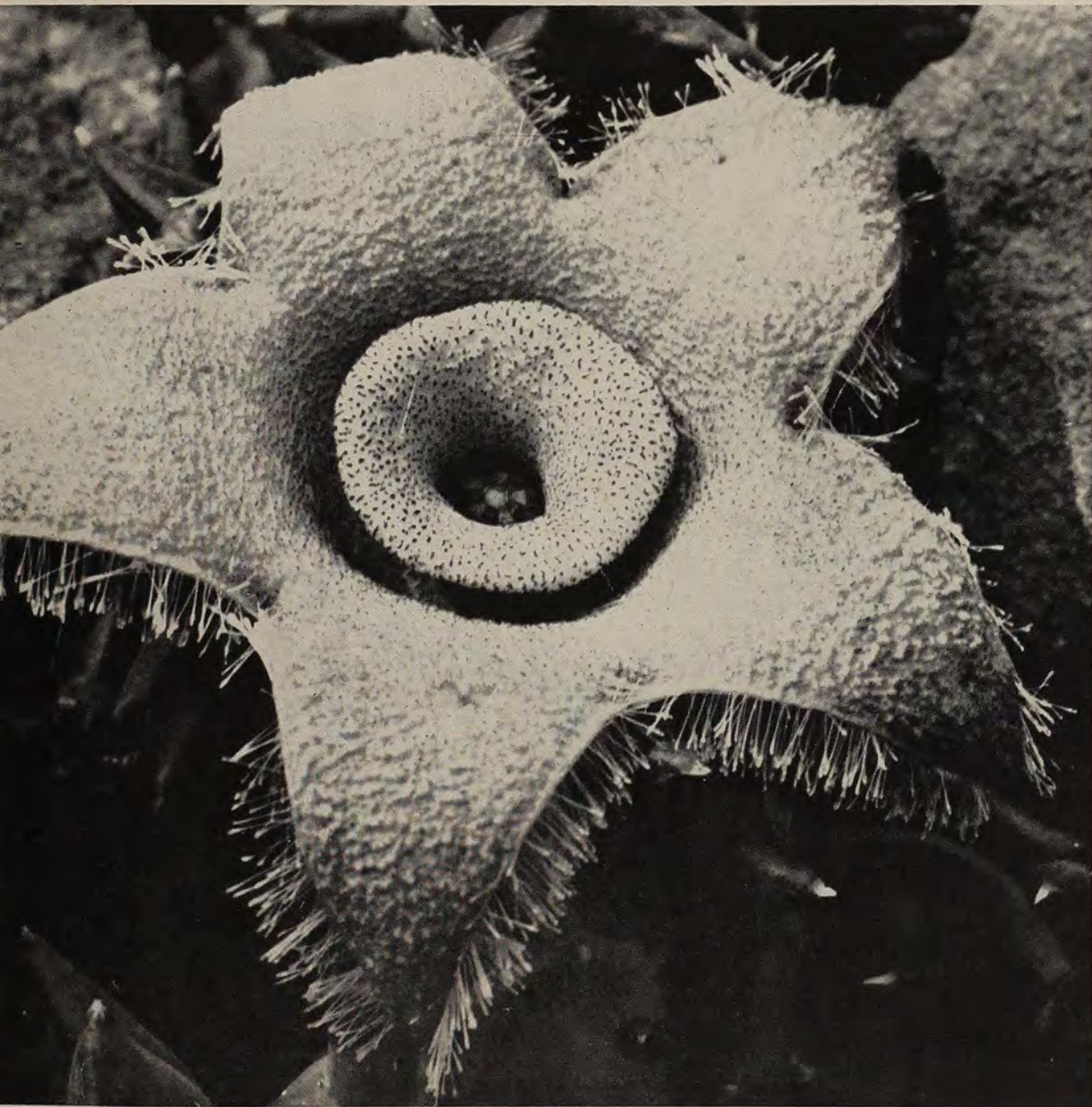


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THE AMERICAN HORTICULTURAL MAGAZINE is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. Original papers which increase knowledge of plant materials of economic and aesthetic importance are invited. For manuscript specifications, please consult the chairman of the Editorial Committee.

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COVER ILLUSTRATION

Diplocyatha ciliata (Thunberg) N. E. Brown

Stems: Decumbent and ascending, 1½-2½ in. long, green to reddish brown.

Flowers: 3-3½ in. in diameter, off-white in color with white hairs.

Notes: A very beautiful species, noted for the delicately balanced hairs which fringe the corolla lobes. These move with the slightest air movement. Not difficult to grow. Should never be over-watered. Stands a minimum of 40° F in winter.

Habitat: Cape Province, South Africa.

Total species of the genus: 1

PHOTO B. M. LAMB

Meet Your Editors

Experts from many branches of horticulture regularly devote time and talent to making your *American Horticultural Magazine* unique among the world's horticultural magazines. Our editors contribute this work without compensation to fulfill its purposes "to encourage and promote American horticulture in all its branches." Nine members presently constitute the editorial committee.

Victor H. Ries, Chairman, Columbus, Ohio. Taught botany and nature study at Iowa State Teachers College, floriculture at Purdue University and Ohio State. Extension professor emeritus of floriculture, Ohio State University. Writes weekly column *Over the Garden Fence* for Columbus, Ohio *Citizen Journal* and East Central garden column for *Flower and Garden Magazine*. Books published include *Gardeners' Trouble Shooters* and with Alex Laurie, *Floriculture—Fundamentals and Practices*. Has traveled widely in United States, Europe, West Indies, Central and South America and has conducted garden tours in many of these areas.

John L. Creech, New Carrollton, Maryland. Born in Rhode Island; Ph.D. University of Maryland, 1952, in botany. Since 1947 with the U.S.D.A. Superintendent, Plant Introduction Station, Glenn Dale, Maryland. Since 1966, chief New Crops Research Branch, Beltsville, Maryland. Three exploration trips to Japan, one each to Taiwan, Nepal, and U.S.S.R. Author of numerous publications, many dealing with plant exploration and introduction of ornamental plants. A Horticultural Medal, the Federated Garden Clubs of New York (1962) and the Thomas Roland Medal, the Massachusetts Horticulture Society (1964), both for work in plant exploration and introduction. Special Merit Award from the United States Department of Agriculture (1966).

Frederic P. Lee, Bethesda, Maryland. Amateur gardener specializing in plants for shade. Author of *The Azalea Book*, which received the Literary Certificate of the National Council of State Garden Clubs. Chairman of the Advisory Council, U. S. National Arboretum. Active as an officer or director of the *American Horticultural Society* for over twenty-five years and received the Society's Gold Medal (1959) and its Awards Citation (1963); also the Gold Medal of the American Rhododendron Society and the Distinguished Service Award of the Horticultural Society of New York. A lawyer by profession.

Conrad B. Link, University Park, Maryland. B.Sc., M.Sc., Ph.D. Ohio State University. Research Assistant in Horticulture, Ohio State University. Assistant Professor, Department of Horticulture, Pennsylvania State University. Horticulturist, Brooklyn Botanic Garden. Currently Professor, Department of Horticulture, University of Maryland. Has conducted research on ornamental plants related to their nutrition in the environmental conditions under which they are grown. Co-recipient for the Leonard H. Vaughn award for research in ornamental horticulture (1954).

Elvin McDonald, New York, New York. Currently Garden Editor, *House Beautiful Magazine*. Graduate of Oklahoma Baptist University, 1956. Attended the Conservatory of Music, Kansas City; Mannes College of Music, New York City; University of Kansas City; and University of Missouri at Kansas City. Formerly Editor of *Floral Magazine*, *Flower and Garden Magazine*, and Garden Editor and consultant for Macmillan Company, New York. Founded American Gloxinia Society, 1951 and editor of *The Gloxinian*, until 1959. Books authored include *Indoor Gardening*, *Plants for Home and Greenhouse*, *The World Book of House Plants*, *Complete Book of Gardening Under Lights*, *The Flowering Greenhouse Day by Day*, *Gardening A. to Z.*

Frederick G. Meyer, Takoma Park, Maryland. Native of Washington. Washington State University. B.Sc., M.Sc. and Ph.D. in botany, Shaw School of Botany, Washington University, St. Louis, Missouri. Dendrologist, Missouri Botanical Garden 1951-1957. Research botanist and plant explorer, U.S.D.A., Beltsville, Maryland 1958-1963. Since 1963 botanist in charge of the herbarium, U. S. National Arboretum, Washington, D. C. Plant explorations in Europe, Ethiopia, Juan Fernandez Islands. Life-long interest in cultivated plants.

Neil W. Stuart, Silver Spring, Maryland. Born in Michigan and graduated from Michigan State University in 1929 with a major in horticulture. M.S. in horticulture, University of New Hampshire in 1932 and a Ph.D. in plant physiology, the University of Maryland in 1934. After 2 years as assistant plant physiologist in the Maryland Agricultural Experiment Station, joined the U. S. Department of Agriculture, Beltsville, Maryland. Worked on problems of cold hardiness, plant nutrition, and effects of light and temperature on flowering bulbs and ornamental potted plants. Recent work is on the chemical growth regulators.

Fred B. Widmoyer, Las Cruces, New Mexico. Head of the Department of Horticulture, New Mexico State University, Las Cruces. Masters Degree from Texas Technological College, 1950, Ph.D. from Michigan State University, 1954. Major field is ornamental horticulture. Numerous articles published in horticultural magazines and journals and for *Encyclopedia Americana*. Presently an officer or director of several professional organizations as well as maintaining an active status in various civic groups and in the U. S. Naval Reserve.

Wilbur H. Youngman, Silver Spring, Maryland. Garden Editor of the *Washington Star* since 1938, and since 1944 editor of *The Star Garden Book*. Graduate of the University of Illinois; M.Sc. from Iowa State University. Retired from the U. S. Department of Agriculture in 1959 after 30 years in seed marketing service. Past president of Takoma Horticultural Club, the Potomac Rose Society, the American Horticultural Society. Accredited judge of American Rose Society. Received "ASTA" Award in 1957 of the American Seed Trade Association, Garden Writer's Award in 1961, and the Special Award of the Takoma Horticultural Club in 1963. Formerly editor of *Gardeners' Forum*. An active gardener with special interest in roses, camellias, azaleas, daylilies, Oriental poppies, and daffodils.



PHOTO PHILIP G. CORLISS

Stapelia hirsuta Linnaeus var. *patula* (Willdenow) N. E. Brown

The "hairy stapelia" was the second species to be discovered. It turned up in Holland before the end of the 17th century from the mountains near Cape-town in South Africa. Flowers are about 4 in. in diameter. The purple corolla lobes with cream markings are edged with soft purple hairs. A fine plant for small collections.

Portfolio of Stapeliads

INTRODUCTION

BRIAN M. LAMB

Stapeliads (Stapelieae) of the Milkweed Family (Asclepiadaceae) are a fascinating group of succulent plants which are becoming increasingly popular with cactus and succulent enthusiasts. In recent years many more species have become available and it is true to say that with my father (Edgar Lamb) we have helped greatly in introducing many new Stapeliads into cultivation. Formerly these plants were considered to be very difficult to grow and only a few species were found in collections. Here in England at 'The Exotic Collection' we have amassed some 500 kinds to grow, study, and photograph.

About the Authors

Brian Lamb, 16 Franklin Rd., Worthing, Sussex, England, is a co-director of 'The Exotic Collection.' With his father, Edgar Lamb, has published the 4 volume work, "Cacti and other Succulents." Father and son also produce a monthly publication with articles on kinds, cultivation notes, and color illustrations on cacti and succulent plants (including Stapeliads). Edgar Lamb is the author of "Stapeliads in Cultivation."

Philip G. Corliss, M.D., San Diego, Calif. Born and raised in New England. Graduate of Dartmouth and of Harvard Medical School 1930. Originally inspired the Portfolio of Stapeliads and later visited with the Lambs in England to obtain their cooperation in the present article. Horticultural photographer and lecturer and breeder of daylilies, spuria and *La. iris*, *amaryllis* and author of a book, *Hemerocallis*, *The Perennial Supreme*. Contributor to the *Daylily Handbook*, Spring issue 1968, *American Horticultural Magazine*.

The Johnson Cactus Gardens, Box 458, Paramount, California 90724, has contributed a number of the photographs in the Portfolio. Mr. Harry Johnson is a well-known authority on succulent plants.

Stapeliads are native to most of the drier parts of Africa and the neighboring islands where climatic conditions are suitable. Also they are found in Arabia, some parts of India and Ceylon, and one species of *Caralluma* is found as far east as Burma. The tribe Stapelieae comprises 22 genera, although some dispute exists over the validity of one or two of the genera. The illustrations of 14 genera accompanying this article include some of the most interesting genera and species and readers should be able to obtain them from reputable growers.

Stapeliads are all free-flowering plants mostly with very succulent stems, usually of soft texture, such that in the wild about 90 per cent of them are found in the shade of rocks or other bushes or trees. Some are found only under the protection of rather spiny bushes, as their very succulent stems would otherwise soon be eaten by goats and other animals.

The stapeliads differ from most flowering plants by their method of pollination. In the center of each flower is the corona, which contains the male and female organs, but the pollen is not a fine powder but rather a small sticky mass known as pollinia. These plants are usually pollinated by flies, sometimes very small ones in the case of tiny flowers, attracted by a smell of rotting meat characteristic of some species. At this point I should add that in the majority of the species the flowers have only a slight odor not noticeable to the human nose, even in a closed greenhouse. However, some species do emit an unpleasant smell of carrion, at least for a few hours, when the flowers first open. Unfortunately, some of the species with an unpleasant smell have been in cultivation

a long time and have given this interesting group of plants a bad name.

The majority of stapeliads are low-growing plants, some only a few inches high, while a few can reach a few feet in height. The flowers take most people 'by storm' because they are very exotic and unusual. The curious patterns on the flowers may be compared with the wings of tropical butterflies. This comparison

is a very good description of many. The petals are rather leathery and flowers vary in size from about a quarter of an inch to as much as 18 in. in diameter in *Stapelia gigantea*. The flowers are normally 5-lobed and often star-shaped, sometimes bell-shaped, as in *Stapelia leendertziae*, or spoke-like in *Duvalia* with the petals folded back to give this unusual shape.

CULTURE

PHILIP G. CORLISS, M. D.

There is perhaps no group of plants more challenging and yet more fascinating and rewarding to the amateur gardener than the stapeliads. Some such as *Stapelia variegata* and *S. gigantea*, are easily grown, while others are difficult and have been completely lost in cultivation.

In nature, stapeliads grow in rocky soils in a climate with low rainfall, slight frost, and plenty of light. These factors provide the key to their successful culture. Only a few places in the United States are suitable for outdoor cultivation, particularly in coastal areas of southern California. All are amenable to pot culture and hence may be grown by anyone.

In the Garden. In frost-free areas of low rainfall, stapeliads are good subjects for the rock garden. Excellent drainage is essential. Many amateurs grow them very successfully in cement blocks.

Pot Culture. Plenty of gravel with lime and/or charcoal is recommended. The soil may contain some well-rotted leafmold but should consist chiefly of sand and clean soil. Coarse gravel or granular pumice should make up the top half inch to assure that the stems are not subjected to excessive moisture. Some kinds will take frequent heavy watering during the growth period in warm weather while others will tolerate no more than an occasional mist spray or a spoonful of water, perhaps from the

bottom. Clay pots are safer than plastic ones as the latter may retain moisture.

Heat. Warmth is important, not only protection from frost but from too much exposure below 50° F. Most stapeliad stems turn dark red-purple when the temperature is cool and revert to green only after the temperature has risen to 70° F. or higher.

Light. Given the proper nutrition, water, and heat, stapeliads still require the correct amount of light for good growth. Too much shade results in spindly growth deficient in bloom and too much sun will cause sunburn and cessation of growth. Shaded glass is ideal. In their native habitat some species grow in full sun but will rarely tolerate such a position in cultivation.

The Flowers. Although late summer and autumn is the period of heaviest bloom, a collection of fair diversity will produce some of the long-lasting flowers each month. They may appear at the base, along the stems, at the stem tips, or on erect or decumbent pedicels. The colors are mostly greenish ochraceous and/or purple-red-brown but include clear red, yellow, and white. Many are densely covered or heavily fringed with hairs ranging in color from white to dark purple.

Stems. Stapeliad stems may be smooth or velvety-hairy. Most kinds are angled and

many have rudimentary leaves. They vary from 1 in. to more than 3 ft. in height and from one-half in. to more than 3 in. in diameter. They may be erect, ascending, or decumbent. Some branch from the base, others from the main stem. Some, like *Pectinaria*, send up underground stems some distance from the original plant. In active growth they vary from light to dark green or glaucous.

Seed, Grafting, Cuttings. Seeds germinate promptly, some within 24 hours, and most in less than a week. As with other succulents, the seedlings will tolerate considerable watering. Stapeliads difficult to grow may be grafted on robust species of *Stapelia* which tolerate liberal watering. The plant juices alone suffice to make the union—no pressure,

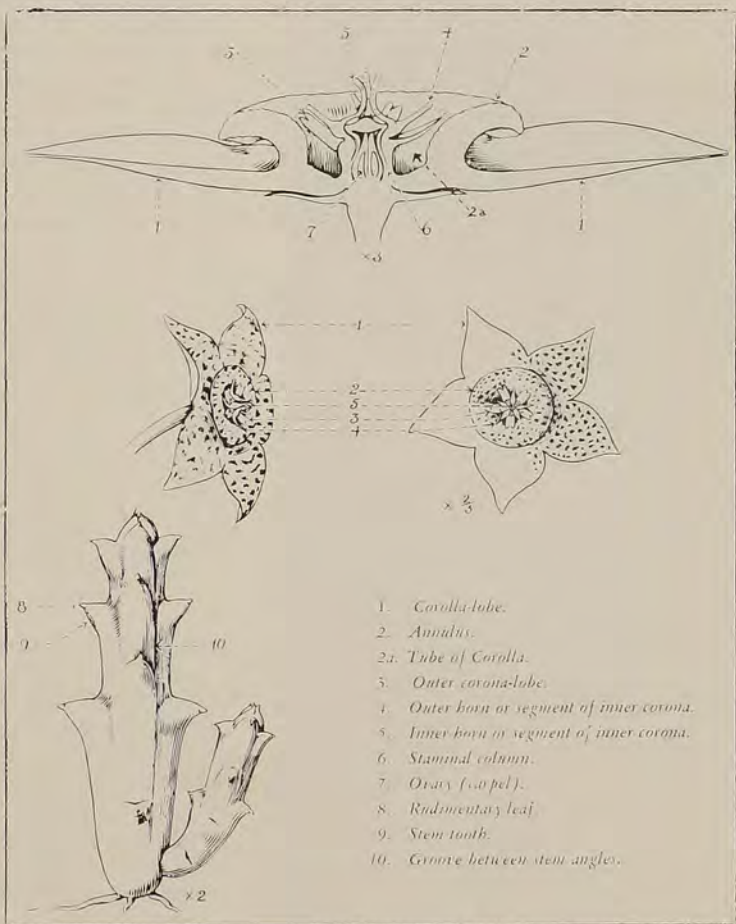
pins, or wrapping are needed. Cuttings of many kinds root easily, but, as in all facets of culture, the stapeliads are variable and temperamental.

Diseases and pests. A dilute solution of potassium hydroxquinoline sulphate on decayed parts will control 'black rot.' The only other pests are mealy bug, red spider mite, and scale, which may be controlled by good insecticides.

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 Lückhoff, C. A. 1952. *The Stapelieae of Southern Africa*. A. A. Balkema, Daapstad, Amsterdam.
 White, Alain & Boyd L. Sloane. 1937. *The Stapelieae*. 3 vols. Published by Abbey San Encino Press. The standard reference work.

Parts of a Stapeliad flower, based upon *Stapelia variegata*. Drawn by Stella Ross-Craig, Royal Botanic Gardens, Kew. Illustration from *The Stapelieae* by Alain White and Boyd L. Sloane, vol. 1, p. 3. 1937.





(Above right) *Huernia transvaalensis*
Stent

Plant: $1\frac{1}{2}$ to $2\frac{1}{2}$ in. tall; stems ca. $\frac{3}{4}$ in. thick, pinkish gray with darker markings.

Flowers: $1\frac{1}{2}$ to 2 in. in diameter, reddish purple, very glossy, at base irregularly flecked with pale yellow. One of the so-called "lifebuoy" huernias, because of the glossy raised annulus.

Notes: "Slow growing, requiring a somewhat more sandy growing mixture than related species of *Huernia*."

Habitat: Transvaal.

PHOTO B. M. LAMB



(Above left) *Huernia pillansii*

N. E. Brown Cockle Burrs

Plant: Densely tufted; stems $\frac{3}{4}$ to 2 in. long, $\frac{1}{2}$ to $\frac{3}{4}$ in. thick, green or dull purplish.

Flowers: 1 to $1\frac{1}{4}$ in. in diameter, pale yellow, becoming pinkish cream in the tube, with crimson spots.

Habitat: Cape Province, South Africa.

Total species of the genus: 46

PHOTO JOHNSON CACTUS GARDENS

(Bottom left) *Huernia campanulata*

(Masson) Robert Brown

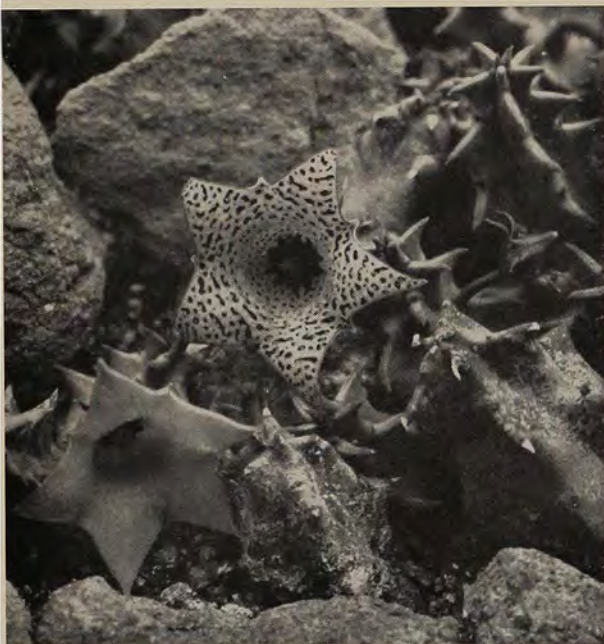
Plant: erect, $1\frac{1}{2}$ to 5 in. tall; stems $\frac{1}{2}$ to $\frac{3}{4}$ in. thick, gray-green sometimes pink-tinged.

Flowers: ca. $1\frac{1}{2}$ in. in diameter, bell-shaped; outside smooth, pale greenish, spotted with purple; inside bearded with stiff purple hairs, whitish marked with blackish purple markings.

Notes: A very beautiful species of easy culture, with a long flowering period. Will grow in most soils.

Habitat: Cape Province, South Africa.

PHOTO B. M. LAMB



(Above left) *Huernia herrei* A. White & B. L. Sloane (upper flower) var. *immaculata* A. White & B. L. Sloane (lower flower)

Plant: erect, $1\frac{1}{4}$ to 2 in. tall; stems ca. $\frac{1}{2}$ in. thick, gray-green.

Flowers: $\frac{3}{4}$ to 1 in. in diameter, whitish yellow marked with irregular purple blotches. Var. *immaculata* wholly whitish yellow, without markings.

Notes: Of very easy culture.

Habitat: Cape Province, South Africa.

PHOTO B. M. LAMB



(Top right) *Huernia kirkii* N. E. Brown

Plant: decumbent at the base; stems ca. 3 in. tall, 5-angled, $\frac{1}{2}$ to $\frac{3}{4}$ in. thick.

Flowers: $1\frac{3}{4}$ to 2 in. in diameter on pedicels about 2 in. long, greenish yellow brightly red-spotted

Notes: A beautiful species. The flower buds are striking. Grows freely and a free bloomer. One of the most desirable huernias for the collector.

Habitat: Transvaal.

PHOTO PHILIP G. CORLISS



(Bottom right) *Huernia confusa* Phillips

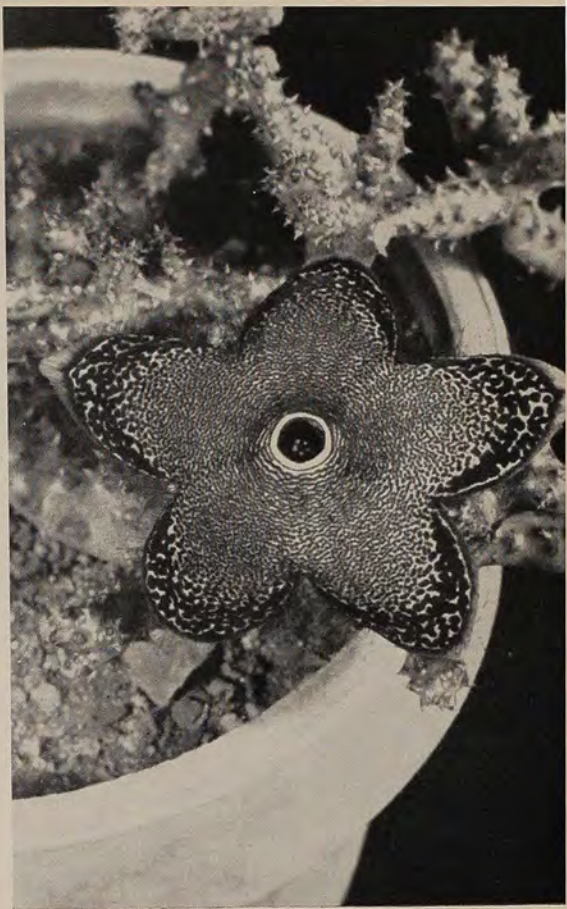
Plant: ca. 3 in. tall; stems 4- to 5-angled, bluish green.

Flowers: ca. $1\frac{1}{2}$ to 2 in. in diameter; annulus yellowish crimson with flecks of greenish white; lobes with irregular light red markings on a creamy, greenish or pink background.

Notes: Of easy culture; one of the so-called "lifebuoy" huernias.

Habitat: Transvaal.

PHOTO PHILIP G. CORLISS



(Upper left) *Echidnopsis cereiformis*
J. D. Hooker

Plant: somewhat prostrate; stems up to 9 in. long, $\frac{1}{2}$ to $\frac{5}{8}$ in. thick, cylindric, 8-angled.

Flowers: ca. $\frac{1}{2}$ in. in diameter, near the tip of the stem, creamy yellow.

Notes: An easy grower and very floriferous; one of the hardiest stapeliads.

Habitat: Eritrea, Ethiopia, Somalia.

PHOTO B. M. LAMB



(Lower left) *Pectinaria asperiflora*
N. E. Brown

Plant: tufted, spreading or erect, $1\frac{1}{2}$ inches tall; stems $\frac{3}{4}$ to 3 in. long, $\frac{1}{2}$ to $\frac{3}{4}$ in. thick, globose to cylindric, with 6 to 8 angles, dark purplish.

Flowers: ca. $\frac{1}{4}$ in. in diameter or less, drooping, subglobose; outside purple-brown, inside white dotted with purple.

Notes: externally the flowers are not highly attractive, but one of the most interesting when dissected and viewed under magnification; very dwarf habit and should be kept dry during dormancy.

Total species of the genus: 6

PHOTO B. M. LAMB

(Opp. page, top right)

Edithcolea grandis N. E. Brown

Plant: ca. 1 foot tall; stems 1 in. or more in diameter, decumbent, 5-angled; angles with hard spine-like teeth.

Flowers: 4 to 5 in. in diameter, the lobes bordered with long purple hairs to about the middle and then dark purple brown.

Notes: highly intolerant of excessive watering; flowers are among the most beautiful of stapeliads; color markings suggest a Persian carpet.

Habitat: Somalia, Kenya, Tanzania.

Total species of the genus: 2

PHOTO JOHNSON CACTUS GARDENS

(Top right) *Tavaresia grandiflora* (K. Schumann)

A. Berger

Plant: up to 8 in. tall; stems cylindric, ca. 14-angled, $\frac{1}{2}$ to $\frac{3}{4}$ in. thick, deep green.

Flowers: tube ca. 4 in. long, $1\frac{1}{2}$ in diameter, pale green with purple-red markings outside, pale yellow and speckled with purple inside.

Notes: Shade tolerant; flowers last over a week.

Total species of the genus: 3

PHOTO JOHNSON CACTUS GARDENS

(Middle right photo) *Trichocaulon cactiforme* (W. J.

Hooker) N. E. Brown

Plant: 2 to 4 in. tall, unbranched or branched at the base; stems $1\frac{1}{2}$ to 2 in. thick, whitish green.

Flowers: just under $\frac{1}{2}$ in. in diameter, green with deep purple spots.

Notes: Small flowers, long-lasting and abundant.

Habitat: Cape Province, South Africa.

Total species of the genus: 26 or more

PHOTO PHILIP G. CORLISS

(Bottom right) *Trichocaulon pedicellatum* Schinz

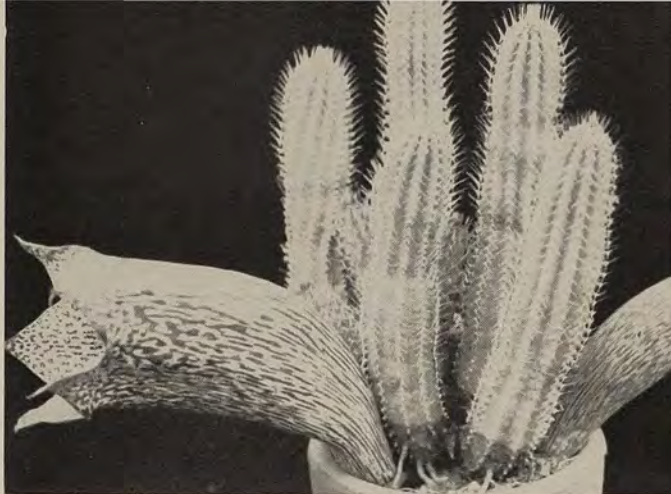
Plant: ca. 5 in. tall; stems ca. 1 in. thick, grayish.

Flowers: ca. $\frac{1}{2}$ in. in diameter, deep purple-brown.

Notes: Difficult and slow growing and requires great care in watering at all times.

Habitat: South West Africa.

PHOTO B. M. LAMB





(Above left) *Caralluma europaea*
(Gussone) N. E. Brown

Plant: 4 to 5 in. tall, branched; stems ca. $\frac{3}{4}$ in. thick, greenish, sometimes mottled with purple.

Flowers: scarcely $\frac{3}{4}$ in. in diameter, pale yellow, mottled and banded with dingy purple.

Notes: Withstands freezing if kept dry, prefers 40° F minimum.

Habitat: Island of Lampedusa southwest of Malta.

Total species of the genus: 105 or more.

PHOTO B. M. LAMB

(Above right) *Caralluma burchardii*
N. E. Brown var. *sventenii* Lamb & fil.

Plant: erect, branching, 3 to 18 inches long; stems ca. $\frac{3}{4}$ in. thick, chalky to gray-green.

Flowers: ca. $\frac{1}{2}$ in. in diameter, red-brown with white hairs.

Notes: A fairly new variety discovered by Eric Sventenius. Flowers usually in December-January and prefers a minimum winter temperature of 50° F for growth and flower development.

Habitat: Canary Islands.

PHOTO B. M. LAMB





(Above) *Caralluma* sp.

Plant: much-branched from base, up to 24 in. tall; stems very glaucous.

Flowers: not seen.

Notes: plant in native habitat. Cuttings brought home failed to root. Plants with typical milkweed-like seed pods.

Habitat: on rocky barren slopes, semi-desert, edge of Dire Dawa, el. 3,400 ft., Harar Province, Ethiopia. November 6, 1964 (Meyer 8728).

PHOTO F. G. MEYER

(Right) *Luckhoffia beukmanii* (Luckhoff) White & Sloane

Plant: up to 30 in. tall; stems erect, gray-green.

Flowers: ca. 2½ in. in diameter; inner face of corolla red-brown with light yellow spots on inner half, the outer half solid red-brown.

Notes: somewhat difficult to grow, yet a most desirable plant on account of the showy flowers. Thought to be a natural hybrid, according to C. Luckhoff (*White and Sloane*, p. 1096). Said to be one of the most profuse blooming of all stapeliads.

Habitat: Cape Province, Clanwilliam Distr., South Africa.

Total species of the genus: 1

PHOTO PHILIP G. CORLISS



(Opp. page, bottom) *Caralluma rangeana* Dinter & Berger

Plant: forming low tufts 3 to 4 in. tall; stems gray-green with brown markings.

Flowers: ca. 1½ in. in diameter, heavily ciliate-hairy, greenish yellow with red-brown bands.

Notes: a remarkable species and strikingly beautiful.

Habitat: South West Africa.

PHOTO PHILIP G. CORLISS



(Above) *Piaranthus decorus* (Masson) N. E. Brown

Plant: decumbent, 1 to 1½ in. tall; stems ½ to ¾ in. thick, grayish green, slightly glaucous.

Flowers: 1 to 1¼ in. in diameter, velvety-hairy on inner face, yellowish, dotted with dark purple-brown.

Notes: introduced by Francis Masson in the 18th century and lost 30 years later, rediscovered in 1928 near Barrydale, Cape Province.

Habitat: Cape Province, South Africa.

PHOTO PHILIP G. CORLISS



(Right) *Piaranthus foetidus* N. E. Brown var. *purpureus* N. E. Brown
Flowers: similar to the species but the colors reversed — yellow markings on a purple-red base.

Habitat: Cape Province, South Africa.

PHOTO JOHNSON CACTUS GARDENS



(Opp. page, bottom left)
Piaranthus pillansii N. E. Brown var. *fuscatus* N. E. Brown

Plant: 1 to 1½ in. tall; stems ca. ½ in. thick, dull light green, mottled or tinged with purple.

Flowers: up to about 1½ in. in diameter, creamy yellow with pinkish markings.

Notes: easy to grow, flowering in late summer or autumn. Keep dry in winter.

Habitat: Cape Province, South Africa.

Total species of the genus: 15

PHOTO B. M. LAMB

(Opp. page, bottom right)
Piaranthus foetidus N. E. Brown

Plant: ca. 2½ in. tall; stems ¼ to ¾ in. thick, green to gray-green, mottled with dull purple in sun.

Flowers: ca. 1 in. in diameter, opening flat, marked with short transverse purplish crimson lines on a yellow background, with a sweet-foetid odor.

Notes: a fine pot plant and free bloomer.

Habitat: Cape Province, South Africa.

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(Below) *Stultitia hardyi* R. A. Dyer
Plant: procumbent; stems ridged rather than angled, greenish mottled.

Flowers: 2½ in. or slightly more in diameter, cup-like, inner face with maroon markings on a cream background.

Notes: a recent discovery by David Hardy of the Botanical Institute in Pretoria. Flowers from middle of summer onwards.

Habitat: Transvaal, South Africa.

Total species of the genus: 3 or more.

PHOTO PHILIP G. CORLISS





(Opp. page, bottom left)
Hoodia macrantha Dinter

Plant: up to 40 in. long;
stems many from the
base, up to 3 in. thick.

Flowers: up to 8 in. in
diameter, bright purple
when expanded,
yellowish along principal
veins and with
purple hairs.

Notes: largest flowered
species of *Hoodia*. Like
all hoodias it will not
live more than 3 or 4
years.

Habitat: South West Africa.

Total species of the genus: 16

PHOTO JOHNSON CACTUS GARDENS

(Above) *Duvalia corderoyi* (Hooker fil.) N. E.
Brown

Plant: $\frac{1}{2}$ to $1\frac{1}{4}$ in. long; stems decumbent, ca.
 $\frac{3}{4}$ in. thick, creeping, dull green, tinged with
purple in sun.

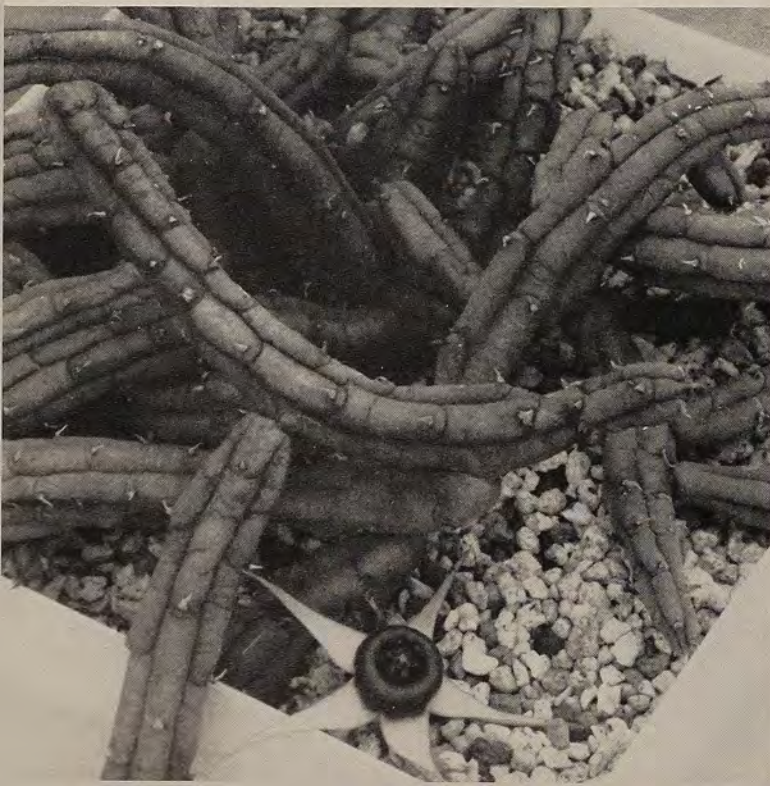
Flowers: $1\frac{1}{4}$ to 2 in. in diameter, smooth, with
purple ciliate hairs at base of the olive green
lobes; annulus with long soft purple hairs.

Notes: the largest flowers of all *Duvalia* species.

Habitat: Cape Province, South Africa.

Total species of the genus: 15

PHOTO PHILIP G. CORLISS



(Opp. page, bottom right)
Hoodia bainii R. A. Dyer

Plant: 6 to 8 inches tall,
multi-branched from
base; stems 1 to $1\frac{1}{2}$
in. thick, gray-green,
sometimes tinted pink
with yellowish teeth.

Flowers: $2\frac{1}{2}$ to 3 in. in
diameter, cup-shaped,
about 1 in. deep, light
yellow or pale buff,
sometimes tinged with
pinkish or very pale
purple.

Notes: A most attractive
plant. Named for
Thomas C. Bain who
discovered it.

Habitat: Cape Province,
South Africa.

PHOTO B. M. LAMB

(Left) *Duvalia procumbens* R. A. Dyer

Plant: procumbent, serpentine stems.

Flowers: $1\frac{1}{4}$ in. in diameter, light cream corolla and a purple-red annulus.

Notes: A recent discovery
by R. A. Dyer.

Habitat: Transvaal.

PHOTO PHILIP G. CORLISS



(Left) *Stapelia variegata*
Linnaeus

Plant: 2 to 6 in. long, freely branched from base; stems decumbent about $\frac{1}{2}$ in. thick, green, often mottled or tinted with purple at tip.

Flowers: 2 to 3 in. in diameter, roughened with irregular transverse ridges on the lobes, pale yellow with purple-brown dots.

Notes: the easiest and commonest stapeliad in cultivation. Will tolerate near freezing in winter if kept dry.

Habitat: Cape Province, South Africa. Common around Capetown.

Total species of the genus: about 85 with many hybrids.

PHOTO B. M. LAMB



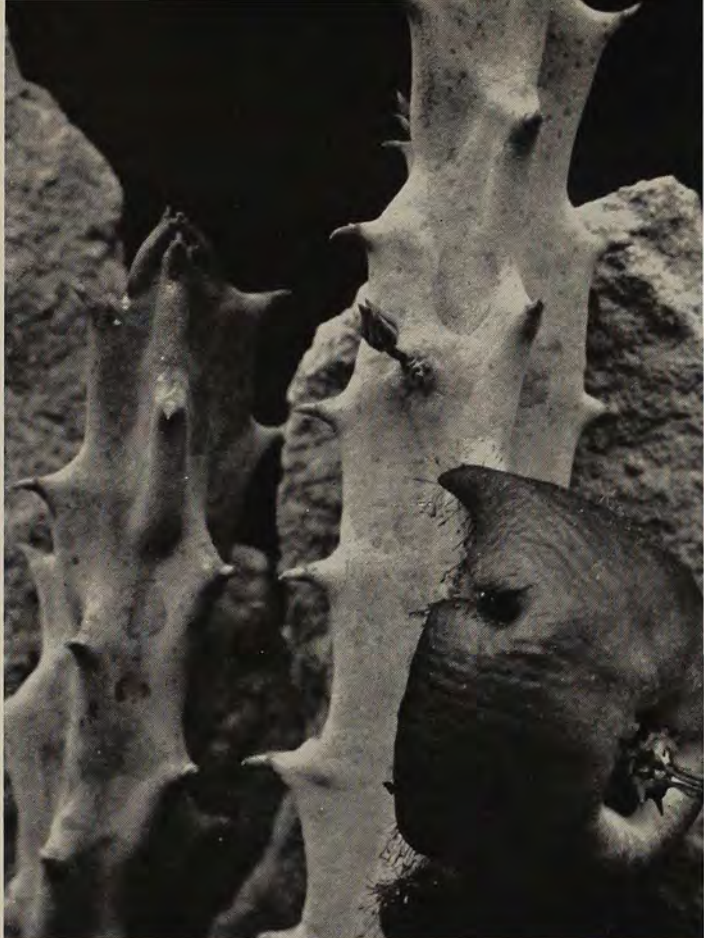
(Right) *Stapelia revoluta*
Masson

Flowers: $1\frac{1}{4}$ to $1\frac{1}{2}$ in. in diameter, the lobes much-recurved, pale purple, dull purple or purple-brown, central area pale greenish yellow or cream-colored.

Notes: one of the finest species because of the attractive stem color; an easy grower and not prone to rotting.

Habitat: Cape Province, South Africa.

PHOTO B. M. LAMB



(Opp. page, bottom) *Stapelia prognantha* P. R. O. Bally

Plant: with gray-green stems.

Flowers: pinkish gray, smooth.

Notes: Recently described species quite easy to grow.

Prefers minimum winter temperature of 50° F.

Habitat: Somalia.

PHOTO PHILIP G. CORLISS

(Right) *Stapelia pedunculata* Masson
Masson

Plant: 2 to 5 in. tall, erect or decumbent at the base; stems to ca. $\frac{1}{2}$ in. thick, gray-green to pinkish brown.

Flowers: $1\frac{1}{2}$ to $2\frac{1}{4}$ in. in diameter, light olive-brown and golden tinged, to olive-green or light greenish yellow, basal part of lobes and small cup pale grayish white, dotted with reddish brown and with dark purple hairs.

Notes: sensitive to high humidity; requires very sandy soil, and careful attention not to overwater. keep dry in winter.

Habitat: Cape Province, South Africa.

PHOTO B. M. LAMB



(Right) *Duvalia compacta* Haworth

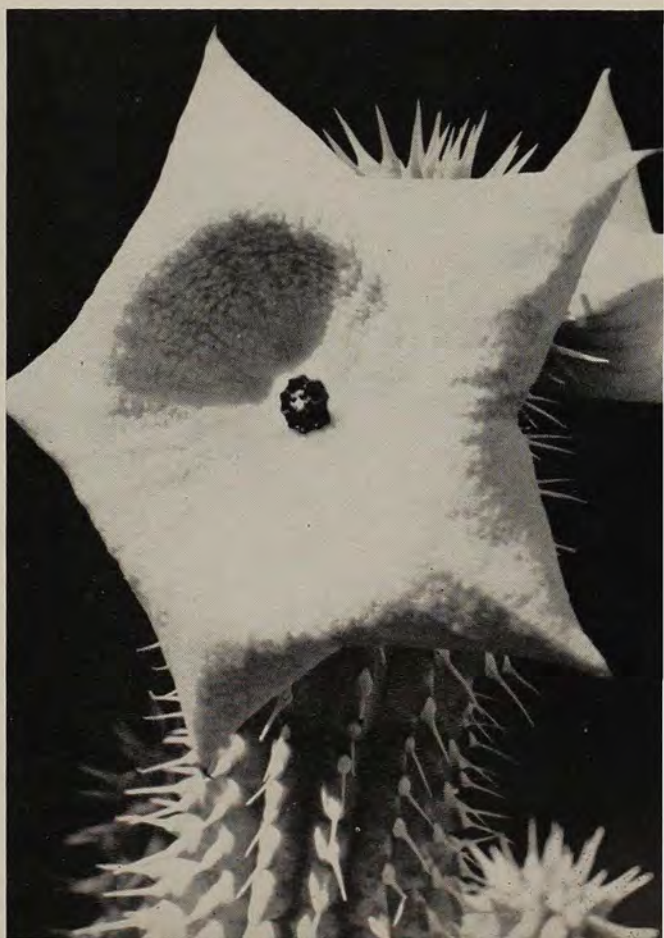
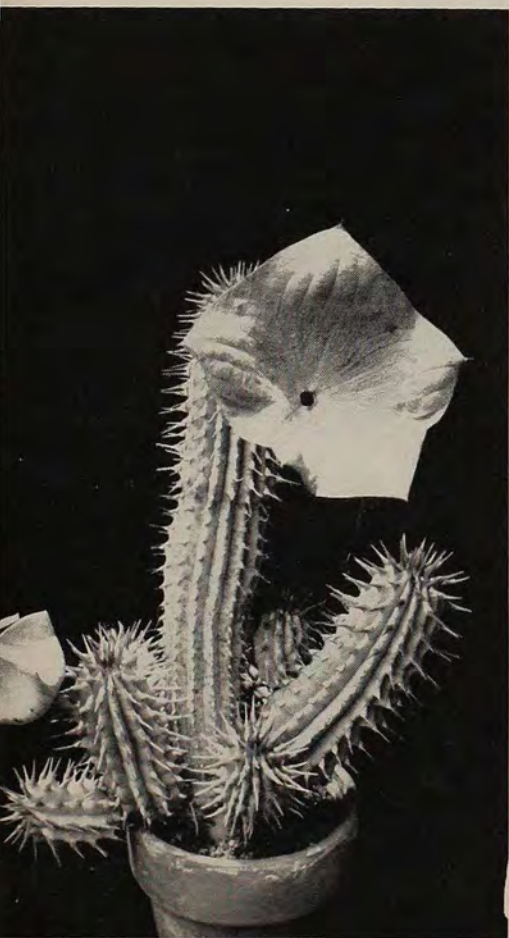
Plant: $\frac{1}{2}$ to 1 in. long, of spreading habit; stems $\frac{1}{2}$ in. thick, dark green to brownish green.

Flowers: ca. $\frac{3}{4}$ in. in diameter, entirely dark reddish brown with yellow or orange-yellow centers.

Notes: Under good conditions a small plant can produce many dozens of flowers.

Habitat: Cape Province, South Africa.

PHOTO B. M. LAMB





(Left) *Stapelia schinzii* Berger & Schlechter

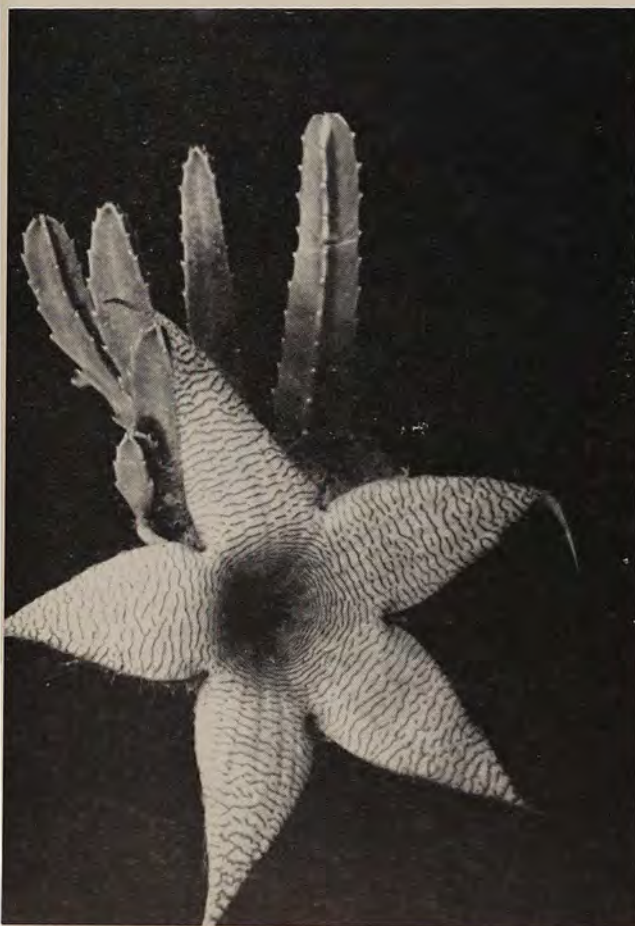
Plant: ca. 2½ in. tall; stems ca. ¾ in. thick, gray-green to purplish.

Flowers 4¼ to 4¾ in. in diameter with transverse red ridges on a green background.

Notes: a very beautiful plant and one of the larger flowered species. Requires care in watering and prefers a winter minimum of 50° F.

Habitat: Bechuanaland, South Africa and South West Africa.

PHOTO B. M. LAMB



(Opp. page, bottom left) *Stapelia comparabilis* White & Sloane

Plant: up to 8 in. tall; stems erect, branched at base, minutely pubescent.

Flowers: 3½ to 4½ in. in diameter, transversely roughened on inner face, dull reddish purple.

Notes: widely cultivated and of easy culture, a vigorous grower.

Habitat: unknown, probably of hybrid origin.

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(Left) *Stapelia gigantea* N. E. Brown
Giant Stapelia

Plant: 4 to 8 in. tall, erect, branching and short decumbent at base; stems square, pubescent, dull light green.

Flowers: when expanded 11 to 16 in. in diameter; transversely roughened and covered with long pale purplish hairs, uniformly marked with crimson lines on a greenish yellow background.

Notes: largest flowers of all species of *Stapelia* of vigorous growth and easy to grow. Best stock for grafting all stapeliads.

Habitat: Natal, Transvaal, Rhodesia, Zambia.

PHOTO JOHNSON CACTUS GARDENS

(Right) *Stapelia leendertziae*
N. E. Brown

Plant: 3 to 4 in. tall; stems somewhat lax, then ascending; velvety pubescent, green to gray-green.

Flowers: cup-shaped, the tube about 3 in. long, 3 to 4 in. in diameter at the mouth; outside puberulous; inner roughened with prominent transverse ridges, brownish purple or blackish purple and dark purple, hairy.

Notes: easy to grow and floriferous; accepts plenty of water in warm growing season, less in winter with a minimum of 45° F.

Habitat: Transvaal.

PHOTO B. M. LAMB



(Bottom right) *Stapelia pulvinata* Masson

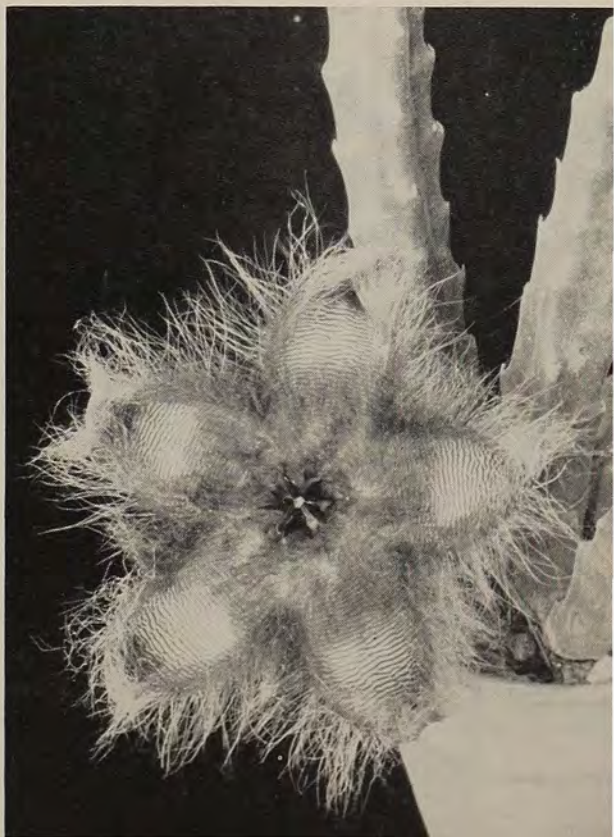
Plant: ca. 4 in. tall, branched from base; stems erect, decumbent at base, about 1/2 in. thick, softly pubescent, dull green.

Flowers: 4 to 4 1/2 in. in diameter, opening flat, glabrous on inner face but densely ciliate and bordered with long soft purple hairs, dark purple-brown, marked with transverse yellow lines.

Notes: no collection is complete without this beautiful free-flowering plant of easy culture.

Habitat: Cape Province, South Africa.

PHOTO JOHNSON CACTUS GARDENS



Fuji—A New Crabapple— and Other Doubles

ROLAND M. JEFFERSON

A strikingly beautiful, double, white-flowered crabapple in the collection of the U.S. National Arboretum has, for years, carried the name *Malus sieboldii* var. *arborescens*. The plant, originally received from the Plant Introduction Station, Glenn Dale, Maryland, in 1942, is now about 22 feet tall and nearly 35 feet across. Botanically, the plant fits the general description of *M. sieboldii* (var. *arborescens* is now considered to be a synonym), but the double flowers produced consistently year after year are abnormal for the species. In all probability, the double-flowered plant arose as a single seedling mutation of *M. sie-*

boldii and should be considered to be of garden origin. This fine crabapple when in flower, stands out as a mass of white beauty reminiscent of Japan's famous Mt. Fuji, a locality where *M. sieboldii* occurs wild. The plant will be distributed as *Malus sieboldii* cv. Fuji (Fig. 1 & 2).

Perhaps too large for the average home garden, yet cv. Fuji would make a splendid tree for large home lots, parks, and other recreational areas.

It is known that cv. Fuji is susceptible to powdery mildew (*Podosphaera leucotricha*).

Although the off-yellow medium sized fruit are not as attractive as in some other yellow-fruited crabapples, such as cv. Wintergold, they are colorful and remain on the plant into winter (Fig. 3).

Botanist, U.S. National Arboretum, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, Washington, D. C. 20250.

Fig. 1. Approximately 40-year-old specimen of cv. Fuji at the U. S. Plant Introduction Station, Glenn Dale, Maryland.



**Description of *Malus sieboldii* (Regel)
Rehder 'Fuji' n. cv.**

A small, broad, round-headed tree, attaining a height of 8.53 m (28 feet), and spreading to 14.02 m (46 feet) in approximately 40 years, with ascending, declining and zig-zag branches.

Flowers 3.4-3.7 cm (approx. $1\frac{1}{4}$ - $1\frac{1}{2}$ in.) in diameter; petals 5, spreading horizontally at anthesis, frequently becoming retroflexed with age, green-white (157D),* occasionally exhibiting infusions of red-purple (66D) along margins and apices on the underside, oblong elliptic to obovate 1.6-2.0 cm (approx. $\frac{5}{8}$ to $\frac{3}{4}$ inch) long, 0.9-1.2 cm (approx. $\frac{5}{16}$ to $\frac{1}{2}$ inch) broad, with conspicuous veins and often undulate margins, villous to glabrescent on both surfaces, claws villous; stamens c. 20, c. 7 mm (approx. $\frac{1}{4}$ inch) long, filaments glabrous, white, 8-10 petaloid or partially petaloid, frequently with winged, villous-glabrescent, green-white (157D) appendages extending from the filaments and the connectives, and circling above the generally sterile anthers for approx. 3 mm (approx. $\frac{1}{8}$ inch); anthers at anthesis yellow (10B); petaloid, frequently with winged, villous-form loosely-compact, bud-like erect clusters while the petals spread to nearly a horizontal plane, then spread horizontally as the petals become more horizontal and start to retroflex. Pomes 1.0-1.3 (-1.5) cm (approx. $2\frac{1}{5}$ - $1\frac{1}{2}$ ((- $\frac{5}{8}$)) inch) in diameter, globose to oblate, occasionally oblique at apices, rounded to slightly angled in cross section, on exposed side greyed-orange (163B), shaded side greyed-orange (163A) dispersed with conspicuous slightly raised brown lenticels occasionally deltoid in shape and up to c. 1 mm (approx. $\frac{1}{32}$ inch) across; calyces deciduous rarely persistent, leaving large circular scars up to 5 mm (approx. $\frac{1}{4}$ inch) surrounding the basins (calyx end), basins wide, rough, occasionally with small umbonate centers; cavities (stem end) shallow, acute, pubescent around pedicels.

The original specimen of cv. Fuji (P.I. number 325156) at the U.S. Plant Introduction Station, Glenn Dale, Maryland, is at least 40 years old (Fig. 1). The tree (N.A. accession 2073) at the U.S. National Arboretum, Washington, D. C., is a graft from the Glenn Dale plant, obtained in 1942. Voucher herbarium specimens of both plants are on deposit at the U.S. National Arboretum. Records at the Glenn Dale station show that asexual propagations from the original plant were distributed only to the National Arboretum.

Cultivar Fuji has been registered with the Arnold Arboretum, the International Registration authority for crabapples.

Scions will be available in 1968 to arboreta and botanic gardens participating in the U.S. National Arboretum

Fig. 2. "Anemone-type" flowers of cv. Fuji. Close observation of the flowers reveals a unique orientation of true petals and the petaloid stamens. When the 5 petals expand, the 8-10 petaloid stamens remain nearly erect in a loose cluster in the center (bottom flower). Later the petaloids expand (center flower).



*All color descriptions are from the R.H.S. Colour Chart (1966). The Royal Horticultural Society, London.



Fig. 3. Off-yellow fruit of cv. Fuji.

plant distribution program. Scions will be available to experiment stations and qualified nurserymen, upon written request to the U.S. Plant Introduction Station, Glenn Dale, Maryland 20769. Plants are not for sale by the U.S. Department of Agriculture.

Some Other Double-flowered Crabapples

Flowering crabapples (*Malus* spp.) possess values that are cherished throughout their growing range and are among today's most desirable ornamental plants. Like apples, they can be grown in nearly every temperate climate. Cultivars Arctic Dawn and Snowcap, for example, are undamaged in the extremely cold areas of central Alberta, Canada. The less hardy species *Malus florentina* and *M. angustifolia* thrive in the warmer temperatures of Italy and southern United States. Between these climatic extremes, several hundred dif-

ferent kinds of crabapple plants are cultivated around the world.

Botanically, there is no clear distinction between crabapples and apples. Yet, horticulturists usually refer to crabapples in the genus *Malus* with pome fruits up to 2 inches in diameter with acid or slightly acid flesh. Apples have fruit larger than 2 inches in diameter.

Crabapples are further divided into orchard and ornamental types. The orchard cultivars are cultivated primarily for commercial fruit with little or no emphasis on ornamental qualities. The ornamental sorts are grown mainly for the overall beauty of habit, foliage, flowers and fruit, or any combination of these features.

Flowers of ornamental crabapples vary in color and size, from pure white, pink to red or purple, and measure 1 to 2½ inches across. The number of "petals" also may vary. Some crabapples have flowers with petal-like (petaloid) stamens or pistils similar in appearance to the five true petals. Abnormal flowers with petaloids are called semi-double or double, depending on the number of petal-like stamens or pistils. Flowers devoid of petaloids are single. Wyman uses the term semi-double for flowers with one to six petaloids, and double if there are more than six.

In crabapples the double or semi-double condition may occur in only a few flowers each blooming season, or be so predominant that few if any normal blossoms develop. Abnormal flowers may consistently occur each blooming year in certain cultivars, while in others this abnormality will vary from year to year.

Semi-Doubles

Examples of ornamental crabapples that regularly or occasionally produce only a few semi-double flowers are *Malus* × *purpurea* cv. Aldenhamensis; *M.* × *robusta* cv. Erecta; *M.* × *hartwigii*; *M. spectabilis*; cv. Crimson Brilliant; and cv. Wabiskaw. Some of the cultivars and hybrids that consistently produce semi-double flowers are *M.* × *scheideckeri*, *M.* × *purpurea* cv. Le-moinei, and *M.* cv. Hillier.

Doubles

Noteworthy among the double-flowering crabapples are *M. ioensis* cv. Fimbriata, cv. Plena (Fig. 4), cv. Nova; *M. coronaria* cv. Nieuwlandiana, cv. Charlottae; *M. spectabilis* cv. Riversi, cv. Alba Plena (Fig. 5); *M. halliana* cv. Parkmanii; *M. × magdeburgensis* and cvs. Katherine, Dorothea, Van Eseltine, and Prince Georges (cv. Prince Georges has approximately 55 petaloid stamens and pistils, more than any other cultivated crabapple).

The foregoing cultivars, with the exception of those of *M. ioensis* and *M. coronaria*, are early to mid-season bloomers, i.e., they are generally in full flower at the National Arboretum during the first 2 weeks in April. The cultivars of *M. ioensis* and *M. coronaria* are in bloom approximately during the first 2 weeks in May. Thus, although differing in habit, flower, or fruit characters, or foliage, the semi-double or double types are available for effect throughout most of the crabapple flowering season.

The number of new semi-double and double ornamental crabapple introductions is continuously growing. During the past 5 years, many new ones have been listed in various nursery catalogues. The choice of superior selections has increased with the recent introduction of cvs. Barbara Ann, introduced by Dr. Donald Wyman of the Arnold Arboretum, Dorothy Rowe, Guiding Star and Dana of the late Mr. Arie den Boer, Des Moines, Iowa.

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Fig. 4. *Malus ioensis* cv. Plena, a native American double-flowered crabapple.



Fig. 5. Double flower of *Malus spectabilis* cv. Alba Plena.

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ADVANCES in Horticulture

Gardening is the nation's leading adult hobby, yielding pleasure and profit in the culture of ornamentals, vegetables, and fruits. Surveys conducted for an Ohio garden implement company show that more than one-third of our people are gardeners. Reports of new plants, products, gadgets and methods overwhelm us and there is a continuing need for evaluation and application of the new information.

With this issue of the American Horticultural Magazine we present a new section—Advances in Horticulture—composed of short reports and abstracts of papers describing new findings of interest to gardeners. We hope that these notes will provide enough information so that if desired, they can be put to use.

Portable Plastic Hotbed and Propagating Frame for the Home Gardener

The portable plastic hotbed and propagating frame shown on these pages was designed by the U.S. Department of Agriculture for the amateur gardener who grows spring vegetables, annual and perennial flowers, and also propagates cuttings during the summer months or overwinters rooted cuttings.

This plastic-covered hotbed, inexpensive, easy to construct, and versatile in operation, is 6 by 6 feet in size and costs about \$25 to build. It weighs less than 50 pounds, is portable, and suitable for use in the home backyard.

A 360-watt soil heating cable, thermostatically controlled to shut off at 70°F, is used to heat this structure. The frame has a base of pine boards with trusses made of 1/2-inch electric conduit piping. These trusses reach a ridge pole, and this gives the structure the appearance of a tiny greenhouse which is entirely covered with plastic film. For additional support the trusses are covered with welded wire mesh.

The two removable covers are made of 4-mil polyethylene plastic film, with one for each side of the ridge. They are supported by the mesh, and may be rolled down from the ridge pole, or up from the sides, allowing almost unlimited adjustment for ventilation.

Fig. 1. Used as a hotbed, film held taught with light rope and tubing.

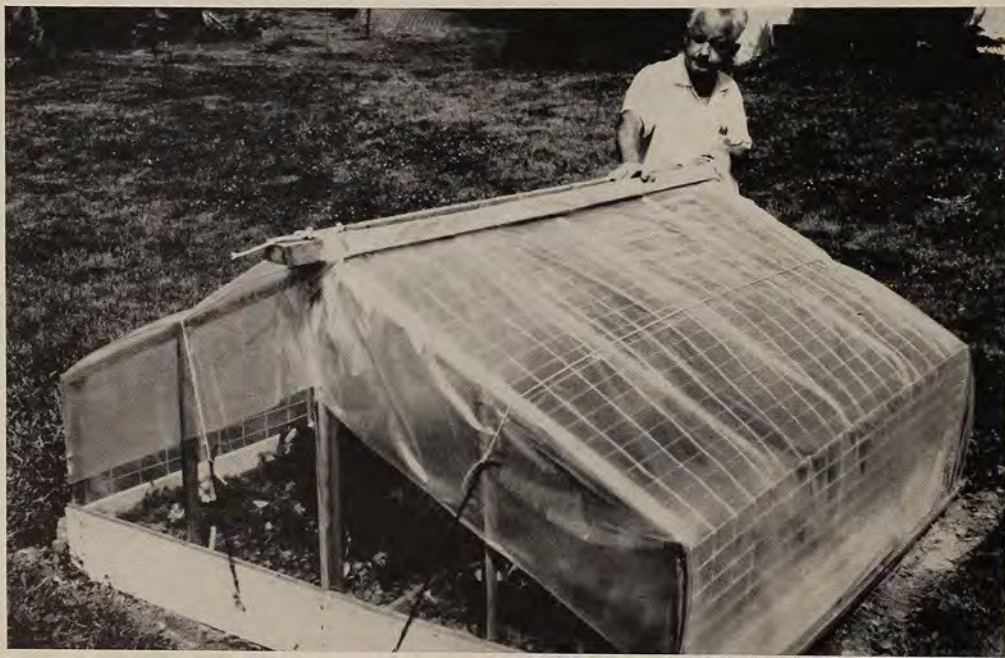




Fig. 2. Used as a propagating frame, with an overhead mist system.

The covers are secured in the desired position with light ropes which pass over the plastic and down to the base at each end. Rubber tubing, at one end of each rope, provides tension. At the end of the spring season, the covers are rolled up and stored out of sunlight to prevent further deterioration from ultraviolet radiation. Since the plastic film covering the ends of the structure is not removable, use of 4-mil vinyl or 3-mil Type W polyester film is recommended for longer life.

The frame is easily bent to shape with a hand conduit bender. Wooden parts should be treated with a wood preservative such as copper naphthanate after cutting.

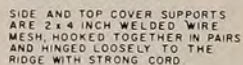
The hotbed should be located on well-drained soil. In some situations, a 3-inch layer of gravel under the prepared soil mixture or flats may be required. The heating cable should be laid on a bed of sand or vermiculite, and covered with about 2 inches of sand. If the seed or cuttings are to be started in a prepared soil bed rather than in pots or flats, protect the cable by placing $\frac{1}{2}$ -inch mesh hardware cloth about 1 inch above it.

Strong, vigorous plants of cabbage, lettuce, petunias, marigolds, and snapdragons have been successfully grown in this hotbed.

To use the structure as a propagating frame for rooting cuttings, fasten cheesecloth with clothespins to the mesh which is used to support the plastic film. Fasten two mist sprayers to a 2-inch by 2-inch by 8-foot board which can be set quickly and easily on the inside, diagonally across the frame about 1 foot above the cuttings or above the ridge on the outside.

The location of the mist sprayers to keep the leaf surfaces of the cuttings moist depends upon weather conditions. If it is dry and windy, mount the mist sprayers on the inside; or if humid and calm, on the ridge. This mist system operates during most of the daylight hours for about 30 days.

Let the frame remain covered with cheesecloth. If the weather becomes windy and dry, it is wise to moisten the cheesecloth several times a day, for an additional two weeks, by which time the cuttings will have developed a medium quantity of roots. Forsythias, azaleas, and rhododendrons have been success-



Annually millions of pounds of synthetic herbicides control the weeds in lawns, nurseries, orchards, croplands, and streams.

The next growth regulators to appear were the gibberellins, those stem-stretching chemicals of fungal origin first recognized in the Orient. Now we know of 22 gibberellins but the part they play in plant growth and flowering is largely undetermined. Vineyardists who cultivate the 'Thompson Seedless' grape use the gibberellins to increase berry size and quality. The same gibberellins will hasten seed sprouting and increase the enzyme content of malt and so are useful in the brewing industry. Gibberellic acid will delay flower bud formation in one plant and accelerate flowering in another. It will protect chrysanthemums against the flower-delaying effects of high temperature or substitute for the dormancy-breaking low temperature required by hydrangeas and rhododendrons. Who knows—perhaps one of the newer gibberellins will perform other garden tasks for us—when we have enough of the chemical to test and imagination to go with it. Until then, the home gardener is on the sidelines awaiting new developments and guidelines to prevent overtreatment.

The growth retarding chemicals, as their name implies, counter the stem-lengthening effect of the gibberellins. Treated plants produce about the same number of nodes which are closer together, and they flower at the same time or only a few days later than similar untreated ones. B-Nine,* Cycocel, and phosfon** are each registered for use of one or more kinds of plants (chrysanthemums, poinsettias, Easter lilies, hydrangeas, azaleas, and bedding plants). They are available through some plant societies and from nationally advertised horticultural supply companies.

*Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture nor an endorsement by the Department over other products not mentioned.

**B-Nine is N-dimethylamino succinamic acid; Cycocel is (2-chloroethyl) trimethyl ammonium chloride; phosfon is tributyl 2,4-dichloro benzyl phosphonium chloride.



Fig. 1. Top: Reduction of the neck of chrysanthemum flower: Response of 'Pink Chief' chrysanthemum to foliar spray of B-Nine. Left, untreated; right, sprayed in early August with B-Nine. Bottom: Compact pot plant: Response of 'Princess Anne' chrysanthemum to foliar spray of B-Nine. Pans were sprayed with 0, and 2500, and 5000 ppm. of B-Nine when the side shoots were about 2 inches long.

Chrysanthemum growers in Maryland find that a single foliar spray with B-Nine applied in early August, about 3 weeks after the last pinch, prevents undesirable legginess. The same effect is produced in the greenhouse with pot mums and standards, and it is now an accepted cultural procedure (Fig. 1). One part of the 5 per cent commercial formulation of B-Nine to 19 parts of water should produce a concentration suitable for spraying most chrysanthemum varieties. Cycocel is effective as a foliar spray but phosfon must be applied to the soil since it damages foliage on contact.

The growth retardants exert an additional effect on azaleas. Shoot growth is reduced on treated plants and, perhaps



Fig. 2. Top: 'Hexe' azaleas. Left, untreated. Right, two sprays a week apart with 0.15 percent B-Nine. Note flower buds on sprayed plant.

Bottom: 'Alaska' azaleas. Left, untreated. Right, 70 milligrams of phosphon-D applied to soil. Note extreme "bonsai type" growth and abundant flowers.

as a consequence, the plants form flower buds at any season of the year when they are in growth (Fig. 2). After bud development and dormancy-breaking cool storage, greenhouse-grown plants flower as well in November as in May, in fact, throughout the year. About 5 to 5½ months are required to produce a flowering plant from a vegetative one. Nurserymen use the retardants to prevent growth of wild shoots on azaleas in late summer, converting growing points into flower buds. Home gardeners can use the retardants on some kinds of plants to promote more compact growth and keep plants within bounds. They will usually increase the plant's resistance to drought and smog.

Recently we found that the chemicals used to prevent unwanted axillary shoot

growth on tobacco will chemically prune a number of herbaceous and woody plants. The effect of suitable formulations of the fatty acid esters is to kill the terminal growing points without damaging axillary buds, leaves, stems, or roots. Regrowth is nearly as rapid as from manually pruned plants. Frequently, more shoots are produced as a result of chemical pruning. Azaleas respond well to the chemical pruning agents and, since less growth is removed at each pruning, they attain marketable size sooner than when pruned or sheared mechanically (Fig. 3).

The use of chemical pruners in the garden on shrubs, vines, and flowering plants is promising but specific applications await further testing.

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Fig. 3 'Red Wing' azaleas, regrowth in 18 days after pruning. Top: Pruned manually. Bottom: pruned with a chemical spray. Note death of tip and development of axillary buds.



PINCKNEYA PUBENS

Georgia Bark, Calico Tree, Fever Tree

Pinckneya pubens is a rare deciduous, large shrub or small tree found along sandy, marshy stream banks, swamps and in pine barren areas of the coastal plains of west Florida to S. Carolina and Georgia. The plant is little known today, due to its habitat, and is rare in cultivation. In addition to the above common names, it is also known in some areas as bitter bark and summer poinsettia tree.

A member of the madder family (Rubiaceae), *Pinckneya* was named by André Michaux in 1803 for Charles Cotesworth Pinckney of South Carolina, a distinguished statesman and general of the American Revolution. A second species, *P. ionantha*, is known from Colombia, South America. During Civil War days, the bark was thought to be a substitute for quinine, thus accounting for a few of the common names. Phar-



PHOTO CALLAWAY GARDENS

Pinckneya pubens Michx.

The petaloid sepal lobes appear light-colored in the photograph.

maceutical records today do not credit any medicinal value.

The deciduous pubescent leaves are entire, ovate to oval, up to 4 in. long by 1½-2 in. wide. The flowers are borne in corymbose cymes with a stout tubular greenish corolla of five lobes and five exerted stamens and appear in late May to early June. The most interesting feature of the flowers are the petaloid sepal lobes of the outer flowers, varying from deep to light pink; a few trees have been found with creamy-white petaloid sepals. The inflorescences thus have the appearance of poinsettia-like flowers and account for the name summer poinsettia-tree or calico-tree. On some trees the colored petaloid sepals last into July. Light brown winged seeds are borne in round capsules of over one-half inch in size. The capsules, before opening in the fall are dark brown and spotted with white dots.

No information is available as to hardiness; however, plants at Callaway Gardens have been exposed to minus four degrees with no damage, but this is usually of short duration. Plants are known to be susceptible to heavy damage from *Euonymus* scale, but no other insects or diseases have been observed. Although the native habitat suggests the need for plenty of moisture, plants in cultivation do not require 'wet feet' and have been grown successfully in a clay loam nursery soil at Callaway Gardens.**

Pinckneya is attractive for its pink "bract-like" flowers in late spring and can be propagated by softwood cuttings or from seed. It has been stated that young plants should not be exposed to direct sunlight; however, we have not

***P. pubens* has survived without injury for the past few years at the National Arboretum in Washington, D. C. The plant is unique among native American trees in being the only member of the family Rubiaceae outside of the tropics with showy petaloid sepals. (Ed.)

found this to be true and grow second year transplants in full sun in nursery rows. Seed will be available through the American Horticultural Society seed exchange.

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Codonopsis

The genus *Codonopsis* in the bell-flower family (Campanulaceae), is not well known in this country. *Campanula* or bell-flower, is the commonest member of the family in cultivation. In the rock garden we often find *Phyteuma*, *Edraianthus*, and *Jasione*. Possibly one reason for the neglect of *Codonopsis* is the scarcity of seeds in the United States. The species are confined to Asia, particularly China, Manchuria, and the Himalayas often at high altitudes. Another handicap is that a number of them emit a rather musky odor which some people find objectionable. Because of this odor, it is thought that many are fertilized by flies and ants. The flowers have a distinctive coloration, often very different from the campanulas. Many of the *Codonopsis* species with bell-shaped flowers have purplish dots or a violet-colored ring toward the base of the drooping corolla. Because of these char-



***Codonopsis vinciflora*.** From *Gardeners Chronicle*, Sept. 11, 1965.



***Codonopsis rotundifolia*.** From *Curtis's Botanical Magazine* t. 8090.

acteristics, horticulturists often recommend that plants be placed at an elevation in the border or rock garden, so that visitors may be able to see the inside of the flower.

Some members of the genus have a twining habit, and without support, I judge they will simply trail along the ground. For example, we had a plant of *C. handeliana* that climbed over a low growing shrub, whereas another plant raised in a pot, hung down for a distance of almost three feet. Moreover, I once read of a species that, in its native habitat, attained a height of almost ten feet.

Most of these plants are probably herbaceous, and generally bloom in summer. Among the low growing species, the rock gardener might be induced to try one or two of them, since they would supply some color at a time when there is usually a dearth of bloom.

The seeds of *Codonopsis* germinate readily, and in time, send down long fleshy roots. If the possessor of an Alpine House should raise them, it would be advisable, therefore, in order not to cramp the roots, to place them in rather

long pots. Similarly, when planted in the garden they should be allowed deep soil for the long roots.

Although the average amateur gardener is not particularly interested in the taxonomy of plants, it might be worth mentioning that *Codonopsis* emits its seeds from the top of the ovary, whereas the seeds of *Campanula* find their exit through tiny holes, or pores, at the side of the capsule. Moreover, the botanists usually divide the species of *Codonopsis* into two groups:

1. Species with bell-shaped flowers include *C. bullayana*, *clematidea*, *handeliana*, *meleagris*, *ovata*, *rotundifolia*, *subsimplex*, and *subglobosa*. These species are again subdivided into twining or climbing and non-climbing or erect. Climbers include *C. handeliana*, *tang-shen*, and *rotundifolia*.

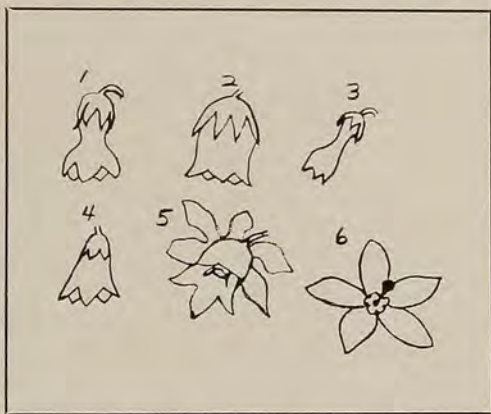
2. Species with saucer-shaped flowers include *C. convolvulacea* and *vinciflora*.

Among the non-climbing low growing species with bell-shaped flowers are *C. ovata*, about one foot high and probably the most popular. Many years ago it received an Award of Merit from the Royal Horticultural Society in England, and is pictured in color in Curtis's *Botanical Magazine* (t. 9208). There is also a line drawing of it in the Royal Horticultural Society's *Dictionary of Gardening* (1956). The plant is a native of the western Himalayas where it grows at rather high altitudes and blooms in the latter part of June and July. The nodding flowers about one inch in length, are on rather long slender peduncles. The corolla is light sky blue, with lobes that are notched about one-quarter of the way. The inside of the flower has purplish veins. Incidentally, I observed that seeds of this plant were offered to members in the seed lists of the Alpine Garden Society of England as well as that of the American Rock Garden Society.

There are several other low growing species with interesting bell-shaped flowers, such as *C. clematidea*, a native of the Himalayas, often associated with *C. ovata*, *C. clematidea* (Bot. Mag. t. 9208) is a taller plant than *ovata*, with terminal

flowers more globose-campanulate, bluish gray outside, and with a purplish blotch toward the base. One plant once raised was pure white on the outside.

C. meleagris (Bot. Mag. t. 9622) is a Chinese plant about 10 inches high, and as one writer states "it cannot fail to fascinate the beholder." Another says it reminds him of *Fritillaria meleagris*. The outside of the terminal flower, fully one inch long, has been described as greenish yellow, and veined lurid purple. Another describes it as greenish



Flowers of *Codonopsis* (1) *bulleyana*, (2) *clematidea*, (3) *mollis*, (4) *ovata*, (5) *rotundifolia*, (6) *vinciflora*.

white or cream-colored, with a network of chocolate-brown veins, and dull purple-violet within, sometimes spotted yellow. The ovate or obovate leaves are crowded at the base. In its native habitat, it blooms in August. Last year the Royal Horticultural Society offered seeds to its members. If any of our readers are attempting to grow this plant, they must remember that it has a long taproot, which might make it difficult to transplant.

C. mollis (Bot. Mag. t. 9877) is another plant with a rather odd-shaped corolla, in that the lower half of the flower is narrowly tubular, and then widens out considerably, with short fairly erect lobes. Its color is pale blue with darker veins. The stems are about one foot long.

C. bulleyana is about 12 inches high

with rather curious shaped terminal flowers. Like *C. mollis*, the base is very narrow, but the upper part of the flower widens out considerably, much more so than does *C. mollis*. The flowers are soft lavender blue, with deeply cut lobes. The silvery gray leaves are rather small, and cordate at the base.

C. viridiflora attained for us a height of about 15 inches, bloomed in our Alpine House during the month of June. It had drooping, campanulate terminal flowers about one inch long, described by some as yellowish green, and purplish dotted only at the base. The outer part of our flower, however, was pale violet-white. In other respects it corresponded fairly well with the original description of the plant.

There are several species reported with wide open saucer-shaped flowers only two of which that I find to be in cultivation, namely *C. convolvulacea* (*Bot. Mag.* t. 9581) and *vinciflora*, both twiners. The former, native of Tibet and China, has stems that may attain a length of ten to fifteen feet. The large, rather spectacular terminal flowers are light lavender blue, with darker colored veins; on the inside there is a dark red-dish band near the base. *C. convolvulacea* var. *forrestii* (*Bot. Mag.* t. 9581) has somewhat larger flowers and leaves. Since this herbaceous species does not emerge from the ground until rather late in the spring, it is well to mark its position. It should really be allowed to twine over a shrub, or over brushwood.

C. vinciflora we have not raised, but it has been reported as being an attractive plant with fairly erect lilac-blue flowers, somewhat similar in shape to those of *C. convolvulacea*. Possibly it might be grown in a slightly shaded location. One authority states it may require a slightly acid soil.

We now come to climbing or twining species with bell-shaped flowers of which *C. handeliana*, *tangshen* (*Bot. Mag.* t. 5018), and *rotundifolia* (*Bot. Mag.* t. 8090) have already been mentioned. In our Alpine House we have had *C. rotundifolia* for about a year, but it has not yet bloomed. As mentioned previously,

we have grown *C. handeliana* both in the garden and indoors. We consider it to be more curious than beautiful. The flowers which terminate the long branches are bell-shaped and good sized, yellowish green outside, and inside; near the base there is a pinkish red ring. The leaves are ovate, acute, cordate at the base, with very short petioles. We have been unable to secure the original description of this plant, so it is possible that our plant may not be true.

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Ornamental Plants of Nicaraguan Lava-flows

While travelling through the tropics I like to visit volcanic regions in search of the prolific and frequently unusual plant formations which occur on accessory lava flows. Nicaragua is a paradise for the horticulturist and botanist. Whether one turns to its unique lava-flows which exist in a great many parts of the country or to the incredible cloud forests of the mountains, I know few lands in this hemisphere which so fully reward the visitor. The republic is on the brink of a boom, both a tourist and economic one, and I can hope that many of my friends in the plant world will schedule a trip to this beautiful land in the near future.

In recent years, Nicaragua has occupied a considerable part of my botanizing attention. This magnificent land, largest of the Central American republics, is the least known country scientifically in the area; it is highly volcanic, with at least two or three peaks smoking without cessation.

Near the capital city of Managua, we find the peculiar twin craters of Volcán Santiago—Masaya, customarily with one crater's vent giving forth great clouds of sulphurous, acrid smoke and gases. During my visit in March 1966, the crater had been quiescent for some time, creating thereby some worry on the part of the populace of Managua, and the city of Masaya, which lies very near the volcano. In the past, the craters have

caused extensive destruction and loss of life in the district.

It is possible to drive, with a four-wheel drive conveyance, to the rim of the recently active crater of Volcán Santiago by taking the good highway from Managua to the picturesque old city of Granada. This city has been planted with native flowering trees which bloom during the pleasant spring months. We find two kinds of *Tabebuia*, the incredible vivid-yellow *cortés* (*T. chrysantha*) and pink magenta or very rarely white *roble* (*T. pentaphylla*) as well as both *Poinciana pulcherrima* and *P. gilliesii*, and the early flowering *Delonix regia*, the Royal Poinciana.

The road from this highway to the volcano is a rough, graded one and is designated "Cortesia de Cerveza Victoria." The craters are several miles distant from the highway although they seem very near. Volcán Masaya rises to an elevation of 1854 ft. and Volcán Santiago is nearly as high at 1847 ft. elevation.

The road quickly enters one of the massive lava-flows which spread out in many directions from the twin craters. The very sharp pieces of rock are brittle and hard on tires and even worse on shoes and limbs, especially if one falls as I have done on several occasions.

From a distance, the vegetation scattered over the lava-flows appears rather drab and uninteresting. By walking, with caution, along the eroded trails a varied and fascinating flora is soon encountered.

The major arborescent species which flower in March are Nancite (*Byrsonima crassifolia*) of the Malpighiaceae with erect spires of vivid yellow crepe-textured flowers, and millions of frangipani (*Plumeria rubra* var. *acutifolia*), Nicaragua's National Flower called Sacuanjoche. The large white highly fragrant flowers of *Plumeria* are borne in high cymes topping the leafless branches. Under the big parent trees of the *Plumeria* are countless dozens of seedlings that resemble fleshy broomsticks thrust at random into the rough lava.

Collar-like masses of the epiphytic orchids *Laelia rubescens* and *Brassavola nodosa* often occur at the base of *Byrsonima* and *Plumeria* trees. The *Laelia rubescens* which flowers during March is a highly variable and widespread species. Its white phase is exceptionally handsome. The *Brassavola* occasionally grows on the volcanic rocks, its almost round foliage burned a rich bronze-purple by the tropic sun. Scattered clumps of another pretty orchid, *Epidendrum gravidum* also occurs here but often higher up on the "host" trees than the other orchids mentioned.

A *Selaginella*, one of the species known as "resurrection plants," form dusty dried clumps in many a crevice in the rocks, and three species of desiccated ferns were its close companions. I have seen one of these ferns in its expanded, moistened state and though I am not familiar with it, by genus or species, I can recommend it as a spectacular, platter-like rosette of lacquered pinnate foliage, which would grace any collection of these plants. As is the case with many of the flowering plants of Nicaragua, the native ferns are poorly known botanically.

A third tree is found on the lava-flows in some quantities, particularly toward the impressive cinder cones nearer the craters of the volcano. This is a particularly delightful species of *Ficus*, one which seldom exceeds twelve feet in height and is typically twisted into forms to excite the connoisseur of tropical "bonsai." Clambering up and over these dwarfed banyans is a magnificent viney representative of the Polygalaceae with masses of fragrant, rich magenta-pink flowers intricately marked with vivid yellow. And with it we find a glorious bignoniaceous vine, with bowers of intense pink, white-marked, tubular flowers, and handsome soft-velvety seed pods of attractive form. Several kinds of vines of the Malpighia family were encountered, too, these with their odd reddish maple-like fruits in copious bunches. Another spectacular tree is the late-blooming *Catamericuche* or buttercup tree (*Cochlospermum vitifolium*) with

its great chalice-like golden petals.

Bromeliads here include *Tillandsia circinnata* (an apparent new record for the Nicaraguan flora), *T. schiedeana* with red bracts and pretty yellow flowers, *T. ionantha* (elsewhere in the country one of the epiphytic glories of the republic), and three other members of this diverse genus. Perched upon the lava-rocks are thousands of what may be *Bromelia sylvestris*, great rosettes of viciously thorny leaves which are often handsomely suffused with red.

Cyrtopodium punctatum is the commonest ground orchid of the area. Typically an epiphyte, this orchid reaches a ground development, with hundreds upon hundreds of high clumps of the immense heavy pseudobulbs appearing in interstices in the lava. During March the majority of these are in full bloom, with erect profusely branched inflorescences four feet in height or more, set with very rich yellow and red-brown flowers and accessory bracts, far superior to any other form of the species I have encountered. As yet, this *Cyrtopodium* is not authenticated from any other locality in Nicaragua. I have, in time past, also found the same species in great numbers on the lava-flows near Tepic, Mexico.

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Momi Fir in Alabama

The present note points out success with a conifer that most gardeners would not have suspected possible to grow successfully in the humid coastal parts of the Southeast.

The occurrence of the Momi fir (*Abies firma*) growing near the Gulf of Mexico seemed to me so very unusual that it is worthy of mention to those with a special interest in coniferous trees. Four or five specimens were planted some 35 to 40 years ago on the grounds of the old Overlook Nursery (K. Sawada and Sons), at Mobile, Alabama. Several of the plants are overcrowded by a pecan but nevertheless the fir has slowly reached its present size of

about 20 feet. The trees are of cone-bearing size, and I am told contain viable seeds. The current season's foliage looks very good every year and aside from the extremely slow growth, I would say the species has proved its adaptability.

I have searched much available literature on conifers and so far have turned up nothing to indicate the existence anywhere in the Southeastern Coastal Plain of any species of *Abies* either in public gardens or in University grounds. I realize there could be trees planted here and there that are unrecorded.

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Transitional Color: A Garden Tool and Talent

In the well-planned garden, color is more than a tool. It is a talent, an artist's skill which can make of a garden a



PHOTOS GUY BURGESS

Sweet violets mingle with pale lavender spring phlox, while Persian lilacs add one more lavender-blue accent to the Robert Smith garden. As the violets and phlox fade into pinkish shades, peonies such as 'Therese Pink', pink iris, and 'Fifth Avenue' pink lilacs lead a shift in color emphasis.



PHOTOS BY GUY BURGESS

Above: as the Persian lilacs develop their clusters, the *Trollius* and *Anthemis* come into bloom to offer a counterpoint of yellow accents to this lilac and lavender scene.

Below: pink crabapple 'Hopa' offers a veritable shower of pink blossoms, changing the faded red brick-paved terrace to a fantasy world of cerise and magenta hues, which mingle with the whitish pink blossoms of *Viburnum carlesii*. Pale pink lily-flower tulips bend on tall stems beside the deeper pinks of the bleeding-heart, a plant which blooms for almost six weeks.



glowing canvas. Some gardeners are born with this talent, others must develop an understanding of its worth.

The springtime garden of Dr. & Mrs. Robert Smith in Colorado Springs reveals an understanding of the importance of color. This garden in spring has what might be labeled 'transitional color unity' as the accompanying photographs quickly convey.

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A White-flowered Form of Kaempfer's Azalea

In Wilson and Rehder's *A Monograph of Azalea* (1921), two white-flowered forms of Kaempfer's azalea are mentioned: *Rhododendron kaempferi* f. *album* Nakai and *R. obtusum* var. *kaempferi* f. *monstrosum* Wilson. The latter is a hose-in-hose cultivar named by E. H. Wilson from a garden plant in Korea. Since *R. kaempferi* does not occur wild in Korea, we can only presume that 'Monstrosum' originated in a Japanese garden and was subsequently transported to Korea. To my knowledge, it does not exist in cultivation.

Rhododendron kaempferi f. *album*, on the other hand, is more than likely a naturally occurring white variant of the species in Japan. It cannot be construed to be 'Monstrosum' as suggested by Wilson. The f. *album* is single-flowered and typical of *R. kaempferi* in all characters except flower color. The plant figured here was collected in the wild on Mt. Takakuma, Kyushu at the mountain station of the Kagoshima University. Material was introduced by the U.S. Department of Agriculture in 1965 from Japan under P. I. 305068.

Mt. Takakuma abounds with azaleas, and *R. kaempferi* is a dominant feature of the locality. Along with it one occasionally sees such rare species as *R. serpyllifolium* and *R. sataense*. I have collected Kaempfer's azalea and observed it in flower throughout its entire range in Japan. I have seen only one white form.

Since Kyushu is the center of distribu-



PHOTO BY AUTHOR

Rhododendron kaempferi f. album
Nakai. A wild plant from Mt. Takakuma growing at Mt. Takakuma Forestry Station, Kakoshima University, Kyushu, Japan.

tion of azaleas in Japan, it is logical that here the greatest amount of variation is apt to occur.

Although there is no evidence that white forms of Kaempfer's azalea had reached cultivation earlier than 1965, several kaempferi hybrids with white flowers are known, such as 'Annamaria', 'Swan White', and 'White Lady'. It is possible that white in these crosses was derived from one of the other parents in the cross.

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Errata

Corrections should be made for *American Horticultural Magazine*, October 1967, Vol. 46, number 4 as follows:

1. Title page. Delete "*Crassula*" in the caption to front cover illustration.
2. Page 246. Caption and credit line apply to figure on page 247.
3. Page 247. Caption and credit line apply to figure on page 246.

Book Reviews

Fantastic Trees

Edwin A. Menninger. The Viking Press, 625 Madison Avenue, New York, N. Y. 10022. 1967. 304 pages. Illustrated. \$8.95 (Library).

Edwin Menninger's most recent book is devoted to some of the trees which, to those of us living in the Temperate Zone, are unusual or bizarre in some way, as indicated by the main subdivisions of the book: "Trees whose parts are peculiar, Trees that are peculiar all over, Trees that cannot live without animals, Trees of peculiar behavior, Trees shackled to fame by size, antiquity, or superstition; The rugged individualists".

The book is easily read and the author includes many interesting anecdotes as well as quotations from botanists and explorers who have had firsthand experience with trees in obscure parts of the world. Most of the trees described are well-illustrated by photographs.

The extensive notes and references at the back of the book include the botanical names of plants referred to in the text often only by common name; this necessitates an awkward leafing back and forth to see what plants is actually being described in the text. Granted the author is writing for a popular audience, I found his occasional anthropomorphic and teleological comments somewhat irritating.

I believe that the book's major contribution is in calling attention to the amazing diversity of form and function in the plant kingdom. For those of us in the Temperate Zone who think we have a good knowledge of woody plants, it is always a healthy antidote to our complacency to be reminded of the rich and diverse flora that exists in tropical and desert areas, and to realize that the growth and behavior of our Temperate flora does not necessarily represent the norm. Perhaps it is misleading to call the plants described here "abnormal" or "bizarre", for in fact they are quite normal in their own distinctive habitats and have evolved successful adaptations for survival under adverse conditions.

ROBERT L. BAKER

At Home With Plants—A guide to successful indoor gardening

Elsie Lee. The Macmillan Company, 60 Fifth Ave., New York, N. Y. 10011. 1966. 208 pages. Illustrated. \$5.50 (Library) Members' price \$5.05.

As the subtitle indicates, this is a guide on growing plants indoors or at least in containers where space is limited, as on terraces or balconies. A simple, easily understood first part of the book considers the selection of plants, the basic

factors of care, soil, light, temperature, propagation, etc. and the use of plants as decorating materials in many situations.

Part II is the growers guide with cultural information on many kinds of plants from *Abutilon* (flowering maple) to *Zantedeschia* (calla). However, plants are discussed with suggestions for growing indoors that do not seem suitable or practical, at least from their propagation to flowering and then for another year, such as celosia, bleeding heart or Christmas rose. Many of the plants listed have light, temperature and humidity requirements that are not normal in home or apartment living. These kinds would be more possible in a home greenhouse. Under such conditions, environmental conditions could be provided that were suitable for plant growth. There is a scattering of misinformation throughout, for example *Calendula* (Marigold) are not the same plants, and anemones do not flower from spring to summer; actually there are many kinds of species and they have varied cultural requirements.

It would have been better to indicate that the book was for greenhouse and indoor plant culture, then conditions would be available for many of the plants discussed.

CONRAD B. LINK

Early American Herb Recipes

Alice Cooke Brown. Charles E. Tuttle Company, Rutland, Vermont 05702. 1966. 152 pages. Illustrated. \$10.00 (Library). Members' price \$8.50.

This book is handsomely presented in the manner we have come to expect in publications from Tuttle. As stated in the preface, there are over 500 recipes collected by the author over a long period of time. They reflect the tremendous importance herbs played in the rigorous survival of our forefathers and they also afford a factual insight into vital aspects of Early American life. This is not a garden book nor a treatise on herb gardening, but a history well illustrated with plates and sketches reproduced from the engravings that appeared in the 1849 edition of Dr. W. Beach's "The American Practice Condensed, or the Family Physician; Being the Scientific System of Medicine; on Vegetable Principles, Designed for all Classes." The book is divided into five parts which cover in turn medicinal uses of herbs, use in toiletries, perfumes, etc., culinary uses of herbs, and also other household uses. A very attractive volume, it should be a welcome addition to the herb grower's library, especially one who wishes to make use of herbs in unusual or old fashioned ways.

FRANCIS PATTESON-KNIGHT

The House and Garden Garden Book

Peter Coats, Editor. Conde Nast Publications Ltd., London W 1, England. 1965. 256 pages. Illustrated. \$22.50 (Library).

A beautifully illustrated book on gardens and gardening developed primarily around the gardens of Great Britain. The first chapters consider the natural elements of the garden, the trees, shrubs and flowers. The next group of chapters are on the "man made" features as the walls, walks, ornaments and sculpture. In each case there are excellent photos to illustrate the chapters.

Well known British gardens are illustrated and described by grouping them into separate sections as country gardens, landscaped gardens of the 18th century, and gardens on the Continent, in France and Italy. The interesting town gardens are of a size and design that they could be adapted to our American town houses. Final chapters consider specialized gardens, garden pools, furniture, garden structures and plants as decorative items in the home.

CONRAD B. LINK

Touring the Gardens of Europe

Dorothy Loa McFadden. David McKay Company, Inc., New York, N. Y. 1965. xiii + 306 pages. Illustrated. \$5.95.

This guidebook to European gardens covers in some detail Ireland, Wales, England, Scotland, France, Holland, West Germany, Italy, Spain, and Portugal. The subject area includes information on how to plan your own tour and how to choose a conducted tour. For those with special interests it will be possible to find, for example, the best rose gardens, alpine plants, cacti and succulents; clematis, dahlias, and topiaries. Other subject areas cover flower shows of Europe, photographing gardens, and suggested reading about European gardens. The key to Gardens near the end is devoted to a list of gardens in 18 countries with details as to where and when gardens are open and their content. The final section of the book includes a series of "Wheel Tour Maps" that show places of interest within a 15 to 30 mile radius of cities, such as Oxford Circle in London, Stratford-on-Avon, Bath and other centers in England, Scotland, Ireland, Paris and other areas in France and Germany.

For the price, the book would be useful for garden-minded visitors to Europe. There seem

to be some technical errors in plant names, but not sufficient to overshadow the main contribution of this handy guidebook.

FREDERICK G. MEYER

Shore Wildflowers of California, Oregon and Washington

Philip A. Munz. University of California Press. Berkeley & Los Angeles. 1964. 122 pages. Illustrated color/B&W. \$4.75 (Library).

A much abbreviated pictorial guide (each plant is illustrated) based on the author's well-known "Flora of California." Strictly aimed for popular use in the identification of plants found in California along sandy beaches and dunes (coastal strand), coastal salt marshes, and bluffs along the coast within the influence of salt spray.

John Clayton, Pioneer of American Botany

Edmund Berkeley and Dorothy Smith Berkeley. The University of North Carolina press, Chapel Hill, N. C. 1963. 236 pages. \$6.00 (Library).

Many already know John Clayton (1694-1773) if for no other reason than for spring beauty (*Claytonia virginica*) described by Linnaeus and one of the commonest woodland plants of eastern United States. Clayton, along with the Bartrams, Catesby, Walter, and Marshall have long since become permanently identified with the development of botany and horticulture in America during the 18th century.

The story of Clayton is particularly well told by dedicated authors able to present the facts clearly and concisely. The authors place Clayton's arrival in Virginia about 1715 having come to the Colonies with his father. Clayton was for many years Clerk of the Court, Gloucester County, Virginia. His chief monument is the *Flora Virginica* published in Leiden in 1739 and 1762, compiled by J. F. Gronovius from plants and descriptions supplied by Clayton. It was the first important North American flora and the only one devoted solely to Virginia.

This scholarly piece of journalism is of interest not only to botanists and other plantmen, but it is an important and fascinating account of early Americana.

FREDERICK G. MEYER

THE AZALEA BOOK

Second Edition

by **FREDERIC P. LEE**



This handsome book tells everything there is to know about azaleas, incorporating the most recent developments in cultural practices, the latest methods of treating diseases and pests, and the best of the new imported and domestic azalea varieties.

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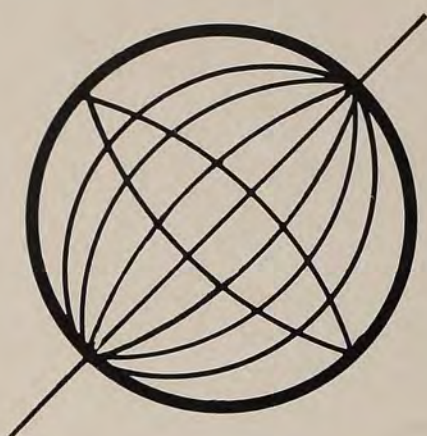
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"Horticulture is a great green carpet which covers the earth. . . . It attracts all sorts and conditions of men concerned with science, with business, with commerce, with beauty and love of plants. Horticulture . . . knows no political, geographical or other man-made boundary."

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