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Robert L. Taylor

[See page 271]

Dianthus winteri: left, *Mrs. Wormald*; center, *Mrs. Back*.

Concerning Rex Begonias

B. Y. MORRISON

For the gardener who lives at some distance from the places where Rex Begonias are popular and common subjects for plant collectors, the acquisition of a collection of varieties can be an amazing surprise. Even though he is a member of the American Begonia Society and has seen pictures and read discussions, he probably could not conjure up in imagination, the diversity of form, pattern and color that is now available, not to speak of the changes in habit that are appearing as a result of various other species than those most allied to the original but now traditional *Begonia Rex*.

Frankly curious, this editor invoked the aid of the editor of *The Begonian*, who made possible the invaluable assistance of Mrs. Louise Schwerdtfeger, so that during 1951 various shipments came through safely from California. In addition, there were bought plants from the Leathermann collection offered as collections by The Barnes Importers. In spite of distance and the amazing succulence of the plants themselves, all traveled well and soon set about the production of new leaves.

Following instructions, the plants were potted in the recommended composts, with inorganic matter, and free draining. Some experimenting was needed to discover the degree of light best suited for development and some accidents took a toll of a few leaves, but almost without exception, fair-sized plants developed before winter came and the signs of dormancy began. This last, the period of dormancy, was a surprise, for the writer had not known of any time when there would be only a resting rhizome or rootstock, and at first there was a beginner's fear that something was seriously wrong.

The other surprise that caused some alarm came with the development of erect stems in such plants as Abel Carriere, Lavender Glow, Nigger Tree and the like, but the "book" showed that *Begonia Evansiana*, a well-known hardy herbaceous Begonia, was responsible, in most cases. The fact remains that these lovely upright things, some of which show of Rex "influence," are privately dubbed the "Fitzes"—not the Rexes or *Rex cultorum*.

There is no complete validity for this discrimination for although the taxonomic keys usually put all the species allied to *Begonia Rex* Putz. in a "Rhizomatous" section, the individual descriptions sometimes include the phrase "stems branching freely." The point may well be raised, however, for the California Begonia breeders are arranging so many more and newer morganatic matings, that one may expect "Rex" leaves on almost any sort of plant in a not too distant future.

Mrs. Krauss, in her delightful *Begonias for American Homes and Gardens* records a series of types of Rex hybrids which serve as an historical landmark; where the next will be, one dares not guess, for one hears now of scandent Rexes and tall cane-like variants.

Doubtless it is foolhardy, but the original concept of a Rex Begonia was of a plant that kept its fleshy, rhizome-like stem crawling along the surface of the earth, with a cluster of leaves at the growing tip, or tips if it had branched, that raised on hairy petioles, the variously patterned, colored leaves, approximately heart shaped in outline, rough in surface (the veins sunken) and with some surfaces as smooth as metal and as glistening. The margins

were not much serrate, nor always wavy. The simplest pattern involved a dark center, a darker zone irregularly or regularly bounded by a band of silvery color with a margin beyond of green usually colored by the new pigmentation from the under surfaces. The under surface of the leaves was usually covered with the raised network of veins, frequently a firm red in color repeating the coloration of the petioles. Various degrees of hairiness were normal both for the petioles or leaf stems and the veins; in some cases hairs appeared in the upper surfaces as well, usually singly and often rising from the silver dots. The hairs themselves might be coarse or as fine as in velvet.

With the presumptuous curiosity of a beginner, an attempt was made to discover where the variations in pattern arose but only a general notation can be made. The small, usually dark "spot" in the leaf blade closest to this end of the petiole may be reduced in size or area, if in size so that it is very small, if in area so that only vestiges remain. These usually follow the major veins that radiate from the petiole, giving a palmate pattern that can be very striking. The next variable element seems to be the so-called silver band which may spread out so that it practically covers the entire leaf whether in solid color as one finds it in Silver Pink or broken into dots. These latter may be so small that they look like stippling, of assorted sizes so that one thinks of astronomers' pictures of heavenly nebulae, or in definite dots and blotches, some of which lie smoothly on the leaf surface or are so puckered as to look like blisters, i.e., pustulate. The other commonly repeated design change appears especially in varieties with starry-lobed leaves. Here the silver band is commonly broad and continuous with extensions that reach

out along the main veins to the margin, so that one sees them as a silver star laid down on top of the green leaf. When these are well developed this effect is very striking.

After one has grown the plants for a time, he becomes aware of the fact that the length of the leaf petioles varies and that this plus their angle of growth has a marked effect upon the mass made by the leaf blades. Many of the older varieties have short petioles so that one sees only the mass of the leaves. Some of the newer sorts allow the pattern of red toned petioles to show through the leaf surfaces, adding a brilliant color particularly when sunlight makes their succulent stems look almost translucent.

The leaf margins may be smooth, somewhat serrate or definitely lobed, but among such varieties as we have grown never as deeply lobed as in some of the species and forms in other parts of the "Rhizomatous" section. In addition the margins may be ruffled which brings an added play of light and shadow over the color patterns and in some clones the growth has extended at the point of petiole attachment so that there is a "spiral case" lapping over the leaf blade. This may be single or double, the latter case less showy than the former as one spiral more or less covers the other. The old variety, Countess Louise Erdoedy, shows this well.

It is difficult to be precise in discussing the variations in leaf surfaces. The normal or presumably normal surface is not unlike that of any leaf, but there are some varieties in which the surface looks as if it were a thin tightly stretched tissue as in Pacific Sunset (not illustrated) or Crimson Glow—or like thin metal foil as in Forty-Niner or Ruth Williams. In still other cases there are areas that appear like fine

suede leather as in portions of the leaves of Ojai and Floralice.

Even from this brief and obviously inadequate discussion it is easy to see how and why one might easily become a "collector" and find refinements on refinements almost without limit. It is not apparent, however, that one would be faced with almost endless difficulty if he were asked to name a collection of varieties that could be called "The best." The brief varietal descriptions that follow should be looked upon only as a report of one amateur observer on one collection. It is admitted that some of the varieties grown were and are still more appealing than others, but it is remembered also that if the writer had had more years of growing experience, he and his colleagues more able than himself, might have brought some varieties to a perfection that would upset any present decisions.

No plants have been grown with the intent of producing a "Specimen" of "show quality." This last seems to be a matter of feeding and grooming with just enough elements of chance in it all to make a good gamble.

Thanks for assistance given as acknowledged before, a wide range of varieties was grown and the only missing elements—if one may judge by written description—are those that relate to "yellow, gold and golden bronze" colored varieties. Dull browns and dull buff colors do appear but nothing more.

There is no question that "Rex" Begonias whether their ancestry be by the right hand or the left are splendid things.

The following descriptions are recorded from observation notes made of the living collection during 1951-1952:

Adrian Schmidt. Medium sized leaves with some deep marginal serrations. Dark green centers, medium

green zone that extends to the slightly brown tinted edge, covered with large, somewhat pustulate silver dots.

Amethyst. Medium sized leaves with ruffled margins, very erect petioles. The medium green center and margin are flushed with purple and the silver green band breaks into fine dots in its outer margin, extending to the edge of the leaves.

Arabian Nights. As grown here, a somewhat upright plant with leaves that fall laxly making an open specimen, quite distinct from more "legitimate" Rex clones. The leaves are deeply lobed and the silver pattern makes a star-like design over the green. The veins of reverse are conspicuously pink.

Arnold Peep. Large leaves with some lobing. Central area small, medium green, tending to follow main veins. The central area broad, light silver green running down into each lobe but breaking up into irregular dots. Some red-brown tinting along margins. New leaves as they develop show darker.

Avila. Medium sized leaves, almost entirely of a metallic light green color, the only color showing a purplish brown tinting along major veins and edges.

Bertha Boner. Medium sized leaves, with moderate spiral curl, ruffled margins. Central area and margin dark green almost completely covered with smallish silver dots. The zone of silver-green, solid and tending to run out into the major serrations.

Brown Curl. Miniature, curl. Growth habit compact. The deep red-brown color of the reverse side of leaves shows through the bronzy green upper surfaces. There are a few small and scattered silver-green dots.

Butterfly. Miniature, somewhat erect growth with conspicuous red-

brown stems. Leaves small, dark green center, silver-green zone toned with lavender from the center, bright green band set off by purplish brown margins.

Cardoza. Large leaves with somewhat variable but always with coloration. Center purple-toned, sage green band almost covered with small silver-green dots, dark red-purple, somewhat ruffled edge.

Cathayana. Erect, medium sized leaves, serrate-lobed margins. Central zone dark somewhat bronzy-green following the major veins, moss green band almost covered with silver-green dots, margin as dark as center but somewhat more bronze-toned. As plant grows older, the lobes of later leaves are more marked.

Cathayana \times Pustulata Ziesenhenné 1950—Erect, stems green, white, hairy, Leaves large, soft, major veins bright, light green, blade almost covered with silver-green like fine silver resposse.

Coree. Miniature with compact habit. The general effect is silver with broken green central zone that follows the major veins and with some irregular blotching of same green showing through near leaf margins. Some red tone shows through from reverse.

Count Adrian Erdoedy. Medium leaf with some spiral curl. General effect metallic, light yellow-green to silvery with a little light brown flush from margins. The veins are impressed giving a somewhat quilted surface.

Countess Louise Erdoedy. Similar to foregoing but more compact in habit and with better spiral curl here.

Crimson Glow. Large leaves. General effect is of metallic silver over pale green, lavender flush from center and along the edges. The "Crimson Glow" comes from the brilliant red hairs on petioles and veins on back of leaves.

Curly Jade. Miniature, moderately

good spiral curl, Jade-green color, dull silver spots irregularly dotted over area between major veins. Petioles red and covered with red hairs.

Dew Drop. Miniature, dense growth. Leaves rather smooth which makes their metallic silver surface very showy. There is a starry pattern of deep green in the center, along the main veins. Petioles dull red.

Dudley. Large leaves, somewhat serrate with some tendency to lobing in older leaves. Dull sage-green in color with silver, almost pustulate blotches scattered irregularly through the areas between main veins. Not one of the more showy clones.

Faith. Small leaves, almost in miniature class, but growth more like usual Rex. Center dark green radiating out along main veins to break the irregular silvery zone, margins dark green, spotted at times. The colors all seem a little dull which is sad for "Faith."

Fantasy. Rather large here, with elongated and somewhat lobed leaves with marked pattern. The center is small and very dark green surrounded by a silver zone that extends to tip of leaf, this in turn surrounded by a sage-yellow zone and irregularly margined in brownish-green. Petioles reddish.

Fireflush. Valuable chiefly for its beautiful covering of short soft hairs of brilliant, almost salmon-toned red. Our plant rarely had more than one good leaf at a time and has not grown successfully.

Flaitz Midget. Erect stems, rather open and diverging with leaves that tend to hang down. Center dark green that follows main veins far out into the green-silver zone, dark to brownish narrow margin. The color is brilliant only in youngest leaves that show a red diffusion outward from center.

Floralice. Medium leaves conspicuous for their surface like suede leather.

Center very deep green, small, and following major veins, silver zone irregular surrounded by brilliant yellow-green band dotted silver, broad brown toned sage. Flowers good.

Forty-Niner. Medium sized leaves, nice spiral curl, all conspicuous for the lustrous metallic quality of surfaces. Dense habit. Center dark-green small, almost starry, most of surfaces silver that extend in star like points to the dark brownish-green border. On new leaves there is a pinkish-lavender flush over silver.

Frey 1950 Cathayensis hybrid. This very distinct clone is not named. Very erect habit, with ascending leaf petioles. The entire pattern, best shown in illustration is of dark green and silver, but young leaves have a faint pink overall flush and deep dull-red veins on reverse. Some lobing in leaf margins.

Gen. Mac Arthur. The best of all the large spiral curls grown here. Plant very vigorous. Almost no green center but some green that follows major veins out into broad silver-green zone that breaks into irregular blotches over the purple-brownish-green margin.

Grace. Large leaves but here not many at one time, petioles show. Center dark green flushed purple sometimes faintly dotted green following major veins only, zone light green breaking into fine dots over a bright green margin, edges ruffled, toned purplish-brown.

Grayback Mountain. Very vigorous, large leaved spiral curl with deeply lobed and somewhat ruffled leaf margins. Small olive-green center that follows major veins into the large silver-green leaf that is accented by small irregular dark green blotches on the margin.

Grayson. Large leaves, general effect is silver green with small dark cen-

ter peppered over with silver dots and dark brown toned edge invaded by silver dots from center. Two plants were received under this name, the chief difference being in the coarser dots of the second plant.

Green River. Medium sized leaves with some suggestion of lobing. Center not conspicuous but clear dark olive-green, most of leaf bright green, with large silver dots on a narrow brown toned edge. Not showy, but very refined.

Guy Fewkes. Here this has been uncertain in growth. At the time of this writing, there is only a small leaf present, pale green with distinct silver dots.

Inimitable. This has not grown well, but produces a few very large leaves rather flat and with almost smooth margins. Although said to be an *Evansiana* cross there has been no suggestion of erect habit. Petioles very pink hairy. Whole leaf silver-green with conspicuous hairs widely distributed over surface. Dark green center shows only as narrow star-like pattern along main veins.

Kay Francis. This also has grown poorly. Erect with leaves that almost suggest those of an Angel Wing Begonia, brown tinted on reverse, dark olive-green with silver dots.

King Edward. Medium size, leaves rather smooth with some ruffling along margins. Center dark purplish-green, band of silver dots of irregular size, margin darker than center especially toward edge. Petioles conspicuously red-hairy.

Lad-X. Medium size, moderate curl. Small dark olive-green center that follows the major veins, large metallic silver zone that breaks into large blotches over the pale green margins that show some brown tones.

Lavender Glow. Erect, showy. Medium sized leaves, center dark olive-

green following the major veins, breaking into the band of silver toned with purple, which in turn breaks up into small dots over the deep red-purple margin.

Leila. Large leaves, rather flat but with some puckering over surface. Small dark green center that follows major veins in star-like pattern into the broad silver-green zone, which in turn breaks up into large blotches over the dark green margin, edges purplish.

Lord Palmerston. Medium leaves. Center dark green finely dotted silver forming broad star pattern breaking into the wide silver-green band, margin dark green finely dotted with silver, some brown tones on margin.

Maiden's Blush. Miniature, irregular center of bronzy-green, red flushed in young leaves, breaking irregularly into the wide silver zone that extends almost to the narrow reddish-pink margin. Colors, clearest in the younger leaves.

Marion Louise. Leaves small, lobed and showy. The large center of dark green that extends in a star-like pattern along the major veins is accented by a brown area in its center. The silver band is somewhat broken, but is bounded by a green margin tinted brown from the edge.

Mary Ann. Leaves as it grows here, small with good spiral curl, some lobing. Silver with some irregular green blotches along veins, some brown tone along the edges. White hairs, sparsely over the surface.

Mikado. Leaves large. The general effect somewhat like Lavender Glow, but with creeping rhizome like the true *Rex*. The red hairs on petioles and veins on back of leaf are a more brilliant hue. Center zone dark purplish-green that follows major veins to form star-like pattern, main surface silver flushed lavender, border lavender with

a few irregular small patches of deep green.

Modesty. Here a poor grower, leaves small. Center dark green, broad silver-green band, lighter green border and brown-toned edges.

Mulberry. Medium sized leaves, petioles red-hairy. Center dark purplish-red almost covered with silver, silver-green zone, purplish margin with some green dots. In some leaves there is a little spiral curl.

Navajo. Large leaves, stems with coarse red hairs. Center olive-green, zone warm purple-red, darker marginal zone. Major veins light brown.

Nigger Tree. Erect. Leaves here a little smaller than those of Lavender Glow, stems and petioles dark and when young red hairy. Center purplish-brown that passes into zone of dark green flushed over with brown, few small silver dots, margin purplish-black.

Ojai. Medium to large leaves with well marked spiral curl and ruffled margins. Center very dark green, almost black that extends a short distance along major veins. Zone very metallic silver with large silver dots that run off onto the bright green margin and very dark ruffled edges.

Pacific Sunset. Leaves large. This clone has not grown well here. Strong red-purple flush over metallic light green with darker margin.

Patsy. Plant small but probably not a "miniature," very *Rex*-like in character. Center dark green with some purplish tone, metallic silver-green zone broken by purplish-green center, some pink hairs, margins dark.

Peter Pan. Leaves small, with some lobing. Center small brownish-olive that pierces the very light silver-green zone that, in turn, breaks into irregular dots over bright green, edges rusty red. Reverse, bright red veins and hairs.

Purple Heart. Has grown poorly here but should be spectacular if well done. No green except as narrow line that follows major veins. Dull purple, rather glossy but not metallic, edges somewhat bronze toned.

Queen Wilhelmina. This too has grown poorly. Apparently a small leaved sort with pattern of cool pale greens.

Radiance. Medium to large leaves, with good spiral curl and ruffled margins. Purplish-green center, dark green zone and brownish edges. The entire surface seems metallic.

Red Wing. Not vigorous here. Dull red over the small green center that plays out along major veins, dull olive-green zone somewhat red flushed, margin darker.

Robin. Erect stems to almost 10 inches, warm red-brown like the new leaves, leaves medium to small, most become a nice sage-green color covered with fine dots of pale pink, thickly along veins, less in open areas. Flowers showy pink. This charming begonia is not a "Rex" in the narrow sense of the word.

Ruth Williams. Medium sized leaves, very erect, some lobing. Very metallic in appearance because the silver-green zone almost covers leaf. Lavender flush in center and irregular dark purplish edges.

St. Teresa. Medium to large leaves with good spiral curl. Light silver-green pattern over pale green with few flakes and blotches of darker, but still light green near margins. A beautiful Begonia but one that no longer suggests "Rex" in the narrow sense.

Scarlett O'Hara. Small to medium leaves, some lobing, some serrations. The leaf surface has quality of fine old taffeta silk, almost a deep red-purple self with broken patches of pinkish-silver where zone would ap-

pear, a few small patches of bright green near the darker purple edges.

Schwerdtfeger's '51 Circumlobata X Rex. Large leaves on tall erect petioles fairly brown tinted toward fore leaves, reflexed somewhat giving umbrella-like effect. Center dark green but showing only along the major veins. Leaves almost completely covered with pale silver-green that breaks into large dots near margin that is deep green. This is not a named clone.

Sea Nymph. Leaves large, some lobing, dull red hairy petioles. Dark green center, broken silver-green zone, dark marginal band with very dark brown-toned edge.

Silver Pink. This has not grown vigorously here but is charming. Leaves somewhat convex, a very light greenish-silver but not metallic or glossy, with almost no touch of dark green, tones with pale lavender-pink from the leaf margins. Conspicuous in the group.

Single Black Twist. Has not grown satisfactorily for us, with only one or two leaves at a time. Very reflexed margins so that leaf has a convex look, excellent spiral curl. Center dark olive-brown, dull green zone, edges dull brown but redder in tone.

Smog. Medium to small leaves, with well developed spiral curl, red petioles with lighter hairs, new leaves darker than old. Center dark green radiating along major veins into the silver zone that breaks off irregularly into the still darker brown-green margin. The veins in upper surface are pink rather than the more usual green or light brown.

Stanley Wilson. Medium to large leaves, somewhat erect stems, leaf surface like old taffeta, margins somewhat lobed. The general color is a warm brownish-red with irregular silver dots as shown in illustration. In our plant these did not coalesce to form zone.

Stardust. Medium leaves. Petioles pink-hairy. Almost no green center, but silver zone to tip, broad green margin fine dotted with silver, extreme edge, reddish toned.

Starlight. Large leaves. Dense habit. Stems and young leaves reddish, mature leaves silver over almost entire surface but follow the lobing somewhat. Hairs on leaf follow pink or red to mature dull color. Sunderbruchii x Rex (Schwerdtfeger).

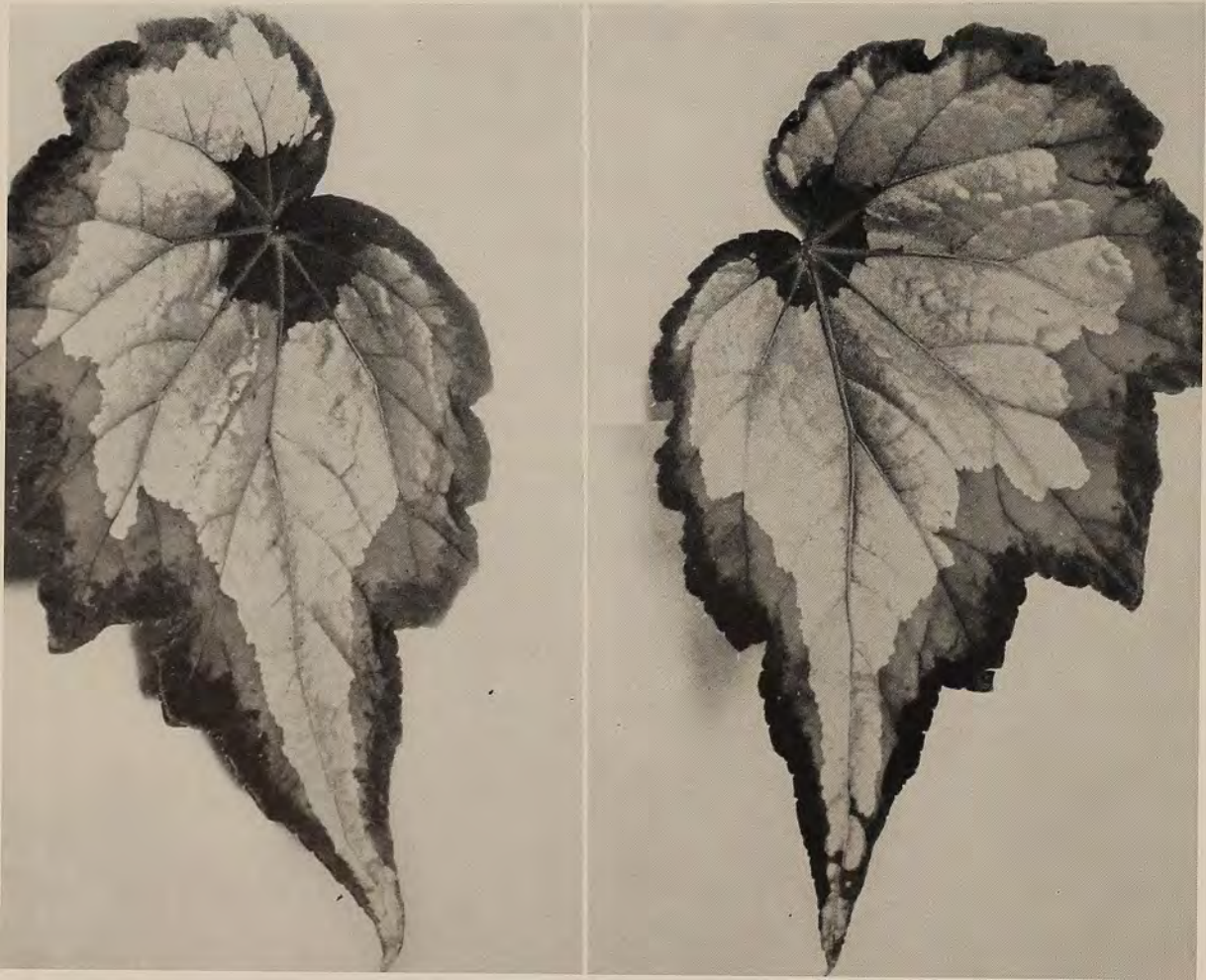
Van X. Large leaves, very showy, stems dark. Dark green center widely star shaped, silver band somewhat broken, margin broad and a green lighter than center, silver dotted, nar-

row brown toned edge. Veins on leaf reverse, dark red and showy.

Virginia Slocum. Medium to large leaves. A beautiful variety but too open in habit as grown here. The leaves appear as a slightly dulled silver over green that shows mostly near margins. Especially on new leaves there is an all-over lavender tone.

Wepper's Moonbeam. Medium leaves, compact habit, petioles red and red-hairy. Leaves appear almost metallic in age. The dark green center is narrow starlike, following the major veins and often silver dotted, rest of leaf silver with green showing through near margin again along veins. Reverse of leaves very red toned.

All photographs accompanying this article were made by Robert L. Taylor



Concerning the Illustrations.

It was quite impossible to photograph the individual leaves at natural size except for the miniatures shown on Page 257, but these are reduced for the printed page. The actual size of the leaves used is given below with the names of the varieties for each page reading left to right and top to bottom.

The important thing to note in looking at the pages is not so much the checking of the patterns, but the examination of the surface textures, the serrations, the distribution of the hairs, and the actual carriage of the leaf blade which is often far from flat and sometimes strikingly convex.

Page 244. Tapestry, $5\frac{1}{2} \times 9$ inches; Butterfly, $4\frac{1}{2} \times 7\frac{1}{2}$ inches.

Page 246. Faith, $2\frac{1}{2} \times 3$; Peter Pan, 4×5 ; Marion Louise, 4×6 ; Smog, 4×5 .

Page 247. Leila, $5 \times 7\frac{1}{2}$; Patsy, $5\frac{1}{2} \times 7\frac{1}{2}$; Stardust, $5 \times 7\frac{1}{2}$; Sea Nymph, $5 \times 7\frac{1}{2}$.

Page 248. Dudley, $7\frac{1}{2} \times 11$; Arnold Peep, $7 \times 8\frac{1}{2}$; Ethel Arnold, $4 \times 5\frac{1}{2}$; Amethyst, $5\frac{1}{2} \times 9$.

Page 249. Inimitable, 6×9 ; Bertha Boner, $5\frac{1}{2} \times 8\frac{1}{2}$; Grayson, 9×14 ; Virginia Slocum, 8×14 .

Page 250. Floralice, $8\frac{1}{2} \times 10$; Schwerdtfeger Seedling Spiral, 8×12 ; Lord Palmerston, 8×10 ; Mikado, 9×11 .

Page 251. Navajo, $7\frac{1}{2} \times 9\frac{3}{4}$; Curly Jade, $6\frac{1}{2} \times 8$; Starlight, $6\frac{1}{2} \times 11$; Cardoza, 7×9 .

Page 252. Stanley Wilson, $8\frac{1}{2} \times 11$; Van X, 6×8 ; Scarlett O'Hara, 6×9 ; King Edward, $7\frac{1}{2} \times 10$.

Page 253. Wepper's Moonbeam, $7\frac{1}{2} \times 11$; Ruth Williams, $7\frac{1}{2} \times 9$; Silver Pink, 4×6 ; Crimson Glow, $7\frac{1}{2} \times 10\frac{1}{2}$.

Page 254. Twisted Spot, $5\frac{1}{2} \times 7$; Countess Louise Erdoedy, $5 \times 7\frac{1}{2}$; Lad—X, 5×6 ; Count Adrian Erdoedy, 5×7 .

Page 255. Radiance, 6×9 ; Gen. MacArthur, $7\frac{1}{2} \times 10$; Robin, 5×6 ; Schwerdtfeger's Circumlobata \times Rex, $7 \times 10\frac{1}{2}$.

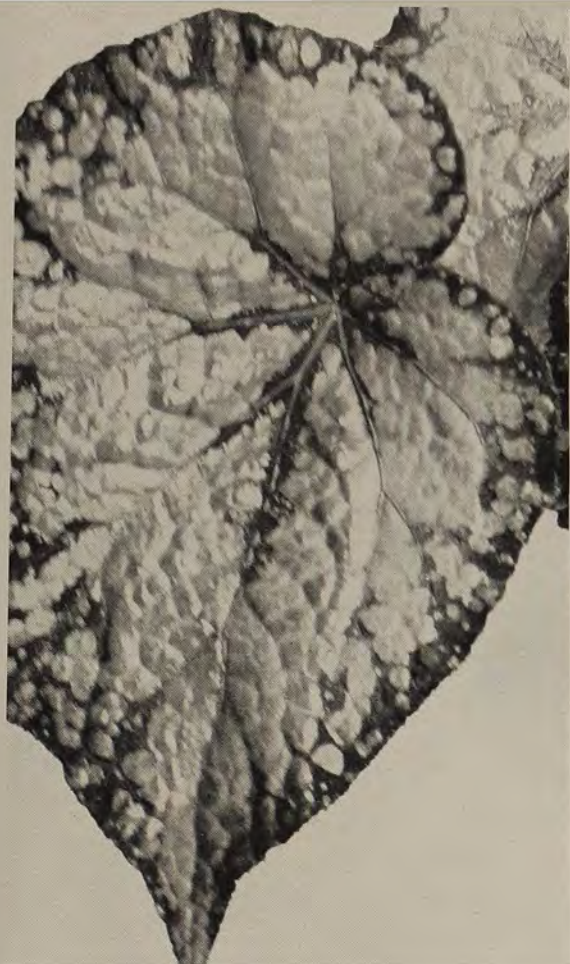
Page 256. Ojai, $6\frac{1}{2} \times 7\frac{1}{2}$; Greyback Mountain, $7 \times 9\frac{1}{2}$; Forty-Niner, $6 \times 8\frac{1}{2}$; Azula, 9×12 .

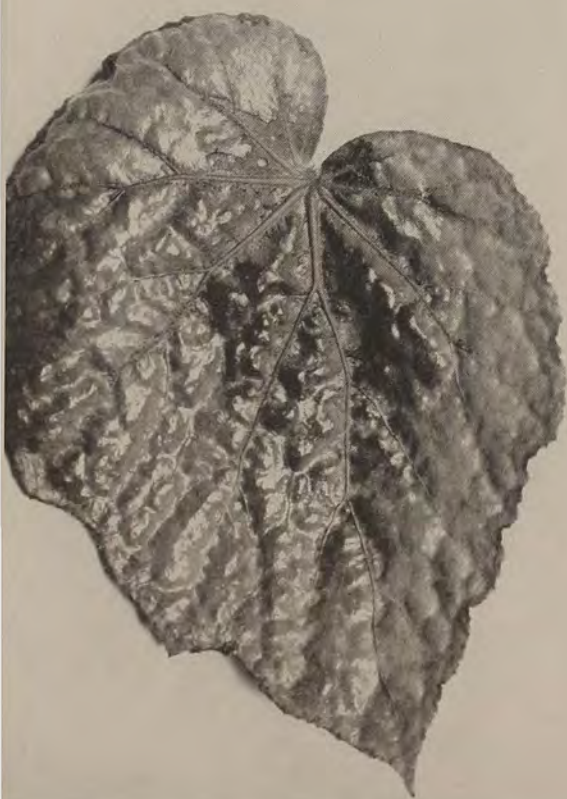
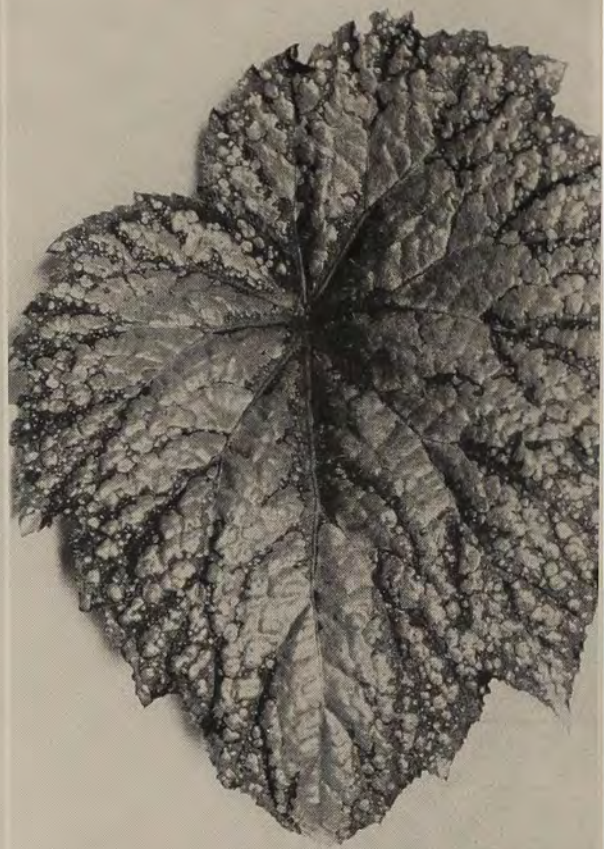
Page 257. Maiden's Blush, $2\frac{1}{2} \times 3$; Coree, 2×3 ; Brown Curl, 3×4 ; Dew Drop, $3\frac{3}{4} \times 4\frac{3}{4}$.

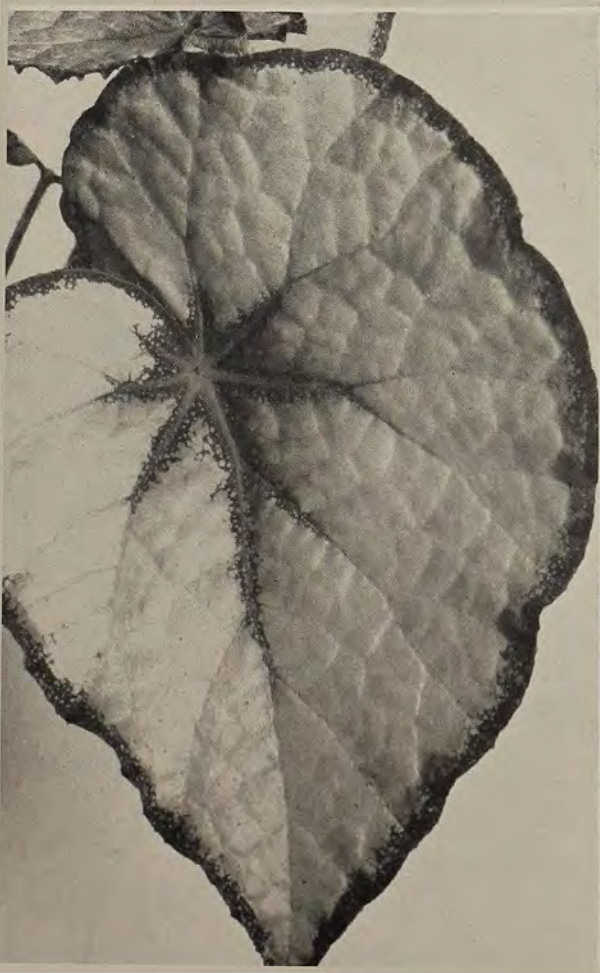
Page 258. Lavender Glow, $7\frac{1}{2} \times 11$; Adrian Schmidt, $6 \times 8\frac{1}{2}$; Mulberry, $7 \times 9\frac{1}{2}$; Nigger Tree, $4\frac{1}{2} \times 6\frac{1}{2}$.

Page 259. Cathayana, $5 \times 7\frac{1}{2}$; Frey 1950 Cathayana Hybrid, $6\frac{1}{2} \times 10\frac{1}{2}$; Circumlobata \times Rex, Schwerdtfeger, 5×7 ; St. Teresia, $9 \times 11\frac{1}{2}$.

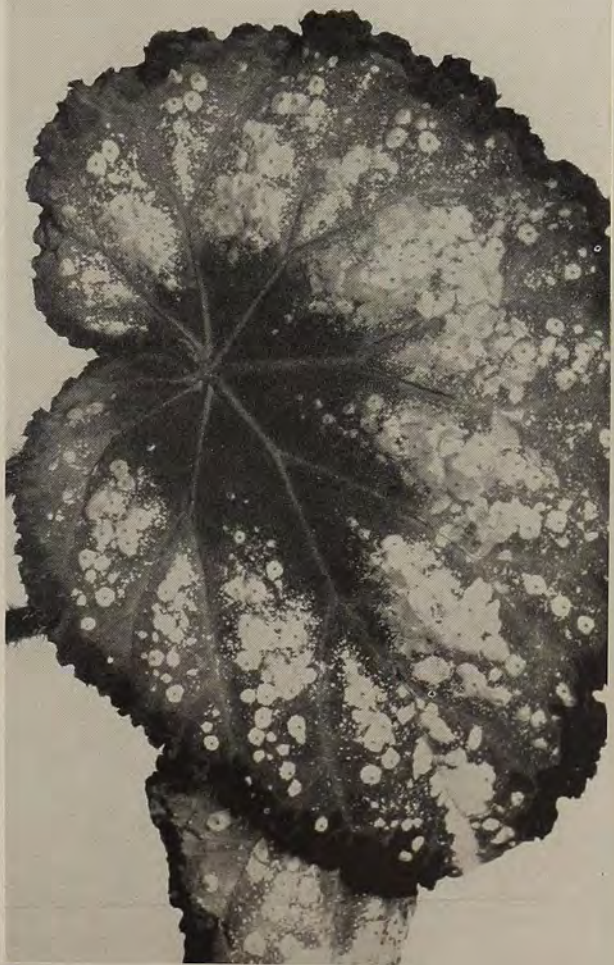


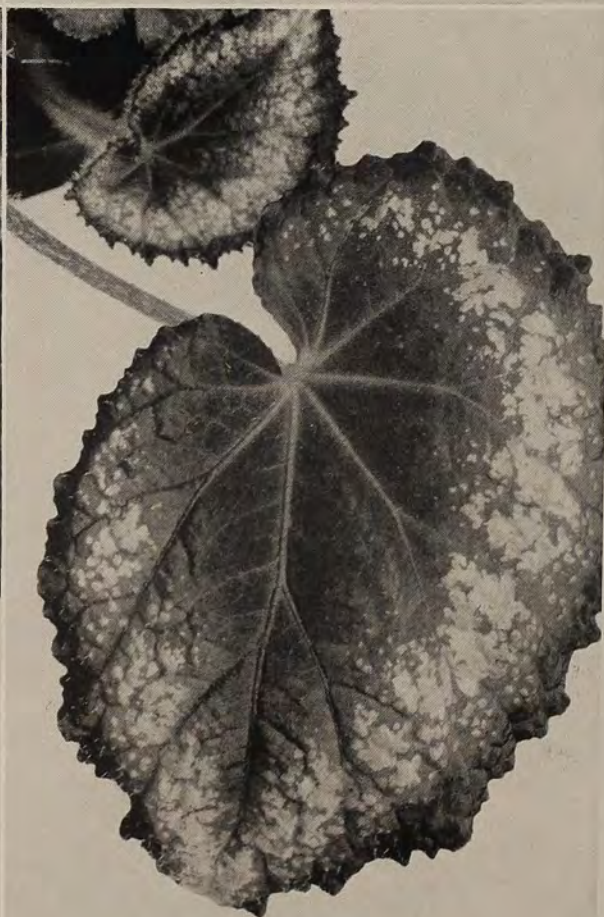


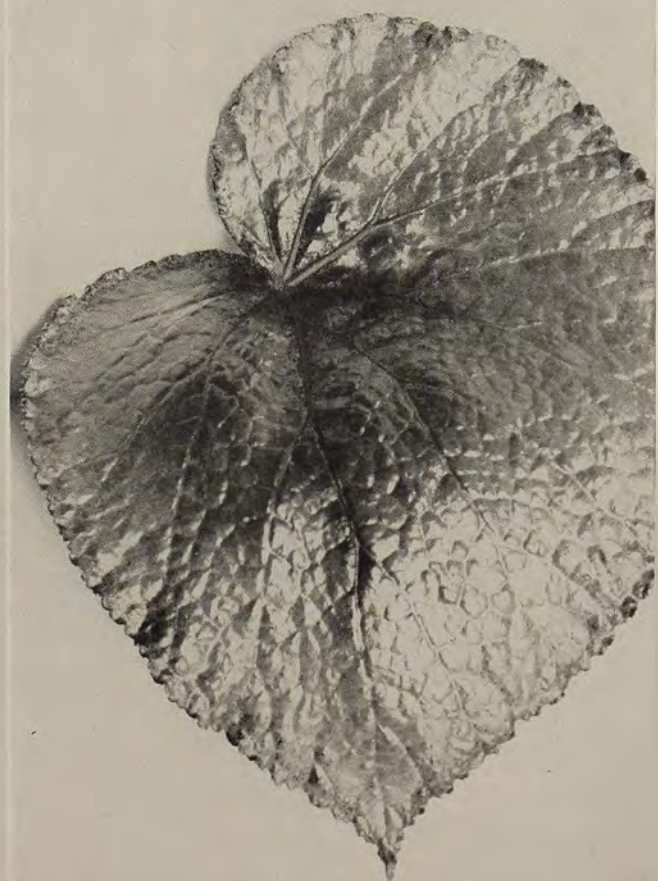
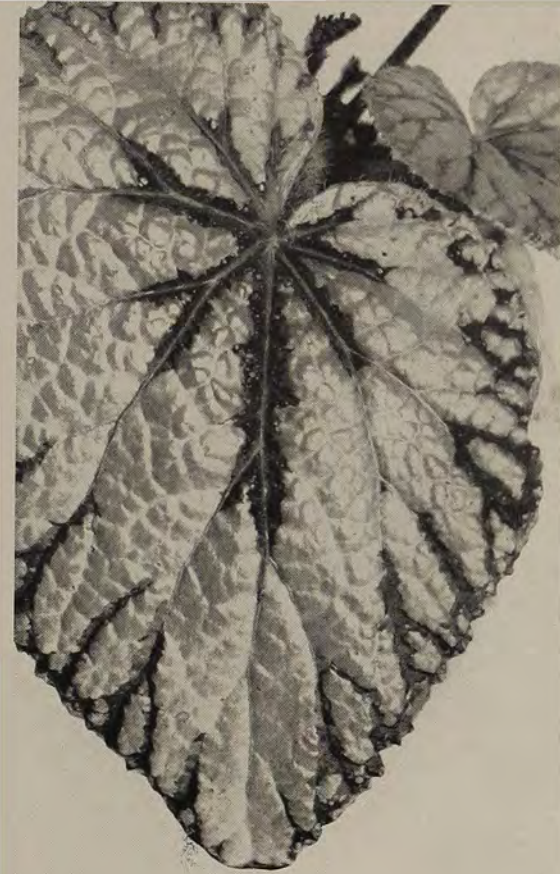


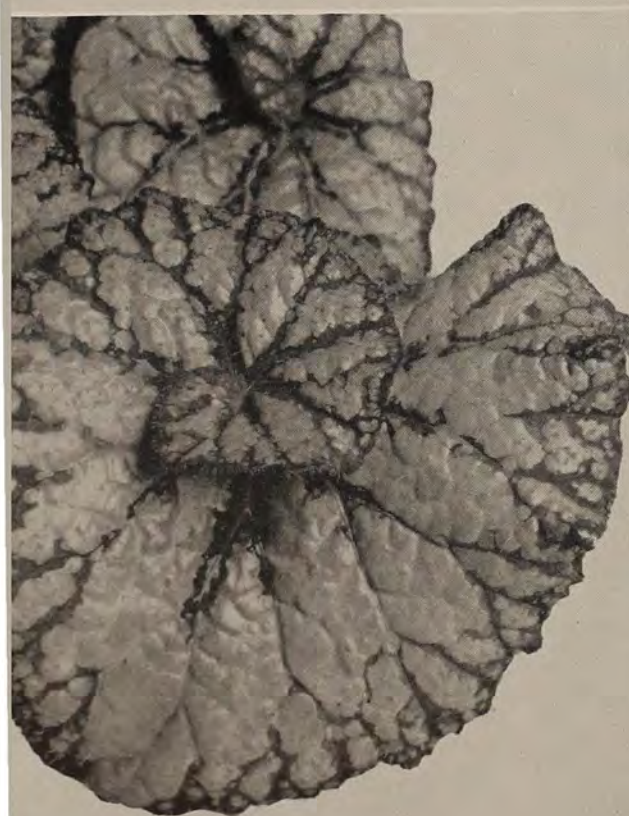
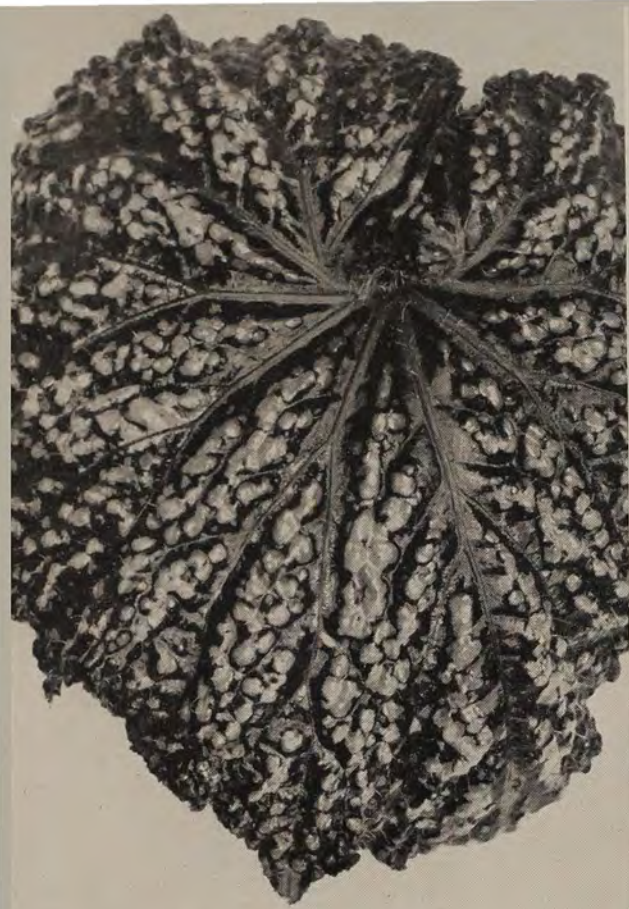






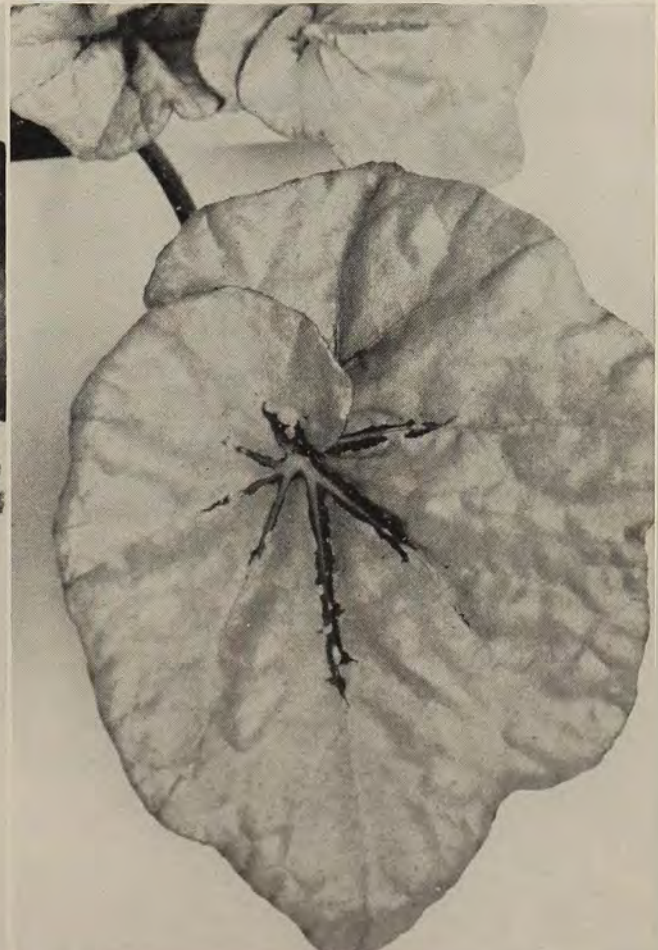


















Portrait of Nicholas Monardes, woodcut. Frontispiece to La Historia Medicinal de las Cosas. 1574.

Nasturtiums

E. BUCKNER KIRK

Nasturtiums, together with marigolds and sunflowers, were the only innocent gold to reach Europe on the flood tide of treasure that poured from the New World into the Old during those years when Spain was looting her American empire with bloody hands. "Golde, Silver, Pearles, Emeraldes, Turkeses" — thus Nicholas Monardes begins a list of the kind of cargo the high-pooed ships brought in. It was plunder on a grand scale, but not even the proudest Indian could resent the loss of that handful of wrinkled seed that some seaman or adventurer stowed away in his pouch to take home.

It was a brutal and reckless time, but instinct, too, with the vitality and excitement that ring in the very title of the book that introduced the Nasturtium to Englishmen: *Joyfull Newes out of the Newe Founde Worlde*.

This book, published in London in 1577, was a translation by one Jhon (sic) Frampton, Merchaunt of *La Historia Medicinal de Las Cosas*, 1574, by Nicholas Monardes, a doctor of Seville.

Dr. Monardes was a busy, happy, and very fortunate man. Passionately interested in his profession, he had the incredible luck to be one of the few European doctors who had access to the novel pharmacopoeia that came from the fabulous "Indies." Not content with the seeds, roots, and dried herbs that reached him in Seville, Monardes carried on a vigorous correspondence with various settlers in the new lands and gave the returning adventurers no rest until they had told him all that they knew of how the different plants were used by the natives and for what ailments. Then he wrote it down, making—as was most unusual in his

day—careful distinction between what he had been told and what he learned from experience. His was, however, a lavish era and he saw no reason to confine himself rigidly to medical matters, so among other odd items, Nasturtiums appear in his book as "Floures of Blood."

"I sowed a seede which thei brought me from the Peru, more to see his fairnesse," he wrote, "then for any Medicinall vertues that it hath." He ends his brief description with satisfaction that his experiment with the exotic seed was rewarded:—"it is a flower very beautifull, whiche doeth adornate the gardens."

From Spain the plant made its way into France and Flanders. By 1597 Gerard records it in his *Herball* as one of "the outlandish" flowers in his garden, sent "by my loving friend, John Robin of Paris." (Robin was keeper of the French king's garden.) By 1629 Parkinson, in *Paradisi In Sole*, could write that it was "very familiar in most Gardens of any curiosity." He thought it a flower "of so great beauty and sweetness withall, that my Garden of delight cannot bee unfurnished of it." Besides it had, he said, "a fine small sent, very pleasing, which being placed in the middle of some Carnations or Gilloflowers . . . made a delicate Tus-simussie, as they call it, or Nosegay, both for sight and sent."

At this point a situation embarrassing for any amateur research worker has arisen. I find myself in conflict with my own basic authority, *The Standard Cyclopaedia of Horticulture*. It seems to be generally accepted that the "Floures of Blood" that Monardes introduced in 1571 was *Tropaeolum minus*, the shrubby dwarf annual. The

larger-flowered trailer, *T. majus* has, says the Cyclopaedia, "been in cultivation in Europe since 1684." Now the flower that Parkinson, in 1629, so delightfully called "yellow lark's heels," and which he thought would make a "delicate Tussimussie" was not picked from any shrubby dwarf plant. On the contrary, it spreads "it selfe into very many long trayling branches, interlaced one within another very confusedly (yet doth it not winde it selfe with any claspers about either pole or any other thing, but if you will haue it abide close thereunto, you must tye it, or else it will lye vpon the ground.)" Also, be it noted, that when Parkinson listed all the names he had heard for the plant, he included "Mastnerzo."

In Monardes' description of "Floures of Blood" he remarked that they had the "same savour and taste as the Mastuesso hath." Now I am under the impression that the taste of *Nasturtium*—and what country child does not know it?—is unique to the genus. So I turned the few pages to Monardes' account of Mastuesso. His description of this "little herbe" leaves everything to be desired, but he does say that, like the "Floures of Blood," it has round leaves and is "notable hotte." It looks as if Monardes may have had two species of *Tropaeolum*, but the inadequacy of his descriptions leaves it unclear.

Sturtevant, however, in his *Notes on Edible Plants*, also noted a discrepancy in the dates. Commenting on an illustration in John Bauhm's *Historia plantarum universalis*, 1651, he remarked that he could not agree with those "who consider this the dwarf form, as the figure given is nearer the tall." There certainly seems reason to believe that *T. majus* reached Europe more than half a century before 1684.

Now, nearly four hundred years

after its introduction, the *Nasturtium* continues to "adornate" the gardens, but in the interim it was put to work. The first job it was to do for mankind was to serve in one of those half-desperate, half-pathetic experiments that were being made in an effort to find a cure for scurvy. In an age of notably unbalanced diet and widespread malnutrition, the disease was everywhere prevalent, but its most dramatic and tragic aspects were at sea.

They were brave men, those early trans-Atlantic sailors. Anyone who has ever watched a full gale in winter on the North Atlantic from the deck of a modern liner shudders to think of what a similar experience must have been like on the little wooden ships that made the early crossings. In addition to such catastrophic acts of God as gale or calm, there were pirates and hostile ships of rival nationalities. But these melodramatic disasters, if the ship survived at all, were measurable in time by hours,—at the worst by days. Scurvy was a creeping thing of weeks or months. It not only incapacitated a crew physically, but drained the men of all energy and spirit. Ordinary day to day work was inefficiently done or came practically to a standstill. Defense, in case of an attack, was hopeless.

A hazy notion arose that some food other than the easily stored salt pork or beef, even something green, might help. For a time *Nasturtiums* were highly valued in the fight against scurvy because, as John Evelyn wrote, in 1699 in his *Acetaria, A Discourse on Sallets*, they are "the most effectual, and powerful Agents in conquering and expugning that cruel Enemy. The seed pods were picked when fully grown but still green, and pickled. It must have been quite a business while it lasted, because any gardener can see that even a single

barrel of Nasturtium seed represented growing on a large scale. It was not until nearly the end of the 18th century that it was discovered that either lemons or limes were really "effectual and powerful" against scurvy and in 1795 the British Admiralty turned British sailors into "Limeys" by decreeing a ration a day of lime juice.

During and after its incursion into preventative medicine, the Nasturtium was retired to the kitchen garden where it must have lead a modest existence in spite of Evelyn's manful effort to bring "sallets" to the attention of his meat-and-starch-eating fellow countrymen. ". . . we are by *Sallet* to understand a Composition of certain Crude and fresh Herbs, such as usually are, or may safely be eaten with some Acetous Juice, Oyl, Salt, &., to give grateful Gust and *Vehicle*." A "sallet" of Nasturtiums might contain some or all of "the tender Leaves, *Calices*, *Cappuchin Capers*, and Flowers laudably mixed with the colder Plants." These "Herby Ingredients" must be "exquisitely cull'd and cleans'd of all worm-eaten, slimy, canker'd, dry, spotted, or anyways vitiated Leaves . . . discreetly sprinkl'd with Spring Water . . . remain a while in the *Cullender*" and finally "swung altogether gently in a clean course Napkin; and so they will be in perfect condition to receive the *Intinctus* following."

It is a great temptation to quote the whole of "the *Intinctus*" but it is really too long. Boiled down to its bare bones—if a French dressing may be permitted bones—it consists of: "Oyl . . . without Smell or the least touch of *rancid*: . . . the best Wine Vinegar . . .; Salt . . . of the brightest Bay Salt; Mustard . . . temper'd to the consistence of a Pap with *Vinegar*. Note: That the Seeds are pounded in a Mortar; or bruis'd with a polished *Cannon-*

Bullet, in a large wooden Bowl-Dish, or, which is preferr'd, ground in a Quern contriv'd for this purpose only; Pepper . . . not bruis'd to too small a Dust; the Yolks of fresh and New-laid Eggs, boil'd moderately hard, to be mingl'd and mashed with the *Mustard*, *Oyl*, and *Vinegar*." This, with various "Strewings and Atomizers" was the basic receipt.

That engaging description of a "sallet" and its dressing will melt the heart of any salad lover today, especially the pepper "not bruis'd to too small a dust." But it is doubtful if many Britishers explored the possibilities Evelyn so alluringly presented to them. Judging from the menus of the time, they must have been few indeed and Nasturtiums from the kitchen garden were used most often as "strewings" of the fresh flowers, or these were pickled as a decorative condiment. The seeds continued to be pickled and used as are capers today.

A more exotic dish, made from a species of *Tropaeolum* may, for all I know, still be in vogue in the high Andes of Peru. The tubers of *T. tuberosum*, which are called *ysamo* there, were cooked and then frozen. Apparently the women of La Paz, Bolivia, were especially fond of this dish that suggests a primitive version of our Birds Eye!

Another way in which the Peruvian Indian enjoys the same kind of Nasturtium is when a farina is made from the tubers and mixed with molasses into a sort of jelly.

The French, too, have used *T. tuberosum* as a food, cooking the tubers and serving them as a vegetable.

Meantime if the Nasturtium continued a humdrum existence in the kitchen garden, it had also, by the 18th century, made its way into the physick garden. In spite of the fact that Mon-



Tropaeolum albiflorum, the White Nasturtium, photographed from *Flore des Serres et des Jardins de L'Europe*, Vol. 3, 1874, Plate 241.

ardes, Gerard, and Parkinson had all denied it any medicinal virtues (except for the ambiguity of Monardes' *Mastuesso*), by 1710 one William Salmon, M.D. listed it in his *Botanologia, The English Herbal*. He has a startling string of maladies for which *Nasturtium* offer a cure. These are so like some for which Dioscorides recommends *Iris* that I could hardly believe my eyes. I thought at first that I must have mixed up my notes, but a careful comparison proves that I was not the one who was confused. Salmon, however, goes his Greek professional forbear one better with a few 18th century frills, one of which is "the Spirit"—distilled from what part of the plant he does not say, but twenty drops "to a dram in some proper Vehicle" he states is the correct dose. This, among other virtues, "provokes Lust and is good against Impotency."

Other factors besides their uses as food and medicine tended to keep *Nasturtium* in the kitchen and physick gardens rather than in flower gardens until nearly the middle of the last century. First the French influence, which had begun to make itself felt in England, was greatly strengthened after the Restoration. It really does not matter whether Le Notre, the great landscape architect of Versailles, came to London or not, as is sometimes hotly debated. His spirit came—there is no doubt of that—and with it, such garden furnishings as straight gravel walks, fountains cascading over flights of marble steps, high clipped hedges, and "bosquets" or groves of trees grouped geometrically. The few flower borders permitted only such plants as conformed to the patterned formality and even these were sometimes replaced by "parterres made of clipped box and an intricate design of colored sands."

Then, with almost startling sudden-

ness, the pendulum swung to the other extreme. "Back to Nature" was the cry by the middle of the 18th century—though parentheses were added in gardens in the shape of ruined temples, fallen columns, grottos, and such-like romantic "fabricks." Nature abhors a straight line and never stoops to a geometric curve. Away with the gravelled walks and the "bosquets" so formally planted. Cascades over marbled steps disappeared in favor of natural—or naturalized—waterfalls and rapids. Hedges came down and great avenues of trees were razed because they were planted in straight lines. But so far as flowers were concerned there was little to choose between all this and the Versailles school, because, you see, Nature does not go in for well designed flower borders; nor would the "natural" landscape of England and the Continent include such exotics as *Nasturtium*.

If the *Nasturtium* temporarily disappeared from fashionable gardens, it could at least lend itself to what passed for scientific investigation during the middle of the 18th century. Elizabeth Linnaeus, daughter of the great botanist, reported to her father that she had noticed before sunrise, and also at twilight, that *T. majus* gave off sparks or flashes of light. "... these scintillations were shown to her father and other philosophers, and Mr. Wilcke, a celebrated electrician, believed them to be electric."

Erasmus Darwin, grandfather of Charles, cannot be said to have immortalized this phenomenon in verse, for his *Botanic Garden* is a drearily dull poem, but he has at least recorded this manifestation of "Tropaeo's:"
 "O'er her fair form the electric lustre
 plays,
 And cold she moves amid the lambent
 blaze."

In the second volume of Paxton's



Tropaeolum major, var. *alto-sanguineum*, Greater Indian Cress or Nasturtium, photographed from Curtis's *Botanical Magazine*, Vol. 62, 1835, Plate 3375.

Mazagine of Botany, a Mr. Trimmer also describes having seen "scintillations" from Nasturtiums.

Fired by all this evidence, I appealed to a friendly gardener who possessed a long dazzling border of Nasturtiums. (Mine were part of a woodchuck's loot.) He wrote me later in the season that he was afraid we would have to continue to depend upon the Central Vermont Electric Service Corporation since neither he nor his wife had caught a glimpse of a single spark.

During all this time, of course, the Nasturtium had not been entirely banished from gardens. People who did not, or had not the money, to follow prevailing fashions, kept up their interest in flowers, and they flourished besides, as they always have flourished, in the beautiful cottage gardens of England. An item in *The Botanical Magazine*, in 1797, (Vol. III, p. 98) reminds us of these facts. The short article pointed out that *T. majus* had so completely superseded *T. minus* that the latter "was entirely lost to our gardens till lately, when it was reintroduced by Dr. J. E. Smith, who by distributing it to his friends and the Nurserymen near London, has again rendered it tolerably plentiful."

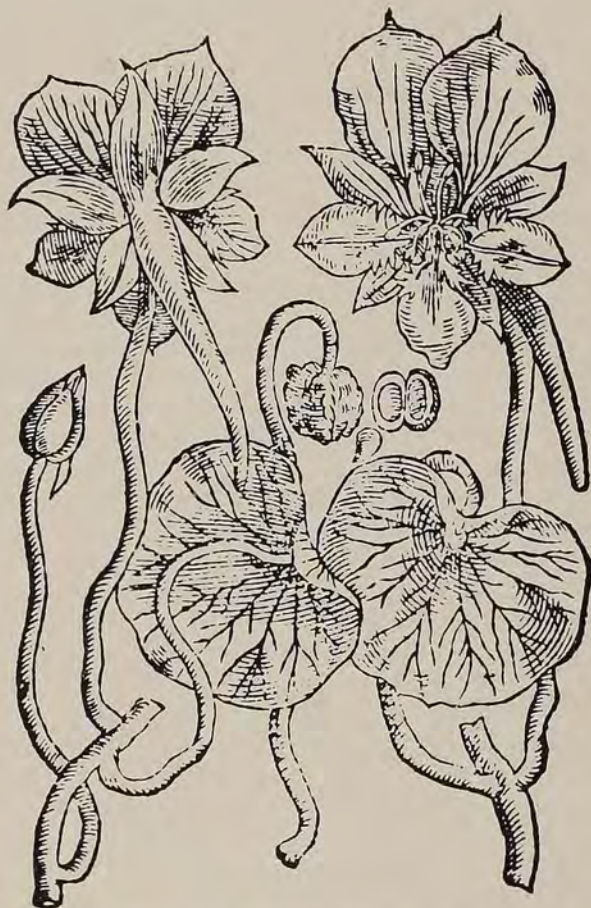
The Dr. J. E. Smith who performed this pleasant small service to horticulture, was the James Edward Smith who had a few years before performed a much greater service to horticulture and to his country by buying the papers of Linnaeus and founding, in 1788, the Linnaean Society.

In 1804 the Horticultural Society was formed, later to come under the British Government as the Royal Horticultural Society. It, with the Linnaean Society, gave formal expression to the interest in botany which had never flagged in England even though flowers, as ornamental garden plants,

had not fared too well for a century or more. Plants had long been shipped to individuals in England from all over the world. These now began coming in to the Horticultural Society and, in turn, the Society began sending out trained men to hunt for more. It was a stimulating and exciting period from the point of view of botany and horticulture.

It was about this time that we get the first mention of the Nasturtium in American gardens. MacMahon noted it in 1806, but Nasturtiums did not come into prominence until much later in the century. Nor, for that matter, did they in England. Then some of the plant hunters, notably Thomas Lobb, began finding varied and interesting species of *Tropaeolum* in Central and South America. Experiments in breeding began. A hybrid between *T. minus* and *T. majus* had probably long been in existence and it is said that one of Lobb's finds brought a dark ruby red to the new hybrids. Another supplied the familiar straw color. By 1857 Tom Thumb, the shrubby dwarf annual, in all the glory of the new colors, was on the market and the Nasturtium took the place it deserved in the flower border.

Now, with a bow to Mr. Bolger, who bred the double Golden Gleam, and to Mr. Burpee, who introduced the multi-colored doubles, I should be able to leave the Nasturtium, but the story is not quite told. To begin with, with all due respect to these two gentlemen, double Nasturtiums are not so much of a novelty as the catalogues would lead us to believe. In the *Gardener's Dictionary*, 1731, Philip Miller lists the last of five varieties as "*Acriviola, maxima, odorata, flora pleno*, the great double Nasturtium." And John Hill, in *Eden, or a Complete Body of Gardening*, 1757, remarks of Nasturtiums

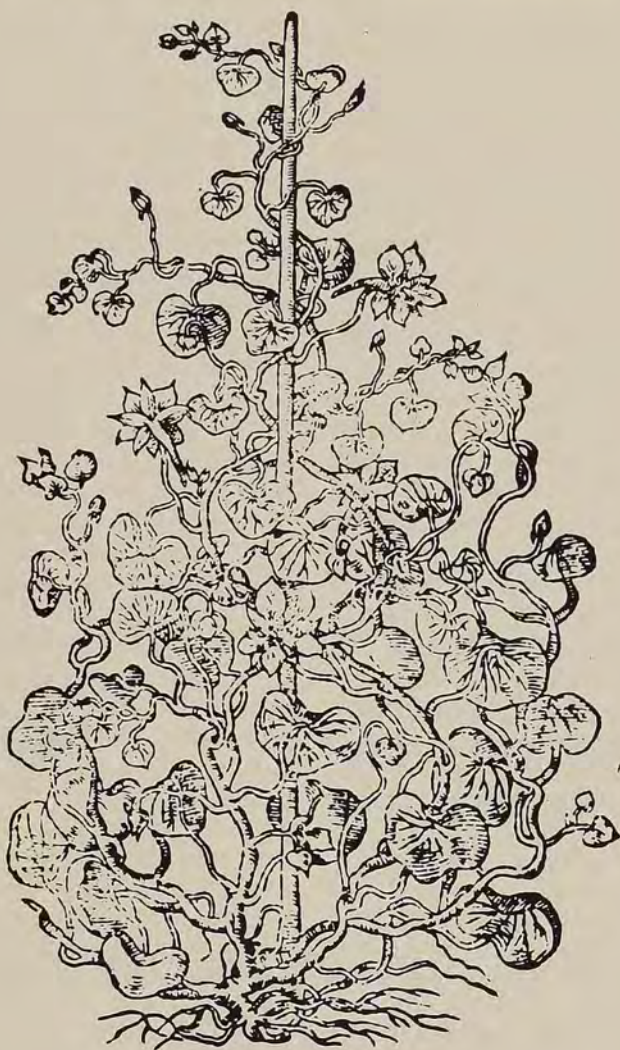


The flower and seed of Indian Cresses, Nasturtium Indicum, photographed from the woodcut in The Herball or General History of Plants, John Gerarde, 1597, Chapter 13, Page 196.

that "when double they become yet more beautiful." But these were more or less common varieties of a genus noted for its variability, so we are no less indebted to the two men who recognized a possibility when they saw it and worked so hard to fix the variation so that it might be available to countless gardeners the world over. Mr. Burpee's story of how it was done, es-

pecially of his own dramatic telescoping of three generations of plants into a single year, is well worth turning back to the old files of the *Saturday Evening Post* to read. It is in the issue of March 12, 1938.

There is another little known story about *Nasturtium*s that may be startling to many gardeners. How many know that there is a blue *Nasturtium*?



Nasturtium Indicum, Indian Cresses, from the
Gerarde Herball, Chapter 13, Page 196.

And what has become of the white *Nasturtium*?

To dispose of the blue *Nasturtium* first, for there is no mystery attached to that, it is a tender, rather frail climber suitable for the greenhouse only. As *T. azureum*, of course, it is listed in Bailey's *Standard Cyclopedia of Horticulture* along with the other forty-odd

species of *Tropaeolum*. But there is no mention of *T. albiflorum*.

The Frenchman who wrote the first article about *T. albiflorum*, (only his initials appear in *Flore des Serres*, Vol. XII), describes how he rushed exuberantly to Brussels to see this treasure and how, having seen it, he so coveted it that he cheated Van

Houtte, the introducer, into selling him some plants. Few gardeners will find it in their hearts to blame him.

The Frenchman first tried to buy some cuttings legitimately as seeds were not available. But when he admitted that he lived in Paris he was told that the Van Houtte establishment had decided to sell only to people living at last 300 'lieues' distant. (Van Houtte had a good thing, he calculated, and he proposed to exploit it.) The Frenchman left the greenhouse in a state of mind it is not necessary to describe though he does so at some length. Then, as luck would have it, he ran into a young German acquaintance. The warmth of the Frenchman's greeting may well have surprised the German who did not then know it was ing. This young man, one gathers, was occasioned by the clothes he was wearing interested in botany and horticulture, and he had also recently been to Russia. As a result of that trip he sported fur boots, a "pelisse" (which I always

though a female garment, but we let that pass) and a typical Muscovite fur cap. The Frenchman probably invited him to the nearest cafe, but wherever they did it, they hatched their plot.

The young German then took himself off to see the white *Nasturtium*. He, too, asked about buying some cuttings. When queried as to his place of residence, he replied that he was the head gardener to "the Grand Vornik de Valachie." To questions as to the whereabouts of Valachie, he replied that it was in Russia, down near the border of Turkey. Such a distance was entirely satisfactory and he acquired three cuttings as the then ruinous rate of 50 francs each. These he promptly turned over to his French friend.

What became of them? They have now apparently vanished from the face of the earth. It is a pity, for the white *Nasturtium* looked to me as "rare and faire" as Gerard found his little *T. minus* to be three hundred and fifty years ago.

Correction Notes on *Anapodophyllon*- The Wild Duck's Foot Leaf

MARJORIE F. WARNER

The following corrections should be noted in the April, 1952, issue of THE NATIONAL HORTICULTURAL MAGAZINE. On page 173, left, line 4, change "juene" for *jeune*; page 174, left, lines 9 and 10, "*Anapodophyllon*" for *Anapodophylon* [sic]; page 174, right, line 8, "on" for of; page 178, right, lines 12 and 13, "*Anapodaphyllon* [sic]" for *Anapodophyllon*. But Morrison's aberrant spelling below, in line 21, is to be retained. Having had such difficulty myself in getting these spellings correctly wrong, it is easy to see how Evelyn and Morrison stumbled over this name.—M.F.W.

Border Carnations and Pinks

JOHN L. CREECH

No English garden would be complete without an array of hardy Carnations and Pinks in its perennial borders. So keen is the interest of the British in the culture of *Dianthus* that the writer was able to review no less than four books devoted to the subject, all published within the past five years and one in its third edition. Only after such reference work and by perusing an English catalog listing over three hundred varietal offerings can one appreciate the intensity with which the Carnation and its relatives are cultivated in the gardens of England. Interestingly enough, in spite of such avid Carnation culture, our American breeders have far outstripped all foreign competition in the development of the greenhouse Carnation and the bulk of the better commercial varieties in English houses are of American origin. The existence of so many fine Border Carnations undoubtedly hindered progress by the British with the perpetual or greenhouse Carnation. On the other hand there has been scarcely any attempt on our part to develop the garden forms and we must turn to the old world to secure the better varieties. Unfortunately, many of these have been developed in terms of the cooler and less rigorous climate of Western Europe and only certain of these races are suitable in our gardens.

The *Dianthus* of the border is a composite of several species, namely: *Dianthus caryophyllus*, *D. plumarius*, *D. chinensis* and *D. barbatus*. Certain alpine species have been recently added to contribute the dwarf and alpine pinks.

The Border Carnations, the Grenadins, Malmaison types and the Perpetual Carnations are improvements on

D. caryophyllus with the invasion of perhaps no other species. These races are usually obtained as named varieties, propagated by cuttings or layers, although one may also find seed collections of certain of these. Another classification cuts across these race lines, one used mainly for show and catalog purposes, and one will find the varieties listed under such names as selfs, white ground picotees, yellow ground picotees, fancies, cloves, bizarres and flakes. The selfs need no further clarification and the cloves are similar except that they are heavily spice-scented. Picotees differ in that the ground color is either white or yellow and the edges of the petals must be tinted with another color that runs evenly around the rim of each petal without a break. Fancies are the varieties with a white, yellow or apricot ground, flaked or striped with various colors. Bizarres and flakes represent the favorites of earlier years and here are the "streaked gillflowers" of the Shakespearian era. Both have a white ground, but the bizarres must have every petal striped with two colors; while Flakes have the petals striped with only one. In any event, the ground must be clear white and unshaded with any color save for the pure stripes.

Should such an elaborate classification excite the reader's interest, the descriptions of some of the varieties will further whet the appetite, for there are such varieties as Dot Clark—an exhibition picotee of deep yellow ground, heavy rose pink edge; Lavender Girl—a fancy with the ground buff-apricot, marked and edged lavender-gray; Black Douglas Clove—a glowing *Chrysanthemum Crimson*;

Firefly—a yellow ground picotee, heavy crimson edge; Unique—a fancy with pale maize ground, lightly barred blue.

As pointed out earlier, however, these have often been bred for show purposes and lack the vigor required to tolerate the climate of our North American summers. Furthermore, to achieve flowers similar to those shown here, one has to stake each individual blossom and pinch the buds as for greenhouse Carnations. They are definitely not the plants to attempt in the average border where survival is sometimes only for the most fit. The writer learned of this through correspondence of a few gardeners in the Pacific Northwest of both the United States and Canada who have at one time or another grown a number of the Border Carnations.

It should be noted that seed of these races can be purchased and a collection of "double picotees" from France was so raised and bloomed continuously during June and July of this past summer. Not only will one enjoy the flowering of these types, but, if handled in sashed frames, the blue-green foliage of the clumps as they slowly develop during the winter are a constant reminder of the more favorable seasons ahead. One will also find under the Carnation heading other races grown from seed and from layers, such as the Grenadins—all clove-scented, double-flowering types resembling miniature greenhouse Carnations; Heineman's Double and Early Dwarf Vienna also may be added to this list. Resembling these in flower form and fragrance is the Marguerite strain. But here is an annual type of Carnation. This race is derived from *D. caryophyllus* × *D. chinensis* and, like that latter parent, will flower in five or six months from seed that may be sown indoors in February or

somewhat later outside.

Turning now to the Pinks, we find *Dianthus plumarius* the main contributor to such races as *D. allwoodii*, *D. winteri*, the Highland Pinks, the Laced and the Show Pinks. In most cases, *D. caryophyllus* is the other parent, although in some *D. superbus*, *D. alpinus* and *D. caesius* are included. Here we find types more suited to our climate and I presume that even in the English gardens the Pinks must predominate, for, unlike *D. caryophyllus* that inhabits the sunny crevices of Southern Europe, *D. plumarius* has a wide distribution, ranging from Eastern Europe to Siberia. One is very likely to find plants of *D. plumarius* flourishing in abandoned borders and sunny nursery areas where the neat hummocks of blue-green will produce an abundance of pink or whitish flowers, characteristically "eyed" with deeper pink or maroon. These clumps are easily divided by scooping under the shallow foliage mat and removing sections for replanting.

Dianthus winteri, a typical race of Pinks developed in the early 1920's. It has a personal significance in that the Division of Plant Exploration and Introduction of the United States Department of Agriculture first introduced several varieties into this country in 1933. The fact that at least three of these varieties can still be obtained is indicative of their adaptability to our climate. Those which the writer grew came from Vermont, so one need not be concerned about their cold-hardiness. The flowers are single, either pink or white ground, with a large maroon eye. Usually the petals are lacinate. The flowers are borne upright on stems up to twelve inches and appear during the entire summer. The varieties shown here are: Mrs. Wormald, having a pink ground, and Mrs.

Back, which displays a white ground.

The Laced Pinks are an older race and the only representative that was available for trial is John Ball, a double with a white center surrounded by a crimson zone extending over each petal and then bordered again by white. A variety also obtained from a northern nursery named Eliza is probably a Laced Pink and has double, pale pink flowers on short stems springing up from a prostrate and grassy base.

One species that is not frequently grown but truly deserving of wider cultivation is *Dianthus superbus*, a robust and heavily flowered Pink from the Southern Alps. The broad green leaves are in tufts on rather untidy stems, but, as the illustration clearly shows, large lilac flowers with finely feathered petals are borne in profusion. This is a plant that will thrive for several years with little attention. Since it produces quantities of seed, a harvest as the clumps begin to decline will insure plants for future years. Here at Glenn Dale this species bloomed through the entire summer and on into the fall until stopped by frost.

We have described in detail a number of the Carnations and Pinks that are the basis of the writer's rather fragmentary knowledge of *Dianthus* for border gardens. A few rules on culture might suffice, for to really delve into this phase one should obtain a more thorough treatise on the subject. A sunny location is essential. Although this precludes intense heat, this problem can be remedied by covering the soil around and beneath the plants with pea gravel or if limestone rock is available it would be even better. This covering provides the cool soil temperature required for *Dianthus* and a dry, rock-like base on which the stems may spread. As for soil, the nature of the areas where *Dianthus* are mainly found

is alkaline. This is not a prime requisite for, by mixing liberal quantities of manure, lime and peat into the soil, an adequate medium can be attained. Having provided these, only the side-dressing of the plants with slow-acting organic fertilizers once or twice during the season is necessary.

Planting may be done either in the fall or spring but the fall method insures the plants ample time to become well established before the coming summer season. Mulches in winter are not necessary and may even be detrimental if wet leaves are crowded around the crown of the plant. Actually, the plants will pass the winter perfectly whether exposed to the elements or covered with snow.

As for propagation, *Dianthus* species and non-clonal races may be raised from seed, using sphagnum moss as the medium. Germination will be complete in about three weeks with fresh seed and the seedlings may be transplanted once before setting out in their permanent position. The seed can be sown as soon as collected or, if facilities are available, held until winter and germinated in late January or February. Regardless of whether fall or spring sowing is used, some of the perennial types of *Dianthus* can be expected to bloom late during the first summer, although the real show will not occur until the next year.

Cuttings are employed by commercial Carnation growers and are also used for Pinks. Non-flowering wood should be used and cuttings may be made either in the fall or spring. Outdoors, after flowering has been completed, there will be a flush of growth to supply all the cutting material needed. Border Carnations, with their sparse vegetative growth, are usually layered in July by stripping most of



Robert L. Taylor

A Laced Pink: Dianthus John Ball.

the leaves from the stems and cutting a tongue into a node. Since this is a garden procedure, it is desirable to replace the soil around the stems to be

layered with an equal mixture of sand and peat. The prepared layers are buried in this medium and will root in a matter of four to six weeks. The new



Robert L. Taylor

Dianthus superbis

plants can then be removed, potted or plunged back into the soil near the parent plants.

Obviously one cannot do justice to

a subject in this short space but, should the reader be stimulated to further research into the Carnation and Pink, a list of recent works follows:



Robert L. Taylor

A collection of Border Carnations: Upper left, Mary Livingstone; upper right, Lavender Girl; lower left, Dot Clark; lower right, Autumn Tints.

ALLWOOD, M. C. *Carnations And All Dianthus*. Allwood Bros. Ltd., Hayward's Heath, Sussex, England. 1947.

BAILEY, L. H. *The Garden Of Pinks*. The Macmillan Company, New York. 1938.
INGWERTSON, W. *The Dianthus, A Flower*



Robert L. Taylor

A collection of Border Carnations: top, *Black Douglas Clove*; upper right, *Mrs. A. T. Kemble*; center, *Firefly*; left center, *Unique*; lower, *Norman Haywood*.

Monograph. Collins, St. James Place, London. 1949.

MANSFIELD, T. C. *Carnations In Color And Cultivation*. Collins, St. James Place, London. 1951.

MERCER, F. A. and R. HAY. *Gardens And Gardening*. Volume 3—Hardy Plants. The Studio Publications, London and New York. 1952.

The Effect of Juvenility on Plant Propagation

F. L. O'ROURKE

Practical plant propagators have long known that cuttings taken from young seedling plants root much more readily than cuttings from mature plants of the same species. Goebel (11), in 1900 mentioned this relative ease of propagation in younger individuals and established the term "juvenility" to describe the physiological condition involved. Juvenility may or may not be accompanied by morphological differences from the mature individual, such as different leaf shapes, thorniness, or other growth characteristics. In many species, however, the superficial appearance of the seedling plant is somewhat different from the mature individual. Ashby (1) reports that Krenke used the leaf shape of the sugar beet leaf to determine the amount of sugar to be found in the roots at that time. Certain characters of the leaf changed gradually over a period of time as the plant progressed from a young seedling toward maturity. Kronke (9) as well as many others, (8, 17, 19, 20), indicated that the juvenile characteristics were associated with the *physiological* age of the individual plant rather than the *chronological* or *time* age, as various plant individuals progress at different rates toward maturity, depending upon both their genetic constitution and their varied response to environmental influences. Whyte (20) quotes Lysenko as distinguishing between growth and development in plants. Growth may proceed with little or no development toward the mature or reproductive stage, and under certain conditions the reverse may be true. In like manner the external appearance of the plant may indicate certain internal conditions, but will vary with the species and the environment.

SEEDLING AGE AND THE ROOTING OF CUTTINGS

Gardner (9) in 1929 reported the chance discovery of the ease of rooting of cuttings taken from apple trees in their first season of growth, and further comparisons made with older trees of apple and many other woody plant species. With most fruit tree species, cuttings from one-year seedlings rooted well, from two-year old plants only fair, and practically not at all during the third year or thereafter. Evergreens and shade trees retained the rooting ability of their cuttings for a longer period, but in all cases there was a sharp drop in the third year of seedling growth. This investigator also noted that not only were a greater number of cuttings rooted from younger plants but that the time required for root production was much shorter. He tested cuttings taken from one-year budlings of apple with negative results. He then tried treating cuttings from older trees with seed extracts, but without success as far as rooting was concerned. Gardner then cut one-year apple seedlings back to the ground and noted that the sprouts arising the second year furnished cuttings which could be rooted "and in some cases even more readily than that of the first year."

Stoutemyer (17) reported in 1937 that cuttings taken from watersprouts of apple failed to root. Seven-year old seedlings and one-year old seedlings of crabapple were cut back to the ground. Cuttings taken from the resulting sprouts the next season rooted well. Stoutemyer considered these shoots intermediate between the juvenile and mature growth phase.

Stoutemyer observed that shoots

arose from scion roots of 17 year old clonal Virginia Crab trees left in the orchard after the trees had been dug out. Cuttings taken from these shoots rooted well and showed the characteristic thin and smooth leaf form of the juvenile phase of growth. These shoots arose from adventitious buds which formed in the secondary cortex of the roots.

Gardner (10) reported a reversion to the juvenile type of leaf form in *Juniperus horizontalis* and noted that such branches "struck root more freely where they came into contact with the soil, than had branches of the normal form with adult foliage."

Thimann and DeLisle (19) tested cuttings from one-, two- and three-year and older seedlings of pine, spruce, maple, ash, and oak. The per cent of successful rooting was in descending order with increased age of the tree.

Deuber (4) compared cuttings taken from Norway spruce 5, 26, and 40 years of age. The greater degree of rooting was generally in favor of the younger trees but fair success was obtained in all age classes. He also tested cuttings from white pine ranging from 2 to 60 years old. Rooting was good in the earlier years but dropped sharply between the fifth and seventh seedling years. Hemlock cuttings rooted well from 4 year old trees but only poorly from trees 20 years of age.

THE SEAT OF JUVENILITY

It has been reported (9, 17) that when young seedling trees are cut to the ground cuttings from the resulting shoots root as well or better than cuttings from one-year seedlings. It has also been indicated (17) that the leaves on shoots arising from adventitious buds in the roots of apple show pronounced juvenile characters and that cuttings from such shoots root

well.

Stewart (16) has shown that when a root of *Acanthus* is cut into pieces the appearance of the leaves arising from the root apex show the juvenile growth form, while those from portions of the root farther back have a more mature appearance. The same juvenile characters in the leaves are shown from the growth of axillary buds on internodal stem cuttings taken near the base of the plant, while terminal cuttings continue to exhibit adult foliage conditions.

Several investigators have found that cuttings taken from the lower portion of a tree root better than those taken from the upper part. Grace (12) took cuttings from the upper third and the lower third of an 18 year old Norway spruce tree. Ten weeks after setting in the greenhouse bench, 43 per cent of the upper and 73 per cent of the lower cuttings were rooted. After nineteen weeks in the bench, 48 per cent of the upper and 86 per cent of the lower cuttings were rooted. The cuttings from the lower portion of the tree also had longer roots and greater root masses.

Doran, Holdsworth, and Rhodes (5) compared cuttings taken from the upper third and the lower third of white pine trees. In one instance 70 per cent rooting was obtained with cuttings from the lower third while those from the upper third did not root at all. Another tree showed 20 per cent rooting from the upper and 10 per cent from the lower portion.

Edgerton (6) used cuttings taken from the upper half and lower half of 10 to 20 feet high red maple trees. The same number of cuttings were used for each individual clone. Those from the lower branches of male trees averaged 49 per cent successful rooting and those from the upper branches

27 per cent. Cuttings from female trees averaged 30 per cent rooting for lower branches and 21 per cent for upper branches.

Thimann and DeLisle (19) reported a greater degree of rooting from cuttings taken from lateral branches than from terminal shoots of white pine and Norway spruce, and a much higher per cent from cuttings near the basal parts of red oak and Norway maple than from either terminal or lateral branches of the same trees.

Stoutemyer, O'Rourke and Steiner (18) compared softward cuttings taken from stump sprouts of honey locust as against comparable material on lateral and terminal branches and found that the former rooted well and the latter very poorly or not at all.

JUVENILITY AND THORNINESS

Frost (7, 8) reported that citrus seedlings, produced either by genetic or apogamic means, are thorny in their earlier life but as they mature, the shoots upward and outward from the trunk gradually lose the thorny condition. He also reported that the thorny or thornless condition could be transmitted by budding, depending upon the portion of the shoot from which the bud is taken. This same phenomenon was reported by Chase (2) with honey locust. Desirable clones of honey locust with thorny trunks were propagated to thornless individuals by selecting buds and scions from the thornless portions of upward and outward growing shoots. These clones have remained thornless ever after and also their progeny during successive and repeated buddings.

Stoutemyer, O'Rourke and Steiner (18) showed that unselected thorny clones of honey locust could be propagated to a practical degree by the use of either dormant stem or root cut-

tings. O'Rourke (14), however, indicated that the thornless clones Millwood and Calhoun could only be propagated by hardwood stem cuttings with the greatest difficulty and that all attempts to propagate these clones by root cuttings resulted in absolute failures. He assumed that the thorny condition of honey locust was associated with the juvenile growth phase with the related ease of propagation while the thornless condition denoted the mature state and the inability to regenerate roots and/or shoots from cuttings.

REJUVENATION BY NUCELLAR EMBRYONY

In *Citrus*, and to a slight degree in *Malus* and some other plant species, seedlings may be produced from embryos which arise entirely from the maternal nucellar tissue surrounding the embryo sac, and subsequently develop within the embryo in the normal way to produce viable seed. The resulting seedlings will therefore be of exactly the same genetic constitution as the seed parent and may be considered clonal since they have been produced by asexual means. Frost (8) and Hodgson and Cameron (13) have reported that such "young clones" produced by apogamy are more juvenile in appearance and characteristics than the "old clones" from which they arose. Buds taken from seedling "new clones" produce more vigorous trees which come into fruiting later than those grown from buds taken from "old clones" of the same variety. The time of fruiting of any clone is apparently associated with the mature growth phase, and as Spinks (15) has pointed out, it cannot be hastened to any degree by treatments and environmental influences. The ease of production of

vegetative individuals of uniform genetic constitution and of high vigor has been hailed by Cook (3) as an opportunity for a new field of research in plant science.

DISCUSSION

The evidence is quite clear that plants in their younger stages may express different morphological appearances in certain characters and usually root from cuttings more easily than plants in a mature or senescent condition. The progress of aging is quite closely associated with development but not necessarily with growth. The changes which take place are internal ones although there may be associated external expressions. The process is purely physiological and should not be viewed from a chronological or time age standpoint.

The implications in the field of plant propagation are more reaching than with the use of cuttings alone. Most experienced nurserymen know that it is necessary to use the roots of rather young seedlings in order to secure a good percentage of graft unions with many plant species. The same principle applies to the use of rootstocks to be used for budding purposes. It is quite common to see roots emerging from soil-touching branches of many young shrubs, while those from older plants do not layer so easily and abundantly except where the branch may arise at or below ground level.

The seat of juvenility or that portion of the plant where the juvenile influence remains longest and exerts its greatest influence is at or just below ground level and probably extends well into the lateral roots. The so-called "reversion to juvenility" is evidenced by leaf characters and rooting

ability of shoots of adventitious origin from these lateral roots. Coppice sprouts from the main trunk, especially if of below-ground origin, also show excellent rooting ability.

There is no evidence to show that tests on the subsequent behavior of the clone have ever been made between plants propagated from these "juvenile areas" and the more mature sections of the same clone. It would be interesting to note any rejuvenation effects such as reported by Cook (3), Frost (7), and Hodgson and Cameron (13) with citrus produced from nucellar embryos. If, as indicated by the above workers with citrus, clones do become senescent, the value of rejuvenation is apparent and plant propagators may well think of juvenility not only in regard to ease of propagation but also as a method holding forth promise for improvement of many plant clones. Shoots from roots may be preferred cutting material if such results can be achieved.

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A Book or Two

Plants, Man and Life. Edgar Anderson. Little, Brown and Company, Boston, 1952. 245 pages with 16 figures. \$4.00.

This fascinating book deals precisely with what the title implies—plants, man and life, even though talking in terms of cultivated plants. Although the author claims he is writing for the layman, this probably is a tongue-in-the-cheek way of saying that authentic botanists might also gain some benefit. Certainly the book will cause many of us to look at plants with entirely new eyes.

Whoever reads the book, layman or botanist, will find provocative ideas presented in a charming style. No condescension and no drabness. The interest is held. The manner in which clues are searched out and pieced together to prove the heritage of a plant can be likened to a good mystery story.

The fact is emphasized that we know next to nothing about our cultivated plants. The author deals more gently

than one would expect with the very botanists who should study the sources of our daily bread. The classification of cultivated plants is such a veritable chaos that the scientific names used to designate plants are often no better than a label saying—"I do not know." It is surprising that we have accomplished as much as we have knowing as little as we do. In the beginning taxonomy was devoted to cultivated plants, but our botanists gradually have been so weaned away that at present they will not so much as sniff at a cultivated plant. Most herbaria are loath to give housing space to such specimens. The author does not mince any words in telling facts which usually are not written even though well enough known to the botanical fraternity.

The problem will be solved only by a new kind of investigator, one who knows morphology as well as genetics, or one might say a hybrid scientist, a cross between a taxonomist and a geneticist.

The book points the path for the future. Careful observations and measurements must be made in the field. Herbarium specimens will need to carry more than the barest data as is now the custom. A good idea lies in the suggestion for the preparation of "inclusive herbarium specimens." In addition to the customary pressed plants, photographs and notes on the total variation will be needed. An interesting example is given where an inclusive herbarium specimen was prepared from several hundred individuals of "coyol" palm, each the size of a telegraph pole. The author compares it to stabling a camel in a dog house.

Even though the facts of the book may be common knowledge yet they are put together in such an entrancing fashion as to persuade one to the author's way of thinking.

DR. W. ANDREW ARCHER, U. S. National Arboretum Herbarium.

Gardening For The Small Place. William H. Clark. Little, Brown and Company, Boston, Mass., 1952. 247 pages, illustrated. \$3.00.

Although there is no definite statement as such, the small place for which the author is writing is the suburban place, the simple lot with neighbors at perilously close locations, so that one must consider them in making one's own plan.

The book is not lacking in other definitions, however, and the first chapter, "Plan Your Planting," is worth rereading more than once.

The book is written with admirable clarity of style and with a very high degree of common sense. The size of the volume, for it is almost pocketbook size, limits many discussions, but that is not too important except perhaps for New Englanders who might have liked

more. For the rest of the country the important things are in the principles laid down. These are the things that should be examined and learned by those of us who live south of the Mason and Dixon line, for some of the plant lists are not only poor but dangerous for us. The Southerner, who would jeer, for example, at the use of Japanese honeysuckle, must remember that in Massachusetts it lives a meager life as compared to its rioting here. The Middle Westerner will find nothing for him and the two extremes of the Pacific Coast as little; but the advice is sound anywhere and the principles that can be damned only as being "temperate" will make safe and excellent points of departure when the home owner feels ready to "express his personality" . . . or burst.

Our Garden Soils. Charles E. Kellogg. The Macmillan Company, New York, 1952. 232 pages with maps, tables, etc. \$4.00.

Directly or indirectly you will find the answers to most of your soil problems in this book. That understandable answers can be found here is a tribute to the writing of Dr. Kellogg who has reduced some of the facts of soil science without sacrificing the basic truths for the sake of clarity.

That the soil in which we grow our plants is highly important for success will not be denied by any gardener. The method of providing a suitable growing medium from what soil is available, however, is not always understood by those growing plants. Soils that are either too sandy, too clayey, too wet, too dry, or lacking in fertility are what most of us become heir to. This book is written especially to help gardeners overcome and understand why these conditions are deleterious to plant growth.

Dr. Kellogg points out that the application of commercial fertilizers can not substitute for good soil structure and organic matter. Although he clearly repudiates the mystic powers that many organic gardening enthusiasts claim for organic matter, he does recognize its great value by calling it "the gardener's elixir."

Among the interesting chapters in this book are those on organic matter, soil water, soil acidity, soil preparation and balancing the plant nutrients. The beginning chapter on natural soils admirably introduces one to some of the basic terminology and classification of soils.

The appendix of this book contains a discussion of soil maps and a handy list of soil preferences for many common cultivated plants.

DR. FRANCIS DE VOS, U. S. National Arboretum.

Beautify Your Home Grounds. Peter Rhodes. Homecrafts Publishers, distributed by Garden City Books, New York 22, N. Y. 90 pages, illustrated. \$1.50.

This paper-bound volume covers almost the same ground as the Clark volume. The differences are striking. Here the text is much less extensive and is written with gusto . . . for this reviewer who has lived too long and moved too much earth and pulled too many weeds and sprayed too many plants, it is almost too exuberant! The text, which is admirably clear, is fortified—or duplicated in equally zestful drawings, brush work in black and white. The

drawings that are indicative of plans and structures are zestful and good, those of plant forms, trees especially, will open the range of vision of many, but the pictures that illustrate individual plants or flowers are in general poor. That is not important here, if the reader will read the text.

The important difference from the Clark text is that there is much more "how-to-do-it" instruction in this book.

They do not supplement each other; they are intended for two distinct types of readers—reader classes, you know, in the insulting terms of the advertiser.

The Real Book About Farms. Robert West Howard. Garden City Books, New York, N. Y., 1952. 191 pages, illustrated. \$1.25.

This is a juvenile that is written from an admirably broad point of view and manages to get across an astonishing amount of information that highlights the admirable points of view in farm living and at the same time shows as well the importance of farm life to the nation. If at the same time it manages to pass over the type of calamity that is also part and parcel of farm living, the eternal element of gamble with Nature, for which all of man's wisdom, experience and skill is never absolutely able to cope, one need not be too dismayed, but leave that also to the sorrows of "growing up" meeting it with the courage and imagination that one must find, or succumb. While the "locale" is New York state, there are adequate bows to the rest of us.

The Gardener's Pocketbook

Achimenes In La Jolla, California

You may be interested to hear about the way *Achimenes* perform in La Jolla. Their best use here is on large hanging baskets or balls for the lath house where *Begonias* and *Fuchsias* are at their height at the same time as the *Achimenes*. The blue or white varieties accent and enhance the beauty of the pinks and reds of the *Begonias* and *Fuchsias*.

They grow with little trouble. The owner of the lath house where I have seen them at their finest simply puts the baskets, when their bloom is over, under a potting bench and gives them no thought until spring. While dormant they probably get a splash of water now and then but it is not given them purposely.

Some years ago, the "babies" were casually planted under a bed of violets and each year since they have come through the violet leaves after the violets had gone.

This friend plants a few tubers in pots each spring, one tuber to a pot and with occasional feeding they develop into larger tubers. When I remarked that the flowers did not seem overlarger or better in any way, the reply was, "No, but the larger bulbs will bloom earlier next year."

I have a small glass house covered with lath in summer, but even with this shade and all the ventilators open it is too warm in the middle of the day for most plants. But the *Achimenes* like it and I plan to have enough of the various sorts to make it a pleasant place.

LAURA M. SIKES, La Jolla, California

Welwitschia mirabilis

We have read in the October 1951 issue of THE NATIONAL HORTICULTURAL MAGAZINE, of the Montreal Botanical Garden's experience in growing *Welwitschia mirabilis*. We should like to report our experiences with this plant at the University of California, Los Angeles Botanical Garden. On August 10, 1950 Mr. Ted Frolich, propagator at the Subtropical Horticulture Greenhouse, took a five gallon can, steamed and filled it with old potting soil—a recently sterilized conglomerate mixture of peat, leaf mold, vermiculite, soil and sand. This can of soil was thoroughly soaked and allowed to dry out to field capacity; the seed was then placed on this soil at the center of the can and covered with one inch of dry sand. No water was given for four months. The can was kept in one spot on a bench in the Avocado propagation greenhouse where the temperature ranged from 65° to 95°. At the end of four months the soil at the rim of the can was pressed down to form a small trench and water sufficient to saturate the soil was given once a month. Germination was in approximately three weeks and in six months the true leaves appeared.

One year later on August 9, 1951 the leaves were about 3½ to 4 inches long and half an inch wide. On this date the can was taken to the Botanical Garden where the bottom of the can was removed and can and all planted on a steep south slope fill in poor sandy adobe soil. The plant received no further attention other than the routine weekly watering of one hour from overhead sprinklers. During five hot weeks

in September and October this slope was watered twice a week, one hour each time. Since December 1st the weather has been wet and cold with nine inches of rain recorded from October 1st through January 10th. 3.75 inches of this fell in 24 hours. Since January 10th we have recorded 9.85 inches in a five day period. The lowest temperatures recorded at this point have been one night of 28° and one of 30° in late December. On January 21, 1952 the following measurements were taken:

Stem one-half inch in diameter; height of center above soil five-eighths inch.

Width of leaves at center $1\frac{1}{8}$ inches, length of leaves $6\frac{1}{4}$ inches. The center of the plant shows two small rough knobs. The leaves are a bluish gray green with a reddish tinge along the edges and near the center. The leaf tips show a woody one-half inch die-back. The plant is apparently in good condition.

DONALD P. WOOLLEY, Senior Superintendent of Cultivations

(A postscript was just received from Mr. Woolley stating that during a recent flood rain storm someone stepped on this plant and it never recovered. Ed.)

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Prepared by FREDERICK W. COE

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