cells, plants and animals are discussed together. The third and fourth sections are concerned with the operation and evolution of biological systems. The text is adequately illustrated. It is highly recommended.

INSECT RESISTANCE IN CROP PLANTS, by Reginald H. Painter. The Macmillan Co., New York. 1951. pp. 520. illus. $7.25.

In this first attempt to bring together the scattered information on insect resistance in crop plants, the author has achieved a great measure of success. This book fills a long recognized need. The subjects included concern the mechanisms of resistance, factors that affect the expression or permanence of resistance, resistance to insects in wheat, corn, cotton, sorghums, potato, and methods and problems in breeding for resistance to insects in crop plants. There is also a selected supplementary bibliography. This important and timely book is highly recommended.

GENERAL BIOLOGY, by James Watt Mavor. 4th ed. The Macmillan Co., New York. 1952. pp. 875. illus. $5.75.

This revised 4th edition of a scholarly text has much to recommend it. The scientific method is introduced at the beginning of the book (Part I). Part II is devoted to plant life, Part III, to the invertebrates, Part IV, to vertebrate anatomy and physiology based on the frog and man, Part V, to development and heredity in plants and animals, Part VI, to the organic world and its evolution, and the appendix to a synoptic table of the plant and animal kingdoms, a reference section in chemistry and a glossary of terms. This excellent, easily readable, and aqequately illustrated text is very highly recommended.

LABORATORY EXERCISES IN GENERAL BIOLOGY, by James Watt Mavor. 4th ed. The Macmillan Co., New York. 1952. $3.50.

This manual has been designed to accompany the 4th edition of the author's General Biology text with the aim of making possible a close coordination between classroom and laboratory work. Part I is concerned with detailed instructions, and Part II consists of the necessary detachable work sheets.

GENERAL BIOLOGY, by Perry D. Strasbaugh and Bernal R. Weimer. 3rd ed. John Wiley & Sons, New York. 1952. pp. 813. illus. $6.00.

This 3rd edition of a well known text will be enthusiastically received by the teacher and student. It retains the former approach to the subject by developing "the study of plants and animals simultaneously, teaching both as living organisms which carry on the same general life processes with their differences appearing in structure and in the nature of the machinery by which they function." The authors are to be congratulated particularly for introducing the student to the scientific method at the beginning of the text. This excellent, easily readable, and adequately illustrated book is very highly recommended.

UNDERSTANDING HEREDITY, by Richard B. Goldschmidt. John Wiley & Sons, New York. 1952. pp. 228. illus. $3.75.

This book was written by an outstanding authority on the subject to fill the "need for a short and easily readable survey of the basic facts of genetics, which will enable also the non-biologist to grasp with only little effort the essentials of that fascinating science." Beginning with the chapter on heredity and non-heredity traits, the author proceeds to the more detailed presentation of the mechanisms of heredity. The text is adequately illustrated, and the author succeeds in making the subject interesting by relating the facts to the common experiences of man. This book is very highly recommended.

RESPIRATION IN PLANTS, by Walter Stiles and William Leach. 3rd. ed. John Wiley & Sons, New York. 1952. pp. 172. illus. $2.25.

This is a revised 3rd edition of a standard work on the principles of plant respiration. As already indicated in the earlier editions, the authors "have aimed at giving an account of the nature of plant respiration which is readable and understandable by the elementary student of botany and which at the same time contains sufficient information to render it a volume to the advanced student." This revised edition is indispensable to all interested in the subject of plant respiration.

MORPHOGENESIS IN PLANTS, by C. W. Wardlaw. John Wiley & Sons, New York. 1952. pp. 176. illus. $2.25.

In this important new book an attempt is made "to set out some of the leading ideas relating to morphogenesis in plants, and to illustrate positive results thus far achieved by effective examples." Finally, with the data of the survey before the reader, "some of the general issues and conceptions which have emerged are briefly considered." This stimulating book is highly recommended.

THE MOLECULAR ARCHITECTURE OF PLANT CELL WALLS, by R. D. Preston. John Wiley & Sons, New York. 1952. pp. 211. illus. $6.75.

The main portion of this text is "concerned with the detailed architecture of cell walls in a wide variety of plants, including growing cells, and an attempt is made to interpret growth processes in terms of the structure thus revealed." Brief accounts are also given of the "more important physical and chemical approaches to cellulose structure," and some explanatory account of the anatomy of development of the tissues under review. This first review in England of those aspects of plant cell "wall studies of greatest appeal to botanists" will be enthusiastically received.

INTRODUCTORY MYCOLOGY, by C. J. Alexopoulos. John Wiley & Sons, New York. 1952. pp. 482. illus. $7.00.

This fascinating book on the fungi, including also chapters on the bacteria and slime molds, written for "the student who knows nothing about the fungi and who needs an orderly presentation" of the subject

fills a long felt need. It "is not intended as a complete treatise on the fungi, and is not intended as a reference book," but "is to answer as simply and concisely as possible the question: 'what are fungi and how do they affect us?' ". The author has succeeded in achieving his objective in this adequately illustrated, easily readable book which is highly recommended.

SOIL MICROBIOLOGY, by Selman A. Waksman. John Wiley & Sons, New York. 1952. pp. 356. illus. $6.00.

This important text by an outstanding authority aims "to survey the nature and abundance of microorganisms in the soil, to review the important role that they play in soil processes, and, so far as possible, to show the relation between them and soil fertility (including plant nutrition and crop production)." The book is adequately illustrated and the author has succeeded in achieving the objectives as stated in an easily readable text. It is highly recommended.

PATHOLOGY IN FOREST PRACTICE, by Dow V. Baxter. 2nd ed. John Wiley & Sons, New York. pp. 601. illus. $7.50.

This 2nd revised edition of a widely used text is "intended for the student, the timber grower who is interested in the health of the forest, and the lumber user who is concerned with the soundness of its products," and "integrates pathology with other branches of forestry such as silvics, silviculture, management and wood technology." The book is adequately illustrated, easily readable, and is indispensable to the forester, the plant pathologist, the arboriculturist, the tree surgeon, and the landscape engineer.

PROBLEMS OF LIFE, by Ludwig von Bertalanffy. John Wiley & Sons, New York. 1952. pp. 216. $4.00.

This is an English translation of the author's German original, and is subtitled, "An Evaluation of Modern Biological Thought." The author first presents a survey of basic biological problems and laws within the framework of the organismic conception (of life), then proceeds to questions of biological knowledge, and finally to the general principles of a modern conception of the world and the claim for a "General System Theory." This very stimulating book is highly recommended to all students and workers in the various sciences.

METHODS OF STATISTICAL ANALYSIS, by Cyril H. Goulden. 2nd ed. John Wiley & Sons, New York. 1952. pp. 467. illus. $7.50.

This 2nd edition of a standard text in the general field of applied statistics is "slanted rather definitely towards the needs of the student who is now, or will eventually be, a research worker." The subject is treated "with pronounced emphasis on experimental design," and "detailed methods for the statistical analysis of experiments of basic design are presented." This excellent book is highly recommended.

INTRODUCTION TO SOIL SCIENCE, by G. W. Leeper. 2nd ed. Cambridge Univ. Press, Amer. Branch, 32 E. 57th St., New York. 1952. pp. 222. illus. $5.00.

This 2nd edition of a standard text presents "a short account of soil science as it exists in the middle of the 20th century," and is written primarily for Australians. Part I is concerned with the mapping, classification and formation of soils, Part II, with the physics of the soil, and Part III, with soil chemistry. A final chapter is devoted to soil erosion, and a section on soil analysis is added in the appendix. This excellent short treatise is highly recommended.

FAMILIES OF DICOTYLEDONS, by Alfred Gundersen, Chronica Botanica Co., Waltham, Mass. 1950. pp. 237. $4.50.

In the introductory section (Part I), the following subjects are discussed by collaborating authorities—Fossil Dicotyledons (Chester A. Arnold), Wood Anatomy (Oswald Tippo), Carpels and Ovules (Theodor Just), Embryology (Herbert F. Copeland), Cytotaxonomy (J. Herbert Taylor) and Plant Geography (W. H. Camp). This is followed by the author's sections on the Characters of the Dicotyledons (Part 2), Historical Notes (Part 3), and Systematic Arrangement (Part 4). In the major part of the book (part 4), he groups 240 families under 42 orders, and these in turn are grouped under 10 large, tentative groups beginning with Magnoliflorae, and branching through intermediate groups into the four climax groups Dianthiflorae, Jasminiflorae, Rubiflorae and the Ulms Group. This most stimulating book is indispensable to all who are interested in plant systematics.

THE MERCK INDEX OF CHEMICALS AND DRUGS. 6th ed. Merck & Co., Rahway, N. J. 1952. pp. 1167. $7.50; thumb-indexed $8.00.

This 6th revised edition of a classic will be enthusiastically received. Its purpose, as in past editions beginning in 1889, is to provide "a conconcise, comprehensive, and reliable encyclopedia of chemicals and drugs for the chemist, pharmacist, physician, and members of allied professions." More than one thousand of the total number of pages are devoted to the brief listing of chemicals with a brief statement of structure, physical properties and use. It is thus a mine of information for the worker in biology and medicine. The reader should familiarize himself with the rest of the book so that these sections devoted to about 30 tables and lists may be consulted as the need arises. This thoroughly revised edition of the classic Merck Index is highly recommended.

THE AMERICAN PLANT LIFE SOCIETY

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

I. THE AMERICAN AMARYLLIS SOCIETY

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

[AMERICAN AMARYLLIS SOCIETY, continued from page 4.]

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

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III. PUBLICATIONS OF THE AMERICAN PLANT LIFE SOCIETY

BOOKS

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

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

PERIODICALS

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

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

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

Volume 3 (1936). Dedicated to Arthington Worsley. Containing the autobiography of Arlington Worsley, and important articles on description, genetics and breeding, physiology of reproduction, and amaryllid culture; with 3 portraits of Arlington Worsley, one color plate, and 30 other illustrations; a total of 151 pages.

Volume 4 (1937). First British Edition. Dedicated to William Herbert. Containing the biography of William Herbert; the reprint of Herbert's essay, "On Crosses and Hybrid Intermixtures in Vegetables"; Dr. Darlington's essay, "The Early Hybridizers and the Origins of Genetics," and many important articles on description; cytology, genetics and breeding; physiology of reproduction, and amaryllid culture; with two portraits, forty-four other plates and three figures; a total of 280 pages.

Volume 5 (1938). First Netherlands Edition. Dedicated to Ernst H. Krelage. Containing the autobiography of Ernst H. Krelage; the history of amaryllid culture in Holland by Ernst H. Krelage, Dr. Uphof's important article in which the name Hippeastrum is rejected; a revision of the tribes of the Amaryllidaceae; and the species of Amaryllis; outstanding articles on forcing amaryllis by Dr. Grainger and Prof. Dr. van Slogteren; and many other articles on description, cytology, genetics and breeding; physiology of reproduction, and amaryllid culture; with 33 plates and 2 figures; a total of 218 pages.

Volume 6 (1939). Dedicated to the Union of South Africa, and containing articles on South African amaryllids, including the history of botanical exploration for amaryllids in South Africa, the distribution of South African amaryllids in relation to rainfall, and a review of the genus Agapanthus by Frances M. Leighton, a review of the Genus Cyrtanthus, with many excellent line drawings, by Dr. R. A. Dyer; other articles—Zephyranthes of the West Indies by Dr. Hume; the Tribe Gilliesieae by Dr. Hutchinson; rating of daylilies for garden value by Mr. Kelso; daffodil articles by Jan de Graaff, and many other items on description, cytology, breeding, propagation, and amaryllid culture; with 44 plates and 10 figures; a total of 258 pages.

Volume 7 (1940). Dedicated to Latin America, and featuring articles on Latin American amaryllids; biographies of Drs. Philippi and Holmberg; report by Dr Goodspeed on the amaryllids collected by the Univ. of Calif., Second Andean Expedition; reports on the flowering of the "Blue Amaryllis," A. procera; and many other important articles on the description, propagation, breeding, culture, harvesting

and storage of amaryllids. Of special interest are the important articles on the description, breeding and culture of daylilies by noted authorities. With 45 illustrations—30 plates and 15 figures—and a total of 242 pages.

Volume 8 (1941). First Daylily Edition. The first extensive symposium on the daylily, containing biographies of George Yeld, Amos Perry, Hans Sass, and Paul Cook, and important articles on daylily evaluation, breeding, propagation and culture. Also important articles on Narcissus and other amaryllids. Thirty-eight illustrations—27 plates and 11 figures—and a total of 185 pages.

Volume 9 (1942). First Alstroemerid Edition. Dedicated to Harry L. Stinson, the outstanding authority on this plant group, who contributes a summary of his work on Alstroemerid taxonomy, breeding, propagation and culture. This volume contains the autobiography of Prof. Dr. Abilio Fernandes, the Check-List of Amaryllids by Major Pam, and a review of the species of Crinum by Dr. Uphof, and also many important articles on daylilies, Narcissus, Cyrtanthus, hybrid Amaryllis, Ixiolirion and other amaryllids. Thirty-five illustrations—17 plates and 18 figures—and a total of 243 pages.

Volume 10 (1943). 10th Anniversary Edition. Dedicated to Elizabeth Lawrence, the outstanding authority on the use of amaryllids in the garden, who contributes a summary of her work in this field. This volume contains the review of Agapanthus and Tulbaghia, by Dr. Uphof; and article on Brunsvigia rosea and hybrids by Mr. Hannibal; a symposium on Narcissus breeding by Messrs Powell, Reinelt, Berry and Reynolds; a review of amaryllid chromosomes by Dr. Flory; articles on hybrid amaryllis, daylilies, and many other important articles on amaryllids. Forty-one illustrations—12 plates and 29 text figures—and a total of 205 pages.

Volume 11 (1944). First Allieae Edition. Dedicated to Dr. Henry A. Jones, the eminent American authority on the onion. This is one of the most outstanding issues up to the present for its record making contributions on the systematics of Allium by British authorities, and on onion breeding, propagation, and culture by American authorities. It contains Mr. Airy Shaw's translation of Vvedensky's Alliums of the Soviet Union; Stearn's essay on the onion in the Old World and other articles; and articles on onion breeding, propagation and culture by Dr. Jones and his colleagues. There are also important contributions on ornamental Alliums for North America, and Allieae of North America. There are excellent articles on hybrid Amaryllis, Daylilies and various other amaryllids. Forty-three illustrations—25 plates and 18 text figures—and a total of 369 pages.

Volume 12 (1945). First Educational Edition. Dedicated to Supt. R. C. Huey, a pioneer in the use of amaryllids as an educational tool. This volume contains a brief autobiography by Supt. Huey, and an article by him on the use of amaryllids in teaching plant science; the announcement by Mulford B. Foster of the reintroduction of the sweet-scented Alstroemeria caryophyllaea, and an article by Harry L. Stinson on the true Alstroemeria Ligtu. This issue also contains an article on the origin of Tapeinanthus humilis by A. & R. Fernandes; important articles on Narcissus breeding; Leucocoryne and related genera; articles on various other amaryllids, including valuable contributions on Hemerocallis description and appreciation, breeding, culture, and packing daylily plants for shipping. Twenty-four illustrations—15 plates and 10 text figures—a total of 180 pages.

Volume 13 (1946). First Narcissus Edition. Dedicated to Guy L. Wilson, the noted Narcissus breeder. This volume contains an autobiography of Mr. Wilson, an article on his breeding activities; an article on Narcissus breeding in Australia by Mr. Alston; articles by American Narcissus breeders, including Frank Reinelt, E. P. Powell, J. S. Cooley, C. W. Culpepper and W. R. Ballard; an article on the karyology of the subgenus Ajax of the genus Narcissus by A. and R. Fernandes; a list of parents of hybrid Narcissus by Arno H. Bowers; Narcissus diseases by C. J. Gould; Narcissus insects and mites by E. P. Breakey; Narcissus culture by various authors. There are also articles on other amaryllids—Hemerocallis, hybrid Amaryllis, Habranthus, Crinums, Lapagerias, Agapanthus, Hymenocallis, etc. Thirty-nine illustrations—186 pages.

Volume 14 (1947). 2nd Hemerocallis Edition. Dedicated to Ralph W. Wheeler, the noted Daylily breeder. This volume contains an autobiography of Mr. Wheeler and an article on his breeding activities; and many important articles on

Hemerocallis description, evaluation, breeding, etc., from various parts of the country. There are also important articles on other amaryllis—Hybrid Amaryllis, amaryllids in the Holy Land and Mexico, starch in Alstroemeria, the Galantheae, Double Narcissus, Zephyranthes, Sternbergia, Allum, etc. Twenty-eight illustrations—206 pages.

Volume 15 (1948). 2nd South African Edition. Dedicated to Dr. R. A. Dyer. This volume contains an autobiography of Dr. Dyer and two amaryllid articles by him, and other articles on South African amaryllids. There are also important articles on Hemerocallis Amaryllis, Crinum, Narcissus, Brodiaea Lilies, Alstroemerias and other amaryllids by various authors. Forty-one illustrations—177 pages.

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A limited number of volumes of **Plant Life,** including **Herbertia,** second series, are available, all quotations subject to prior sale.

Vol. 1 (No. 1). 1945. Symposium on Narcissus breeding by various authors. Vol. 1 (Nos. 2 & 3), First Bromeliaceae Edition. Profusely illustrated symposium on the bromels by Dr. Lyman B. Smith, Mulford B. and Racine Foster, David Barry, Jr., Ladislaus Cutak, and Wyndham Hayward. 25 illustrations—105 pages.

Vol. 2 (Nos. 1—3). 1946. Verbenaceae Edition. Illustrated treatise on the Verbena Family by Dr. and Mrs. Moldenke, the outstanding authorities on this plant family. 9 illustrations—100 pages.

Vol. 3 (Nos. 1—3). 1947. General Edition. Containing an illustrated article on winter and spring flowering Gladiolus by W. M. James, and articles on the Dutch Bulb Industry by Dr. A. J. Verhage and J. F. Ch. Dix. 10 illustrations—42 pages

Vol. 4 (Nos. 1—3). 1948. Aroid Lily Edition. An illustrated treatise primarily on the genus Zantedeschia (Aroid Lily) containing articles by Hamilton P. Traub, A. A. Longmire, Fred M. Danks, H. M. Butterfield, Wyndham Hayward and Len Mirzwick. 11 illustrations—48 pages.

Vol. 5 (Nos. 1—4) 1949, 34 illustrations, a total of 134 pages.

Nos. 1—3. **Gesneriaceae Edition,** with important articles on the subject by F. E. Smith, W. Hayward and the Moshers.

No. 4. **1949 HERBERTIA Edition, devoted exclusively to the amaryllids;** the **First Australian Edition,** dedicated to Capt. C. O. Fairbairn, with biographies of Australian amaryllid pioneers, and articles on Australian amaryllids, South African amaryllids, the Pink Amaryllis, **A. belladonna** var. **Haywardii,** with illustration, hybrid Amaryllis breeding in South Australia by E. Both, Narcissus culture by Dr. Cooley, Mr. Mitsch and Mr. Ballard, and also important articles on other amaryllids.

Vol. 6 (Nos. 1—4) 1950. 47 illustrations, a total of 162 pages.

No. 1. **1950 HERBERTIA Edition, devoted exclusively to the amaryllids;** the Hybrid Amaryllis Edition; dedicated to Mrs. Mary G. Henry, containing Mrs. Henry's autobiography; articles on Collection Amaryllids in South America by M. B. Foster; Amaryllis flower types; double Amaryllis; Amaryllis of To-morrow, by W. Hayward, and other articles on hybrid Amaryllis, Hemerocallis, Cyrtanthus, Blue Amaryllis, South African Amaryllids, Review of the genus Brunsvigia (part I) by R. A. Dyer, etc.

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Vol. 8. (Nos. 1—4) 1952, with 34 illustrations, a total of 183 pages.

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Nos. 2—4. **Malvaceae Edition,** with articles on the Perfect Mallow Marvel by E. Sam Hemming, a new Hybrid Hibiscus, by Prof. Ballard, and propagation of Hibiscus, by Dr. Hava; and a report on plant culture activity in the Southwest Region by Dr. Corliss, the Plant Life Library (book reviews), the American Plant Life Society and Seeds and Plants Directory.

Vol. 9. (Nos. 1—4) 1953, with 32 illustrations, a total of 125 pages.

No. 1. **1953 HERBERTIA Edition, devoted exclusively to the amaryllids;** sponsored by the **American Amaryllis Society,** which is affiliated with the **American Plant Life Society.** This is the **Second Narcissus Edition,** dedicated to E. A. Bowles, containing a portrait of Mr. Bowles, and papers on Narcissus: a review of 40 years devoted to Narcissus breeding by Guy L. Wilson, an article on miniatures, naturaliz-

ing, decoratives, and a beginners' list by C. E. Quinn, fall-flowering Narcissus by L. S. Hannibal, Narcissus breeding by E. C. Powell, and W. R. Ballard, Daffodils in piedmont Virginia by H. I. Tuggle, old naturalized Narcissus in the South by Mrs. Evans, Daffodils in 1952 by Grant E. Mitsch, and Daffodils in northern California by H. I. Johnson.

There are also articles on other amaryllids, including reviews of Amaryllis Shows in New Orleans and Houston, papers on the evaluation of Hybrid Amaryllis by Mr. Manley and Dr. Thornburgh, an article on Allium by R. B. Freeman, Amaryllis species by Mrs. Mary G. Henry, the Orpets, and Mr. Burlingham, Hemerocallis by S. E. Saxton, George Gilmer, and W. R. Ballard, Calostemma by Mr. Chandler, Crinum scabrum by Thad M. Howard, Lycoris by Wyndham Hayward, Hymenocallis by Len Woelfle, and on other amaryllid subjects, including the description of two new Amaryllis species.

Nos. 2—4. **Agavaceae Edition,** with articles on Dracaena and Cordyline by Mrs. Morris Clint, The Tribes and Genera of the Agavaceae, and Polianthes tuberosa by Hamilton P. Traub, Beaucarnea recurvata by Mulford B. Foster, and sections on The Plant Life Library (book reviews), the American Plant Life Society, a complete list of publications, and Seeds and Plants Directory.

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IV. PLANTS RECEIVING APLS AWARDS IN 1952

The following awards were made since 1951.

xCyrtanthus clone FAIRY HILL; A. M., January 4, 1952. Presented by Mrs. Mary G. Henry, Gladwyne, Penna. An excellent pot plant, and a very charming subject out of doors in California; blooming during the winter, and again later in the year. [No. 132]

xAmaryllis clone SNOW QUEEN; A. M., April 11, 1952. Presented by Mr. Wyndham Hayward, Winter Park, Florida. A fine 4-flowered pure white form that is easy to handle under ordinary pot culture. [No. 133]

xAmaryllis clone NIVALIS; A. M., April 11, 1952. Presented by Mr.

Wyndham Hayward, Winter Park, Florida. A fine form that is easy to handle under ordinary pot culture, 3—4-flowered, white. [No. 134]

Narcissus triandrus var. *concolor,* A. M., December 18, 1952. Presented by Dr. A. Fernandes, Coimbra, Portugal. A fine self yellow, free-flowering under out door culture in southern California. [No. 135]

[Clint—DRACAENA AND CORDYLINE, continued from page 133.]

and several shoots may be expected from a 4″ cutting, the little shoots should be taken off with a small portion of the old stem when they have developed about six leaves, and re-rooted. At this date, the first week in June, all cuttings are potted and about 10% of the little plants have been re-rooted and potted in small pots. These will be carried along as fast as their growth will permit and should be a foot or more high by fall. If plants are wanted for the garden, planting directly in the ground is perhaps quicker. Rooting is slower, but growth more rapid thereafter. Usually enough shoots will develop to sufficiently cover the unsightly stem.

[Burlingham—AMARYLLIS BELLADONNA, continued from page 124.]

season, and it disappeared. In my ignorance I reasoned that the Amazon Lily, *Eucharis grandiflora* might be a *Lilium,* and liliums can be propagated from scales. So I peeled off seven pieces from the outer layers of the bulbs (which were later identified as *Amaryllis belladonna* Linn.), and planted them midway between the two rows. The result is two small bulbs. The pieces received no care, and almost no water during the dry season, and I am amazed that even two bulbs resulted, but this is apparently due to the small amount of stem tissue at the base of the leaf scales.

In three years one of the original *Amaryllis belladonna* Linn. resulted in a clump of nine bulbs. I have not disturbed them. The other bulb of that species, planted eighteen inches from the first, grew into such a large clump that on July 14, 1951, I dug up the clump. I took out 28 rooted bulbs, which I replanted in new locations. One of the 28 bulbs, three and a half inches in diameter, which I presume was the original bulb, had attached to it 16 offsets. The bulb with its offsets presented such confusion that I could not tell which offsets were rooted. I did not want to pot any, and I did not want to plant an unrooted offset in full sun, so I replanted the twenty-eighth bulb with its sixteen offsets still attached. The two original bulbs of *A. belladonna* Linn., did not receive differential treatment and the results are unexplained at present.

Editorial note.—*Amaryllis belladonna* Linn. bulbs planted deeply do not form offsets as readily as those planted shallowly.

[Moldenke—AMARYLLID GENERA AND SPECIES, continued from page 53.]

ported by a very short, 2 mm. long, lacerate, scarious spathe. This much can be seen from the dried specimen sent by Tineo.

Nothoscordum vernum R. A. Phil., Anal. Univ. Chile *93:* 267. 1896. Leaves narrowly linear, equaling the scape; umbel few-flowered; flowers 2 to 5; spathe-valves oblong-lanceolate, hyaline-membranaceous, much shorter than the pedicels; sepals oblong-lanceolate, coalescent and becoming yellowish at the base, the mid-vein becoming violet on the outer surface; filaments yellow, scarcely 1½ times as long as the sepals; style equaling the filaments, twice as long as the ovary. Found on the seashore at Concon in October, 1884, by F. Philippi.

Nothoscordum brevispathum R. A. Phil., Anal. Univ. Chile *93:* 268. 1896. Leaves narrowly linear, shorter than the scape; scape 20 to 25 cm. tall; spathes scarious, ovate, only 8 mm. long; umbel 3- or 4-flowered; pedicels twice as long as the spathe, equal to or 1½ times as long as the perigonium; segments of the perigonium ovate-lanceolate, white, with a purple vein dilated at the base; stamens and style equaling the perigonium. It grows in the Illapeline Andes at a place called Las Mollacas.

Nothoscordum nidulans R. A. Phil., Anal. Univ. Chile *93:* 268. 1896. Bulbs clustered; leaves shorter than the scape, 10 mm. *wide;* flowers in a rather flat umbel, about 10, shortly pedicellate; pedicels equaling the spathe and perigonium; segments of the perigonium connate for one-fifth their length; filaments longitudinally dilated for almost their whole length; style many times surpassing the ovary, equaling the capsule. Common in fertile gardens at Santiago, where it is called *Allium roseum* by gardeners.

Brodiaea patagonica Speg., in Rev. Facult. Agron. Vet. La Plata *3:* 576-577. 1897. Triteleia, 1-flowered, with ovate bulb, leaves synanthous, very narrowly linear, plicate, rather obtuse at the apex, the scape somewhat longer, erect, glabrous, slender, 2-bracteate at the apex, the flower subtubular, borne on a pedicel half as long, its 6 segments linear, acute, subequaling the tube, white, marked with green lines. It grows commonly in grassy places along the Rio Santa Cruz, where it was collected in 1874 by C. Berg, and in 1882 by Carlos Spegazzini, and at the Gulf of San Jorge, where it was collected in February, 1896, by Carlos Ameghino.

Observations: Bulb rather deeply (3 to 4 cm.) buried, ovate, 15 mm. long, 8 to 10 mm. in diameter, clothed with thin subhyaline tunics, bearing 3 to 5 leaves and 1 or 2 scapes at the apex; leaves synanthous, fasciculate, green, very narrowly linear, 4 to 8 cm. long, 1 to 1.5 mm. wide, rather obtuse and subcallose at the apex, ampliate into a thin sheath at the base, the exposed portion plicate, the buried portion obtusely carinulate; scapes slightly surpassing the leaves, 5 to 10 cm. long, 0.8 to 1 mm. in diameter, terete, glabrous, smooth, green, naked, erect, simple, 2-bracted at the summit; bracts lanceolate, 16 to 20 mm. long, 3 to 4 mm. wide, long attenuate and very acute at the apex, sheath-

ing toward the base, shortly ochrea-like (the sheath 3 to 4 mm. long), thinly membranaceous, subhyaline, the outer one slightly larger, with 7 to 9 rather inconspicuous nerves, the inner one shorter, 4- or 5-nerved; pedicels erect, short, 5 to 8 mm. long; flowers solitary in the bracts and on the pedicels, erect, the tube subcampanulate from the terete base, 10 mm. long, 2 to 3 mm. in diameter, crowned at its apex by 6 wide-spreading subequal lobes which are linear (rarely lanceolate), long attenuate-acute toward the apex, 10 to 15 mm. long, 1 to 2.5 mm. wide, white, marked with a rather broad central greenish line which runs down to the base of the tube; stamens 6, the 3 opposite the outer segments included and attached below the middle of the tube, the 3 opposite the inner segments slightly exserted and attached at the mouth of the tube; filaments glabrous, slender; anthers yellow; ovary elliptic, 3 to 3.5 mm. long, 1.5 mm. in diameter, green, glabrous; style elongate, 13 mm. long, slender, scarcely 3-lobed at the apex; fruit capsular, from globose to obovate, obscurely trigonous, included by the more or less marcescent and not at all or slightly thickened perigonium. Specimens vary from green to somewhat violet-colored.

The species is related to *Brodiaea (Triteleia) uniflora* Lindl., but the compared specimens seem to differ at once by the conspicuously narrower, shorter, non-glaucous leaves, smaller stature, etc. Here belongs in part the *T. uniflora* of Hieronymus (not Lindley) in Hier., Sert. Pat. f. 53, n. 146.

Crinum norfolkianum A. Cunn., Jour. Bot. Lond. *1:* 123. 1842. Leaves smooth along the margin, pedicels longer than the small ovary, stamens half as long as the lanceolate segments, filaments 5 to 6 times as long as the anthers.

Pancratium donaldii Blatter, Jour. As. Soc. Beng. *26:* 360. 1931. Closely related to *P. parvum Dalz.* and also to *P. st. mariae* Blatt. & Hallb. It differs from the first by its broad conic corona and very stout scape, from the other by its style not being included and the tube of the perianth much longer and also distinctly trigonous.

Milla brevipes Baker, Jour. Linn. Soc. Bot. *11:* 386. 1871. Leaves 4 to 8, 3 inches long, 2.5 mm. wide; scape somewhat shorter than the leaves; spathe-valves 2, connate at the base, the free part 12 mm. long; umbels 3-flowered; pedicels scarcely 2 mm. long; perianth white, 10—12 mm. long, the segments lanceolate, brown-carinate, four times as long as the tube; stamens in 2 series; filaments filiform, flattened toward the base; ovary sessile. Chile.

Brodiaea recurifolia C. H. Wright, Bull. Misc. Infor. Kew, p. 117. 1915. Related to *B. sellowiana,* differing in its narrower perianth-segments. Bulb ovid, up to 1 cm. in diameter; leaves synanthous, linear, obtuse, recurved, flat, glabrous, very minutely denticulate at the margins, 6 cm. long, 2.5 mm. wide; peduncle 2 cm. long, 1-flowered, slender; spathe 18 mm. long, membranous, 2-lobed; pedicel 1 to 3 mm. long; perianth white or pale-yellow, the tube 1.5 cm. long, the lobes elliptic, obtuse, 6 mm. long, 3 mm. wide, 1-nerved; anthers sagittate, 3 mm. long; staminodes oblong, 1.5 mm. long; ovary subglobose, the cells 10- to 12-

ovulate; style 1.5 cm. long; stigma shortly 3-lobed. Uruguay.

Brodiaea circinata Sandwith, in Hooker's Ic. Pl. 5th. ser. *4:* pl. 3350. 1937. Perennial herb, remarkably rhizomatous below the bulb, the rhizome up to 8 mm. thick, giving rise to many long roots up to 1.5 mm. thick; the bulb itself oblong-ovoid, up to 2.5 cm. long and 1.5 cm. in diameter, covered by membranous white-hyaline striate sheaths; the whole sheath very long, extending to 7.5 cm. beyond the bulb, when dry up to 7 mm. wide, surrounding the leaves and scapes, unilaterally spathaceous-split 2 to 3.5 cm. below the apex; leaves 3 or 4, synanthous, glaucous, toward the apex almost always conspicuously recurved-circinate, obtuse at the apex itself, about 10 to 16 cm. long, equaling the flowers or slightly surpassing them, 3 to 5.75 mm. wide above, much narrowed below; scapes 1 or 2, becoming purplish, 7.5 to 13 cm. long, up to 2 mm. wide above when dry; spathe-valves 2, connate near the base, white-membranous, violet-nerved, 1.8 to 2.1 cm. long, up to 7 mm. wide, obtuse, erect and rather closely including the tube of the perianth; flowers solitary, sessile, white, translucent, erect; perianth-tube narrowly funnelform-campanulate, 1.2 to 1.4 cm. long, 6 mm. wide at the apex, violet-striped when dry; the segments spatulate, rounded-obtuse and lightly cucullate (later emarginate) at the apex, greatly narrowed below, clawed, 1.7 to 1.8 cm. long, 6 to 8 mm. wide, white, membranaceous, but the median longitudinal zone thicker, drying olivaceous-brunneous and conspicuously 3-nerved on the inside; stamens 6, all inserted about 8 mm. above the base of the tube; filaments unequal, the alternate longer ones 10 mm. long, the others 8 mm. long, without appendages; anther-cells oblong, 2 to 3.75 mm. long; ovary ovoid-ellipsoid, about 5 mm. long and 2.3 mm. in diameter, the stalk about 2 mm. long, adnate to the tube of the perianth; style 1.15 cm. long, very shortly and obtusely 3-stigmatiferous at the apex; fruit not seen. Argentina.

Milla uniflora Graham, (in Jour. Linn. Soc. Bot. *11:* 382. 1871.) Bulb ovoid, proliferous, membranaceous-tunicated, 12 to 18 mm. thick, with roots, the outer membranes upwardly long-protracted; leaves 6 to 9, synanthous, fleshy-herbaceous, 6 to 12 inches long, 3 to 6 mm. wide, glaucous; scapes 1- or in gardens very rarely 2-flowered; spathe-valves 2, lanceolate, 1.8 to 3 cm. long, connate toward the base; pedicels 1 to 2 inches long; perianth 1.8 to 3.6 cm. long, pale-lilac, the segments lanceolate-spatulate, in the expanded flower rather spreading, with a thicker keel, somewhat longer than the funnelform tube which is 4 to 5 mm. wide at its mouth; stamens in 2 series in the tube; filaments filiform, slightly longer than the anthers, the upper ones reaching to the throat; ovary sessile; style filiform, 6 to 8 mm. long. Collected at Buenos Aires by Gillies and by Tweedie.

Milla uniflora var. *conspicua.* Segments oblong-spatulate, less narrowed toward the base, broadly imbriate in the expanded flower; pedicels often longer. Collected at Montevideo, Tweedie 1389, Gilbert s. n.

Milla uniflora var. *tweedieana* Baker, Jour. Linn. Soc. Bot. *11:* 382-383. 1871. Much smaller, the leaves scarcely more than 1 mm. wide; scape 2 to 3 inches long; pedicels 6 mm. long, scarcely exserted from

the spathe; perianth 10 to 12 mm. long, the segments oblong-spatulate, equaling the tube; stamens all distinctly exserted from the tube. Collected at Buenos Aires by Tweedie. Probably a true species.

Milla nivalis Baker, Jour. Linn. Soc. Bot. *11:* 383. 1871. Bulb ovoid, membranaceous-tunicate, the external membranes much prolonged upwards; leaves 5 or 6, green, fleshy-herbaceous, synanthous, 6 to 9 inches long, 3 mm. wide; scapes subequaling the leaves; valves of the spathe 2, lanceolate, 1 inch long, connate at the base; umbels 2- or 3-flowered; pedicels 6 to 30 mm. long; perianth funnel-form, 18 to 20 mm. long, the segments linear, green, fleshy, acute, spreading in the expanded flower, the tube cylindric, scarcely more than 2 mm. wide at the mouth, twice as long as the segments; anthers sessile, in two distinct series within the tube; ovary sessile, lanceolate; style filiform, 3 mm. long. Collected by Germain in Chile.

Milla porrifolia Baker, Jour. Linn. Soc. Bot. *11:* 386. 1871. Bulb ovoid, 16 to 24 mm. thick, membranous-tunicate; leaves 4 or 5 synanthous, fleshy-herbaceous, 6 to 8 inches long, 2 to 4 mm. wide; scape subequaling the leaves; valves of the spathe 2, lanceolate or linear, 16 to 24 mm. long, connate at the base; umbels 4- to 6-flowered; pedicels 12 to 18 mm. long; perianth funnel-form, whitish-violet, 18 to 20 mm. long, the segments lanceolate-spatulate, 3 times as long as the tube; stamens in 2 series from the tube; filaments 5 to 6 mm. long; ovary sessile; style filiform, 8 mm. long. Collected in Chile by Philippi, Germain, and Beechey.

Milla patagonica Baker, Jour. Linn. Soc. Bot. *11:* 382. 1871. Bulb not seen; leaves 4 or 5, synanthous, filiform, somewhat firm, 6 to 9 inches long; scape 1-flowered, 4 to 6 inches long; valves of the spathe 2, lanceolate, erect, 16 to 18 mm. long, connate at the base; pedicels 12 to 18 mm. long; perianth 20 to 22 mm. long, pale-lilac, segments lanceolate, acuminate, erect, twice as long as the narrowly funnel-form tube; stamens in two series; filaments filiform, 6 to 8 mm. long; ovary sessile; style 6 mm. long. Collected in Patagonia by Captain Middleton. It has the habit of *M. uniflora,* but differs in its filiform leaves and lanceolate acuminate perianth-segments.

Milla sessiliflora Baker, Jour. Linn. Soc. Bot. *11:* 382. 1871. Bulb ovoid, 6 to 8 mm. thick, membranous-tunicate, the external membranes much elongated; leaves 4 or 5, synanthous, fleshy-herbaceous, filiform, surpassing the flower; scape 24 to 30 mm. long; valves of the spathe 2, linear, connate for a long distance downwards; flowers solitary, sessile in the spathe, whitish, 18 to 20 mm. long, the segments ascending, lanceolate, a half to a third as long as the very slender tube; stamens inserted in 2 series above the middle of the tube; filaments filiform; anthers oblong, one-third to one-quarter as long as the filaments; ovary sessile; style 10 to 12 mm. long. Collected in Chile by Philippi and Germain.

[Moldenke—AMARYLLID GENERA AND SPECIES, continued on page 160.]

[Moldenke—AMARYLLID GENERA AND SPECIES, continued from page 153.]

Milla setacea Baker, Jour. Linn. Soc. Bot. *11:* 385. 1871. Bulb ovoid, 6 to 8 mm. thick, membranous-tunicate, the external membranes much prolonged upwards; leaves 5 or 6, synanthous, 3 to 4 inches long, setaceous, rather firm; scape filiform, glabrous, 2 to 3 inches long, always 1-flowered; valves of the spathe 2, linear, 6 to 8 mm. long, connate at the base; pedicels 3 to 4 mm. long; perianth funnel-form, white, 9 to 10 mm. long, slender, the segments oblong-spatulate, subacute, "the flesh (or fleshy parts) pale brown," three or four times as long as the campanulate tube; stamens inserted at the throat of the tube, slightly 2-seriate; filaments filiform, 3 to 4 mm. long; ovary sessile; style filiform, 4 mm. long. Collected by Tweedie at Tucuman.

Strumaria chilensis Molina, in Sagg. Chili. ed. 2. p. 130; 284. 1810. Leaves linear; flower alternate, larger; struma free.

Zephyranthes pumila (Spin.) M. Roem., Syn. Ensat. p. 122. 1847. Flowers pedunculate; spathe monophyllous, 1-flowered, longer than the pedicel, including the pedicel, bifid; perigonium erect, its tube rather long; leaves linear, erect, subequaling the scape, channelled; spathe acute, surpassing the tube of the regular perigonium (the tube being much longer than the limb); stamens included. Closely related to *Z. atamasco,* in which the spathe is much shorter, the tube equalling the

limb; in our species the tube is much longer than the limb, which is also completely included by the spathe; the limb is scarcely expanded to such a degree as in *Z. atamasco.* The plant is very doubtful.

Pancratium santamariae (err. *st. mariae)* Blatt. & Hall, Jour. Ind. Bot. *2:* 52. 1923. Perennial glabrous herb; bulb globose, 4 cm. in diameter, the tunics membranous, pale brown, venose, the neck distinct, 2—5 cm. long, sometimes with two necks out of the larger of which issues the scape; roots arising from the margins of a basal disk attaining a diameter of 2 cm.; leaves appearing after the flowers, about 5, linear, fleshy, equaling or somewhat longer than the scape, 15 mm. wide, obtuse at the apex; scape strong, 15—20 cm. tall, delicately longitudinally striate, 2-edged, gradually diminishing from the thicker base, the diameter at the base 7 and 4 mm.; spathe one; umbellately 4- or 5-flowered, hyaline, nerved, about 2.5 cm. long, broadly ovate, somewhat unequally bifid, the lobes acuminate; pedicels variable, almost absent to 10 mm. long, somewhat trigonous, strong; tube of the perigonium up to 2.5 cm. long, greenish below, white above, somewhat trigonous, slender, somewhat ampliate at the apex, the segments white, about 2.2 cm. long, 5 mm. wide, lanceolate; corona 7—10 mm. long, cylindric, rugose, with 12 deltoid segments 2 mm. long; filaments subulate, shorter and narrower than the segments and of finer texture; anthers linear-falcate, unequally versatile, about 6 mm. long, 0.75 mm. wide, yellow; ovary ellipsoid-trigonous, 8 mm. long, 5 mm. wide, green, the ovules numerous; style filiform, 3.5—4 cm. long, included in the tube; stigma small, capitate; flowers withering after about 18 hours. In the affinity of the new species *P. parvum,* it nevertheless differs in its strong scape, numerous flowers, much shorter perigonium-tube, the lanceolate segments, and the included style. It was collected by C. McCann near Saint Mary's Villa in the village of Khandalla, Questern Ghats mountains, province of Bombay, India. It flowers in the month of June (Herb. S.X.C. no. 19854) [=Herbarium of Saint Xavier's College]. See Figure 5.

Pancratium arabicum Sickenberger, Mem. Inst. Egypt. *4:* 290-291. 1901. Leaves appearing after the flowers, broadly scarious-dilated at the base, standing in a sheath protracted above the surface of the ground, more or less spirally twisted or flat and laterally curved; inflorescence lateral; floral spathe 2-parted, the "leaves" broadly ovate-lanceolate from the base, long-acuminate, surpassing the ovary, 4—5 cm. long, 1.5 cm. wide at the base, all scarious at the time of anthesis, scariously broad-costate and striate; pedicels one-third as long as the ovary; segments of the limb with a dilated dorsal line, green-flecked, corona cylindric, the limb divided into 12 broadly ovate-lanceolate, acuminate, reflexed teeth with a strong very agreeable odor; capsule ovate-subacuminate, 3.5 cm. long, 2.5 cm. in diameter, attenuate into a pedicel that is 2 cm. long, the valves of the mature capsule oblong-ovate. It flowers in the month of August. It grows on dunes in the vicinity of the sea and on calcareous sandy hills. Pays d'el Arich! Aboukir. W. Innes. Menagel near Mex! It differs from *P. sickenbergeri,* first seen along the seashores, by its elongate-ovate *(Iris*-like) capsules, each part

attenuate, not rotund-ovate with each part obtuse; from *P. aegyptiacum* by the leaves being membranous-dilated at the base and the capsules pedicellate, not subsessile; and from *P. maritimam* by its leaves being membranous-dilated at the base, the capsule ovate and pedicellate, not sessile and rounded—from all by its lateral inflorescence.

Strumaria bidentata Schinz, in Bull. Herb. Boiss. *4:* Append. III, pp. 46-47. 1896. Bulb subrotund, tunicated, white outside; leaves unknown; scape 9 cm. long, erect; flowers umbellate, 10—12; valves of the purplish spathe 2, lanceolate, cuspidate, rather erect; pedicels slender, erect; segments of the perigonium lanceolate, white, reddish at the base outside, 4 mm. long; filaments inwardly dilated, 2-dentate, very shortly connate at the base, beyond that filiform.

Pancratium tazetta Sessé & Monc., Fl. Mrx. ed. 2. p. 85. 1894. Narcissus with many-flowered spathe, nectary campanulate, plicate, truncate, one third as long as the petals, and flat leaves. It lives in Tacubaya and in very many places in Europe. Perennial.

Tulbaghia simmleri Beauverd, Bull. Herb. Boiss. ser. II. *8:* 988, fig. 2. 1908. Corona urceolate, crenate-trilobed, pale rose, one third as long as the similarly-colored calycinal limb; segments of the calyx ovate-oblong, rather obtuse, subequal, slightly shorter than the cylindric tube; bulb ovate, tunicated. Transvaal.

Hessea schlechteri O. Ktze. Rev. Gen. *3:* 310. 1893. This differs from H. stellaris, etc., by its larger flowers, the pedicels scarcely twice as long as the flowers and pubescent like the glandulose ovary. Natal.

Crinum strictum Hornemann, Enum. Pl. Hafn. 13. 1907. Leaves linear, strict, longer than the terete scape; flowers sessile, the tube longer than the limb; spathe of three "leaves".

Crinum lindleyanum Schult. f. ex Seub., in Mart. Fl. Bras. iii. I. 159. 1842-49. Leaves flat, linear-lanceolate, rather scabridous along the margins; flowers 4 or 5, shortly pedunculate; tube of the perigonium subequaling the limb; sepals revolute, undulate; stamens and style-apex colored. Leaves mostly longer than the scape, recurved; perigonium white, suffused with rose, strongly but not pleasurably odorous; stamens and style purple at the apex. Certainly this species, as well as the preceding [*Crinum undulatum* Hook.] very closely related to *C. erubescens* and perhaps is better made a variety of that, but this will have to be investigated later with living specimens. It grows in the province of Maragnanensi, Brazil (Don). It grows also in Surinam (Herbert). Perennial.

Beauverdia lorentzii Hert., in Bossiera *7:* 509. 1943. Bulb with the smell of *Allium,* globose, brown-tunicate, 15—20 mm. in diameter; leaves narrowly linear, subrigid, rather obtuse, flat, 1—2 dm. long; scape 1-flowered, hirtellous, 8—10 cm. long; valves of the spathe elliptic-acuminate, 12—14 mm. long, surpassing the pedicel which is 6—8 mm. long; tepals 6 or sometimes 8, equal, elliptic, rather acute at the apex, almost free at the base, golden-yellow, 1-nerved, 12—15 mm. long; filaments subulate, flat below, 7—8 mm. long; ovary obovate, 3 mm. long; style twice as long as the ovary, 4—6 mm. long, shorter than the anthers which are 2 mm. long; stigma ternate-capitate. Argentina.

Sternbergia alexandrae Sosnovsky, Trud. Bot. Inst. Akad. Nauk. SSR. Azerb. Fil. Baku *2:* 269-270. 1936. Leaves broadly linear, 11.5—15 cm. long, 7—8 mm. broad, opaque-green, narrowed toward the apex, obtuse at the apex, broadly canaliculate above, obtusely keeled along the middle beneath; flowers autumnal; spathe white, 2-plicate on the back, rather obtuse at the apex, somewhat split; perigonium yellow, about equaling the tube of the spathe, 1.5 cm. long, the segments broadly linear, to 4.6 cm. long, acuminate at the apex, subretuse, rather acute, the upper portion inside very shortly barbellate with white pellucid hairs; stamens 6 or 7 times shorter than the limb; capsule borne on a short (to 5 mm. long) peduncle, ovoid, to 2 cm. long; seeds ovid, black, foveolate-rugose, the aril crest-like, hazel-colored, folded. It differs greatly from *S. colchiciflora* W. K. in its leaves appearing after the flowers and at the time of flowering, in all dimensions, in the form of the segments of the perigonium, the proportion and certain characters of the stamens in reference to the limb. This plant is dedicated to the memory of my sainted mother. It lives in the republic of Azerbaijan, district of Szemakha, Kabistan, on Mount Kalendar-tepe, in the *Artemisit* association; cultivated in the botanical garden of Tiflis from bulbs collected by the distinguished N. Sachokia. It flowers in September; fruits in April to May.

Nothoscordum lloydiflorum Beauverd, in Bull. Herb. Boiss. ser. II. *8:* 998, fig. 2. 1908. Bulb subglobose, 10—12 mm. in diameter, gray-tunicate, with 1 or 2 scapes; leaves 2—6 cm. long, 1 mm. wide, narrowly linear, erect-patulous, flat, scabrellous along the margin, rather obtuse; scape 3—5 cm. long, 1-flowered, scabridous, shorter or equaling the leaves; valves of the spathe 7—9 mm. long, narrowly elliptic-lanceolate, surpassing the short (4—6 mm. long) pedicel; tepals 9—10 mm. long, elliptic, rather obtuse at the apex, almost free at the base, whitish, dark violet-uninerved; filaments 5—7 mm. long, flat, lanceolate, subulate, the alternate ones longer; ovary 2.5 mm. long, 1.75 mm. wide, obvate, the cells 6-ovulate; style 9.5 mm. long, slightly longer than the ovary, in length coming between the longer and shorter stamens; anthers 0.75—1 mm. long; stigmas capitate. Perennial. In fields, Independencia, dept. Canelones, Uruguay, May 3, 1908, C. Osten 5222.

Nerine filifolia var. *parviflo*ra Barker, Fl. Pl. S. Afr. *15:* pl. 568. 1935. It differs from the typical form in its smaller flowers.

Pancratium angustifolium Lojacono Projero, in Fl. Sic. *3:* 82, pl. 4, fig. 3. 1908. Bulb with the leaves narrowly linear, more slender than those of *Pancratium maritimum* L., 5—7 mm. wide, striate, very narrowly margined, ciliolate on the margins (!), very obtuse; scape slender, small, terete (not angular-compressed and two-edged); spathes 2, short, oblong-lanceolate; bractlets linear, filiform from the base of the ovary, 1 or 2; flowers 2, sessile, large; tube of the perigonium truncated at the origin of the limb and always of its length, the segments broadly lanceolate, acuminate, generally very narrow, spatulate, with an apiculum, broadly streaked on the back, the inner ones more obtuse and broader, inserted at the origin of the corona; corona large, broad, longer

than the infundibular part of the perigonium, the lobes broadly but shortly 3-angular, rather acute; filaments exquisitely sinuous, adnate up to the throat of the corona, the free filiform part surpassing the corona; anthers rather small, arcuate, reniforms; style narrowly clavate toward the apex, capitulate, lobulate. Sicily.

Crinum bancanum Kurz, Naturk. Tijdschr. Nederl. Undie *27:* 231. 1864. Bulb. . .; leaves linear, submembranous, subundulate, flaccid, 18 inches long, ¾ inch wide, glaucescent-greenish; scape 12 or more inches long, rather compressed, reddish-green; spathe chartaceous, bifid or split, 10—12 flowered; flowers showy, odorous, the tube 3 inches long, the limb longer, reddened at the base, yellowish-green from the middle, striatulate; segments of the limb 2—2½ inches long, 6—8 mm. wide, linear-lanceolate, incurved-mucronate, subreflexed, white, rose-striate in the middle; filaments and style purple.

Gethyllis campanulata L. Bolus, jour. bot. *67:* 137. 1929. Bulb globose, 4.5 cm. in diameter; leaves in fascicles of 8 to 10, appearing after the flowers, narrowly linear, slightly spirally twisted, 5—7 cm. long above the ground, to 1.5 mm. wide, the margins and nerves sparsely setulose, the setae white; perianth snow-white or rarely suffused on the outside with pale rose; the tube 5 cm. long, 4 mm. wide at the base, 3 mm. wide at the apex; the segments erect, connivent and imbricate, thus forming a bell 3—5 cm. in diameter, oblong-elliptic, acute, 4.3 cm. long, the outer ones to 2.2 cm. wide, the inner ones to 2 cm. wide; stamens 12, arranged in 6 pairs, the filaments of each pair shortly connate at the base, spreading, 6 mm. long; anthers 1.2 cm. long, sometimes spirally twisted, sometimes circinately recurved; style strict, exserted 1.3 cm. beyond the tube, very slightly dilated into a minutely trilobed stigma. Cape Province.

Nerine transvaalensis L. Bolus, Fl. Pl. So. Afr. *18:* sub pl. 691. 1928. Closely related to *N. frithii,* but distinguished by the narrower and shorter perianth segments, the more slender and longer filaments, and the dissimilar appendages. *N. frithii* L. Bolus, in part, before Plate 132.

Nerine angulata L. Bolus, So. Afr. Gard. *20:* 148, fig. B. 1930. Segments of the perianth to 4.3 cm. long; filaments to 3.8 cm. long, appendage at the base; ovary acutely angular, the angles narrowly winged, 7 mm. in diameter from angle to angle; stigma suborbicular, pulvinate, 1.5 mm. in diameter—otherwise very similar to *N. angustifolia.* From a garden, Immelmann (N. B. G. 2056/28).

Hessea leipoldtii L. Bolus, So. Afr. Gard. *20:* 148, fig. c. 1930. Leaves 2 or 3, oblong-oval, densely and softly ciliate, otherwise glabrous, 5.3 cm. long, 2.7 cm. wide; peduncle to 10 cm. long, 9—12-flowered; pedicels at length broadly spreading, 5 cm. long, dilated above; segments patulous, obtuse, to 7 mm. long, 3 mm. wide; stamens to 5 mm. long; style increasing to 5 mm., the base dilated, obtusely subangular; ovary 1.5 mm. in the immature fruit 6 mm. in diameter, with 2 or 3 seeds per locule. Near Olifant's River Dam, Clanwilliam region, April, Leipoldt s. n. (Bolus Herb. no. 19140).

Gethyllis lanuginosa Marloth, So. Afr. Gard. *21:* 41, figs, 1, 2 & 3. 1931. Leaves linear, involute at the apex, very densely lanuginous with

simple hairs; flowers white; stamens 6; style declinate, surpassing the anthers; stigma discoid; berry clavate. Cape Province.

Gethyllis setosa Marloth, So. Afr. Gard. *21:* 41, fig. 4. 1931. Leaves lanceolate, short, erect, very densely covered with scales which are composed of white setae affixed at their center, the lower portion of the scales lacerate, the upper portion solid and directed toward the apex of the leaf; style declinate; stigma oblique-conic. Cape Province.

Gethyllis verrucosa Marloth, So. Afr. Gard. *21:* 41, figs. 5 & 6. 1931. Leaves linear, divaricate, the upper surface and margins covered with flat lacerate scales and red tubercles; style declinate; stigma capitate. Cape Province.

Nothoscordum nudum Beauverd, Bull. Herb. Boiss. ser. 2. *8:* 998, fig. 3-A-C. 1908. Bulb globose, 8—10 mm. in diameter, brown, tunicated, 1-scaped; leaves during anthesis absent; umbel 3—5-flowered; values of the spathe 7—9 mm. long, ovate-lanceolate, acuminate, violet-spotted, striate, shorter than the pedicel; pedicels 1—2 cm. long; tepals 6—7 mm. long, 1—2 mm. wide, elliptic-oblong, acute, subconnate at the base, yellowish-uninerved; filaments 4—5 mm. long, flat, lanceolate-subulate, the alternate ones longer; ovary obcordate, 3 mm. long during anthesis, the locules 3- or 4-ovulate; style 3.5 mm. long, slightly longer than the ovary, surpassing the anthers (which are 2 mm. long); stigmas elongate. Perennial. Camine al Puma, in rocky hills, dept. Minas, Uruguay, April 14, 1906, C. Osten 4689.

Nothoscordum scabridulum Beauverd, Bull. Herb. Boiss. ser. 2. *8:* 1000, fig. 3-D-G. 1908. Bulb globose, 8—10 mm. in diameter, fuliginous, truncate; leaves 3.5—4 cm. long, 1/3 mm. wide, few, very narrowly linear, rather firm, glabrous, striate, rounded at the apex; scape 18—25 cm. long, scabridulous, many times longer than the leaves; valves of the spathe 7—9 mm. long, ovate, acuminate; umbel 2—4-flowered; tepals 5—8 mm. long, 2—2.5 mm. wide, elliptic-oblong, rounded at the apex, subconnate at the base, whitish, yellowish-uninerved; filaments 4—5 mm. long, flat, lanceolate-subulate, unequal; anthers 1.75 mm. long; ovary obcordate, 2 mm. long during anthesis, the cells 8-ovulate; style 3.5 mm. long, surpassing the anthers; stigmas hemispheric. Perennial. In shaded mossy places, Verdun, dept. Minas, Uruguay, April 16, 1908, C. Osten 5199.

Nothoscordum minarum Beauverd, Bull. Herb. Boiss. ser. 2. *8:* 1001, fig. 3-H-M. 1908. Bulb globose, 10—12 mm. in diameter, gray, tunicated; leaves 10—12 cm. long, very narrowly linear, rather thick, canaliculate, flexuous, scabridulous at the base, rounded at the apex; scape 10—18 cm. long, deflexed, glabrous, surpassed by or equalled by the leaves; valves of the spathe 10—15 mm. long, ovate-lanceolate, striate with pale brown; umbel 2—4-flowered; tepals 7—10 mm. long, 2—3 mm. wide, equal, elliptic-oblong, acuminate at the apex, subconnate at the base, yellowish, golden-uninerved; filaments 4—5 mm. long, subequal, flat, linear, narrowed above; anthers 2.25—2.5 mm. long; ovary elliptic-subglobose, 2.5—3 mm. long during anthesis, the cells 6—8-ovulate; style 3 mm. long, slightly longer than the ovary, of a length intermediate

among the stamens or shorter than they are; stigma conic. Perennial. In fields, Arequita, dept. Minas, Uruguay, October 10, 1907, C. Osten 5147.

Nothoscordum grossibulum Beauverd, Bull. Herb. Boiss. ser. 2. *8:* 1003, fig. 5-A-D. 1908. Bulb ovate, 2 cm. in diameter, gray, tunicated, with many scapes; leaves 4—8 cm. long, 1 mm. wide, narrowly linear, striate, rounded at the apex; scape 3—7 cm. long, few-flowered, glabrous, surpassed by or equalled by the leaves; valves of the spathe 11—18 mm. long, narrowly ovate-acuminate, longer than or subequalling the pedicel; umbel 2- or 3-flowered; tepals 9—12 mm. long, 2.5 mm. wide, elliptic-lanceolate, rather obtuse at the apex, subconnate at the base, unequal, whitish, greenish-uninerved; filaments 6—7 mm. long, flat, lanceolate-subulate, subequal; anthers 1.5 mm. long; style 6 mm. long, twice as long as the subclavate ovary, surpassing the anthers; stigma capitate. Perennial. Cerro Verdun, dept. Minas, Uruguay, April 14, 1906, C. Osten 1686.

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