



Hunt Institute for Botanical Documentation
5th Floor, Hunt Library
Carnegie Mellon University
4909 Frew Street
Pittsburgh, PA 15213-3890
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
Web site: www.huntbotanical.org

The Hunt Institute is committed to making its collections accessible for research. We are pleased to offer this digitized item.

Usage guidelines

We have provided this low-resolution, digitized version for research purposes. To inquire about publishing any images from this item, please contact the Institute.

About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Add somewhere about
non-fes. in windows.

By B. Y. Morrison

Cactus Circular for Beginners

The collector's instinct finds expression in gardening as elsewhere and one of the most popular of garden hobbies is the collection of cacti whether for growing in pots or for planting out-of-doors in those regions suited ^{to their} ~~cactus~~ cultivation. There have ~~always~~ ^{ever} been cactus collections since the time ^{in the early 19th century when} ~~that~~ the wealth of species, particularly those native to Mexico, were first shipped to Europe ~~in the early nineteenth century~~. As is the case with all plant hobbies, there have been times when the enthusiasm has both waxed and waned. At the present time enthusiasm is definitely in the ascendancy.

Two questions usually arise before the cultivation of new plants ^{undertaken} is ~~commenced~~: What does the plant look like ~~so one may decide if it will~~ give him pleasure and what care will it require.

The first question is difficult to answer briefly because cacti ^{of various sorts} are native from North American southward to the tip of South America with a few representatives in Africa and the islands to the east of the East African coast. Within these limits there are a great diversity of forms, sizes, colors, flowering habits, ~~of cacti~~ and species of huge treelike stature as well as plants of almost miniature proportions. All have certain characteristics that distinguish them as cacti botanically, but the popular idea seems to be that they are essentially leafless plants, well furnished with spines and often with brilliant flowers - a concept that is not strictly true but serviceable to a large degree.

If the personal pleasures are to be recorded, they would usually center about the strange beauty of the plants with their unusual plant forms and patterns of growth, their colored spines and woolly hairs, their brilliant flowers often of a delicacy that contrasts strangely with the actual plant form and finally in some cases their fruits which may be both showy and edible. The^{se} obvious matters are fortified by the pleasures of association whether historical, geographic, botanical or purely personal.

An attempt to suggest the form of the various genera most often cultivated will be made where these are discussed.

The essential answer to the second question proposed is that success will depend chiefly upon a ^{careful} ~~successful~~ attempt to provide the plant growing conditions similar to those it had in nature. They vary somewhat according to the native habitat of the particular plant which also will be discussed later on.

*Insert on
page 3*

In a circular like this it is ^{not} necessary to go into all the details of the structure of the cactus plant which shows many modifications from the structure of the ordinary plant. The gardener should remember, however, that the functions of the reduced and usually evanescent leaves of cacti ~~are~~ ^{have been} largely taken over by the green bark. If this is understood, the grower will not fail to have sufficient sunlight reach the bodies of his plants. The modifications in the body of the cactus are more clearly indicated in the diagrammatic illustrations in Figure

A few generalizations are safe. All cacti are plants that have definite periods of growth and rest, and ~~during their resting period~~ will actually suffer if the conditions that favor active growth are maintained. ^{during their rest period} The chief exceptions to this rule are the species from purely tropical conditions. All cacti require adequate drainage, especially when grown in pots, and many are desirous of soils rich in lime. All cacti are lovers of heat and light and most are dependent upon strong sunlight for their best growth.

Insert page 4 → For a sound basis of starting a collection, the gardener should get some good botanical text that will give him a foundation for his work. ^{or} For this circular it is enough to suggest that there are three great tribes in the Cactaceae, Peireskieae, Opuntia~~e~~ and Cereae^e.

_____ with over 120 genera and approximately 1600 species.

The majority of plants that are ordinarily offered in catalogues, other than those of specialists, are largely confined to the following genera: Aporocactus, Ariocarpus, Astrophytum, Cephalocereus, Cereus, Chamaecereus, Echinocactus, Echinocereus, Echinopsis, Epiphyllum (Phyllocactus), Ferocactus, Lobivia, Mammillaria, Nopalea, Opuntia, Rebutia, Zygocactus. The plants that are offered in most large towns in florists' shops and department stores make an even smaller number. For the specialist, on the other hand, there are many more genera available and a very great number of species which may be valuable if one has a botanical collection but do not always add much to the beauty of a small collection.

The plants that come to the market ~~for sale~~ are of several types. Especially in ^{late} ~~mid~~ summer there are offered for sale quantities of plants that have been collected in the wild, handled ^{carelessly} with more or less care and shipped to market to be sold cheaply. If these ^{have been} ~~are~~ handled with ^{any} care and have not been too seriously damaged en route, they can often be brought to excellent growth. Many states now have excellent laws to prevent this type of collecting and since there are many good nurseries from which properly raised plants may be had at fair prices, the latter are preferred.

Nursery plants are of three types - plants raised from seed, from cuttings and from grafts. Seedlings have the great advantage that they are a whole plant without scar tissue and with a normal root system. They have the disadvantage of small size with a corresponding wait for blossoming ~~is~~ ^{to be} ~~obtained~~. The great beauty of the small plant often compensates for this delay. Cuttings are rooted portions taken from older plants whether offsets, as from Lobivia, single joints as from Opuntia or sections of the stem as in Cereus. In most cases they are entirely satisfactory, but it occasionally happens that root development is uneven from the callused basal cut. Grafts are plants in which weak-growing species or forms are grafted, usually upon rooted cuttings of Selenicereus or Cereus, using a stock just high enough to bring the union above the ^{ground} ~~growing~~ line! This is done particularly for those species that are liable to decay at ^{that point} ~~the~~ ground line under pot conditions. It is a practice that is used also for those species that have a drooping or trailing habit of growth in which case the stock is tall and the plant known as a "standard". Similar tall stocks are used for grafting crested forms of cactus that are much prized by some fanciers. There are fasciations which are often amazing if not actually monstrous.

NOTES ON CULTIVATED CACTI

In a bulletin such as this it is not possible to include keys useful to identify all the cacti that may be bought without names in summer sales or found in the wild if the gardener collects in cactus country. It seems desirable, however, to give brief discussions of all the commonly cultivated genera with a short discussion of their appearance and their cultural requirements. These latter are based primarily upon data collected in the eastern United States under household conditions.

12

Aporocactus. This genus is best known by the so-called rat-tail cactus A. flagelliformis (Mill.) Lem., which has been grown in many miscellaneous collections of house plants in both city and farm.

All the species which are cultivated make masses of slender stems (finger-size) more or less flexible, hanging down over the sides of the pot or clambering upward over any sort of support. All the stems have ribs along which are situated the radiating clusters of spines. The flowers are not overlarge but are showy, red and pink in color and produced in spring. These plants are often grafted high and trained as standards.

All species are agreeable to a soil mixture of sand and garden soil to which some humus has been added.

All are sun lovers and require ample moisture during the growing season.

Species offered in cultivation now are: A. flagelliformis (Mill.) Lem. crimson-pink flowers; A. flagriformis (Zucc.) Lem. crimson; A. leptophis (DC.) Br. et R. red; A. Martianus (Zucc.) Br. et R. scarlet; A. Conzattii (Berger) Br. et R. brick red.

Ariocarpus Scheidweiler. Specimens of plants in this genus often come to market among the plants collected in the wild and are offered as properly grown nursery plants, with the "living rock" A. fissuratus K. Schum. the most frequent.

All are plants with thick "beetlike" tap roots and rather flat tops so arranged that the triangular or otherwise angled tubercles often suggest a rosette plant. All species like full sun, free ventilation, a rather poor soil with some humus and perfect drainage. Little moisture is required at any season.

Of the species available, A. fissuratus is valued more for its curious tubercles that are greenish and deeply fissured and roughened than for its small but handsome rose-pink flower. A. retusus Scheidw. has green triangular tubercles and pale pink flowers. A. furfuraceus Thompson has paler green tubercles

and usually white flowers. A. Kotschoribyanus (Lem.) K. Schum. is dark green, with pink to red flowers; A. scapharostrus Boedeker, grayish with purplish flowers, comes from a particularly hot and barren native scene. A. trigonus K. Schum. has much more upright triangular tubercles with more numerous, smaller, yellowish flowers.

Overfeeding, overwatering, too little light and too little heat in summer are the dangers for this genus.

Astrophytum Lemaire is a genus that does not resemble any other genus of cacti. They form rather globular plants having usually 4 to 8 ribs which are very conspicuous and usually lined with small starlike groups of spines. The surfaces are more or less covered with scurfy scales that give a gray effect over the green.

All the species are Mexican, requiring a poorish, sandy soil, lime in abundance, full sun and adequate water in summer and dry conditions in winter.

Four species and many forms are available in trade, of which A. myriostigma Lem. is probably the most commonly grown although A. ornatum DC. (Weber) is often met.

Cephalocereus (Pfeiff.) Br. et R. For the amateur who grows his collection in pots, this genus is one of lesser importance except for one or two species. As a group they are large, erect, columnar species, some branched and treelike, all ribbed, the ribs in varying number and lined with clusters of fine spines and often with a abundance of wool from the areoles - particularly from those uppermost.

The species most commonly met is C. senilis Pfeiff. known by all as "Old Man". This makes a plant of pale green color with a varying number of ribs. Both color and ribs are obscured with somewhat raised areoles furnished with a few yellow spines and abundant white wool. Native to Mexico and impatient of overwatering.

is not color same as Senilis by W.C.

Don't some
come from
moist
tropics?

All species should have poor gritty soil, rich in lime and should be kept dry. As many come from tropical regions, a moist atmosphere is not harmful. All are grown for the beauty of the plants and hairy developments and spines rather than their flowers which usually are small, not widely opened, nocturnal and produced only ^{on} ~~from~~ old plants.

Cereus Miller, as considered in The Cactaceae by Britton and Rose represents a small portion of what was once a much larger genus. For the most part they are large, columnar, often branched and treelike cacti that are not particularly suitable for growing in pots for the house. In commercial collection one finds this genus represented as often by one of the monstrous or fasciated forms as by any normal plant.

Where they may be grown out of doors, they make handsome specimens. The large nocturnal flowers are rather handsome, especially on old specimens.

Smile
Borg

This genus does not contain the so-called night-blooming cereus of gardens which is ^{nyctocereus serpentinus} Selenicereus pteranthus ??? mmb *make up your mind!*
^{epiphyllum appetatum}

Chamaecereus Br. et R. which has only one species, C. Silvestrii (Speg.) Br. et R. often appears in summer sales and makes a very nice house plant if not over-watered. It is found only near ~~THESE~~ Tucuman, Argentine, a region with approximately all its rainfall during the summer months when growth is active. The plant makes a tuft of short finger-sized shoots closely covered with acicular spines along the ribs. The small orange-scarlet flowers, borne in late spring, appear rather large on the slender shoots. According to Borg, the joints break off easily and usually root where they fall. Full sun.

note In journals one reads complaints against not flowering.



Echinocactus (Lk. et Otto) Br. & R. includes only those few species which remain after the eight various genera have been created about old species once Echinocacti and other new species that fit these several groups. Plants that were once Echinocactus are now to be discovered under the following genera: Ancistrocactus, Arequipa, Astrophytum, Cactus, Copiapoa, Dennoza, Discocactus, Echinomastus, Erioyce, Ferocactus, Frailea, Gymnocalycium, Haematocactus, Homolacephalus, Lophophora, Malacocarous, Matucana, Neoporteria, Notocactus, Oroya, Parodia, Pediocactus, Pyrrhocactus, Sclarocactus, Stenocactus, Strombocactus, Thelocactus, Tommeya, Utahia. Some of these genera are represented in current trade lists.

Count 29, 6

The genus in its reduced state is small with all its members either globular or cylindrical, rather slow growing and more to be valued for the form and color of the plant, for the spines and wool than for the flowers which are often small and rather hidden in the spiny masses.

sp. alacular, colorful

G.R.

Digitized by Hunt Institute for Botanical Documentation

The species most commonly found in cultivation is E. Grusonii Hildm. which has been cultivated for many years on account of the beauty of its translucent pale yellow spines. It should be given a limey soil, rather poor and well drained, and should be half shaded in summer.

In the genera that now include species once assigned to Echinocactus are several that should be noted. Most of the Malacocarous Salm-Dyck hide behind the name Notocactus K. Schum., a genus of rather nice pot plants provided they are kept nearly dry all winter. All are nearly globular with many ribs, these often not conspicuous, some with many bristles and some with few, but in most cases these are more decorative than the flowers. The latter are of fair size and yellow color.

ident or footnote

Parodia Sp. is fairly well represented in trade. It comprises a series of species, South American from Bolivia south and mostly east of the Andes. They are essentially globular with handsome spines. The flowers are

usually brilliant but not overly large.

Stenocactus K. Schum. are mostly small essentially globular cacti from Mexico with numerous ribs and widely spaced, rather conspicuous spines, often the most beautiful part of the plant. Flowers brilliant but small. Keep dry in winter.

~~These are the (K. Schum.) Br. et R., again a Mexican group,~~

*Don't think
one rather
popular?*

Thelocactus (K. Schum.) Br. et R., again a Mexican group, is globular, not conspicuously ridged, but sometimes very spiny, and with rather larger and more brilliant flowers, white, yellowish, pink or red. Like the last must be kept dry in winter.

*raise to
full fl.*

Echinopsis Zuccarini is a genus of South American cacti that once included the species that are now ^{placed} ~~included~~ in the genera Lobivia and Rebutia (which see), plants that were once considered Echinocactus. They are useful house plants, relatively slow growing and free flowering with showy, rather large flowers.

Digitized by Herbarium Institute for Botanical Documentation

Essentially the group is made up of globular or cylindrical forms with prominent ribs and large but not very showy spines. The flowers are large and have long tubes that bring the flower faces well above the level of the plant. The free-flowering forms often carry more than one flower at a time. These are usually white and open during the day, but there are some species and some hybrids in which they are yellowish or pinkish. Rich soil but porous, full sunlight, and copious watering only in summer.

As a first trial, choose E. Eyresii.

Epiphyllum (Hermann) Haworth. Among tropical cacti that are grown in house collections few of the large-flowered sorts are as dependable for flower as these and few are less armed with spines and ? glochets? . The main stems are usually round, but the lateral shoots are often flattened so that they often resemble large leaves. The long-necked flowers are produced from the margins of these branches. There are both day- and night-blooming types.

The most common color is white with pink or yellowish tints on the outer segments and the scales of the tube.

In commerce there usually are offered more hybrids than species of Epiphyllums and most appear to be hybrids, ^{with fine red flowers} in which there is blood, probably ~~from~~ Heliocereus speciosus (Cav.) Br. et R. with fine red flowers. Much of the history of these hybrids is conjectural, but the plants remain among the most beautiful of cultivated cacti.

The soil recommended for all is a porous mixture in which old cow manure mixed with some sand or coarse loam to which not more than one-half drainage material has been added. The plants should never have full sunlight and may be kept out of doors in summer if shaded or sheltered from wind. A little extra care in watering and a little extra light when growth begins will give a good impetus.

See page 104

It should be remembered that these are not desert plants nor xerophytes. In the eastern United States, the "night-blooming cereus" handed down as house plants for generations belongs here and is to be had under Epiphyllum oxypetalum.

Ferocactus Br. et R. This is a genus created by Britton and Rose from species once considered Echinocactus. It has been enlarged by the addition of more recently discovered species. They are native from Mexico northward into our southwestern states. All are rather large, globular to cylindrical cacti with thick prominent ribs and large showy spines which constitute the chief beauty of the plants. The flowers are large but not nearly so showy as in some other genera.

A warm location, full sunlight, moderately rich soil mixed with rock or brick and a limey reaction are the general requirements of all Ferocacti. As is usual, they should not be overwatered, particularly in winter.

They are slow in growth as pot plants but are said to develop more rapidly as they grow older.

For a first trial, choose F. latispinus.



Lobivia Br. et R. is one of the many segregates chiefly from Echinocactus but containing some transfer from Echinopsis. They are all South American and useful cultivated cacti valued chiefly for their brilliantly colored flowers that are freely produced. They require a porous, rather rich soil, with some humus, some lime and some rubble.

Essentially they are globular with many ribs and numerous spines. These last may be very long and conspicuous or relatively short. The flowers are relatively large for the size of the plant, though not as large as those in Echinopsis, in color usually yellow, orange or scarlet. They are day bloomers and last more than one day.

The plants take some shade in the growing season and should be kept quite dry and cool in the non-growing season.

The species with the greatest horticultural literary history is Lobivia ~~Mammillaria Haworthii Salm-Dyckii~~ Pentlandii (Salm-Dyck) Br. et R. which will make a good beginner's choice.

Mammillaria Haworth, in spite of the many species removed from it to form other genera, remains a very large genus, sufficiently large and diversified that botanists can separate it into sections and series, and collectors can find their entire attention used up in this one genus.

They are essentially Mexican, but extend southward into Central America and northward into the United States. They are globose or nearly so with conspicuous tubercles always arranged more or less in spiral rows with conspicuous spine areoles and spines on tip of each tubercle. These, their patterns, colorations, and their contrasts with the colors of the plant body furnish enough basis for collection. The flowers are rather small, usually hidden more or less in the mass of the spiny tubercles. They do not always open widely, are greenish, yellow, pinkish or red, and are followed by red fruits.

Do not the fruits deserve more emphasis than this?

The plants are beautiful as young seedlings and until they become so old that the dead tubercles about the base of the plant become a disfiguration.

For the most part, perfect drainage, a moderately rich soil, some lime and little water in winter will satisfy most species. Beyond this point a technical manual should be consulted.

Nopalea Salm-Dyck. This genus contains a few species which look like the flat-jointed opuntias in a general way and differ ~~essentially~~ in some of the flower characters. They require essentially the same care.

The form that appears most commonly in the market is the variegated form of Nopalea dejecta Salm-Dyck. This plant has the typical loose-jointed habit of the type, perfectly described by the specific name dejecta. The variegations are creamy white smeared and streaked over the green pads and in some cases almost covering them.

The genus is interesting because it also contains N. coccinellifera (Mill.) Salm-Dycke, one of the cacti from which were once gathered the cochineal insects. It too has a piebald variegated form of no greater beauty but rather more compact habit than that of the plant mentioned above.

Opuntia Miller is a very numerous family of plants extending from the United States through Mexico to the southern tip of South America. There are several species that are entirely cold hardy and may be used out-of-doors in all but the coldest parts of the United States; most, however, are useful for showy plantings in the warmest part of the country, unless grown as house plants. In the latter case they should be given locations that are particularly well lighted and should not be watered at all during the non-growing season. If they are over-watered or poorly lit, their growth is weak and etiolated almost beyond recognition.

By those who can grow them out-of-doors, they are prized for their showy flowers, their conspicuous, usually edible fruit and their conspicuous, often showy spines and glochids.

Botanists group them into sections according to their structural growth but horticulturists usually make two divisions only, those species that have flat spreading joints and those which do not, an arrangement that is serviceable if not altogether accurate. *with cylindrical joints? 6.21*

Among the species most commonly grown out-of-doors in the East is O. humifusa Raf. long known as O. Rafinesquei Engelm., native along the sea-coast and sometimes inland. It has a prostrate growth, dull green joints that shrivel in winter, and brilliant canary-yellow flowers followed a year later by crimson fruits. It is a beautiful plant especially when a good colony is in flower, but is not so spectacular as some other species.

This group also contained most of the large padded species that were proposed as cattle-food, a recommendation that seems to be more acceptable to men than to cattle except in extremity (Opuntia ? tuna ?).

Opuntia with the spine-less forms, etc.

The species most commonly grown as a house plant is O. microdasys Lehm. which has few if any spines, but is covered with closely set areoles, each carrying a tuft of yellow glochids which gives the plant a velvetlike appearance which is most unsafe to ~~touch~~^{touch} as the glochids are easily detached and quickly work into the skin. Its growth is compact and often architecturally handsome, but the plant must have light to develop normal growth.

Digitized by Herbarium Institute for Botanical Documentation

The other group of Opuntias have cylindrical joints from pencil size to ovoid.

Before the gardener who grows his cacti in pots goes far toward adding many Opuntias to his group, he should visit a fine collection and decide whether or not he wishes to give up much space to them, *(since they are often seriously stunted in house collection)* The same advice may be useful to the gardener who can grow them out-of-doors, but his desires will be more numerous.

Rebutia K. Schum. is a genus composed largely of species that were originally called Echinocactus, and those that have been described since the genus was made. Essentially they are rather small, approximately globular plants, never ribbed but with tubercles arranged more or less spirally and small, rather weak spines. The flowers are showy, usually red or yellow and freely produced. Cultivation as for Lobivia. All are from South America.

is established

One might begin
Our beginning was with R. minuscula.

Zygocactus K. Schum. is one of the genera known to most gardens because it contains the Christmas cactus, Z. truncatus (Haw.) K. Schum. treasured everywhere for its abundant bloom that appears in mid-winter. It is also known as crab-claw cactus or lobster-claw.

It is essentially a shade-loving cactus that must not be treated like a desert plant. On the other hand, it must not be over-watered or it will drop its shoots, joint by joint.

In some ways it resembles a small epiphyllum, but has jointed shoots of smaller dimensions and much smaller flowers. Many varieties of this plant are known, some of them really hybrids with true epiphyllums, differing chiefly in the color of the flowers.

The so-called Easter cactus which somewhat resembles this plant belongs to another genus and should be purchased as Schlumbergera Gaertneri (K. Schum.)

Br. et R. It requires essentially the same treatment.

Both types of plants are often grafted upon other stocks such as Selenicereus or Hylocereus, to give a hardier crown or to furnish a tall standard so ~~that~~ the drooping shoots may display themselves to advantage.

Additional Genera

In giving a brief review of the genera of cacti that are most likely to appear in small collections, it is inevitable that some genera must be omitted that are available in the nursery trade if one shops about. A few of these should be mentioned very briefly.

Cleistocactus Lemaire are native to South American countries and are valued for their slender cylindrical growths, more or less conspicuously ribbed and with fine spines. Flowers brilliant but not very spectacular. Good watering only when in active growth and flower.

Coryphantha (Englm.) Lemaire comprises a group of species which were once included under Mammillaria. Culture same. *(a little more characterization?)*

Espostoa Br. et R. is a small group of South American cacti, columnar, ribbed, with conspicuous spines that rise through masses of hair or wool. Flowers not important. Culture as for Cereus.

Gymnocalycium Pfeiffer comprises the South America counterparts of our Echinocactus and Ferocactus. They are mostly globular plants with warty ribs, showy spines and rather conspicuous flowers. Culture as for Echinocactus.

Harrisia Br. et R. is a genus of tropical cacti making slender, weak-growing stalks that may be trained as vines. The nocturnal flowers are large and very beautiful but are not freely produced until the plants are fairly old.

Hellocereus Berger is, like the last, made up of rather weak-growing, almost vinelike species with similar requirements. Their flowers are usually red and brilliant.

Lemaireocereus Br. et R. Most of these were cereus and are essentially columnar plants with conspicuous ribs and showy spines; the flowers are smaller and less brilliant than some other related genera. Grown essentially for

beauty of spine and wool. *Columnar habit ?*

Leuchtenbergia Hooker. is essentially a curiosity among curiosities.

The single species, L. principis Hook., native to warm areas in central Mexico, wants a deep pot, a limey, rough and poor soil mixture and as much light and heat as possible. It makes a large cylindrical root. The tubercles are long, triangular, gray-green and topped with conspicuous white spines. The yellow flowers are borne at the tips of the areoles.

The plant consists essentially of a collection of tubercles.

Lophophora Coulter is represented by several species, not very beautiful in form or habit or bloom but interesting because of the narcotic properties of the mescal buttons, made by drying the cut tops.

Penicereus Br. et R. is a small genus of native southwestern cacti with large "turnip-like" roots in nature that make pot culture impracticable. If grafted, they grow and flower well, with large nocturnal white flowers borne on the slender, angled stems. *spectacular, fragrant?*

Digitized by Hunt Institute for Botanical Documentation

Peireskia (L.) Plum. is a genus of tropical cacti distinguished by their persistent leaves that resemble normal leaves. As they make rather large plants and should have greenhouse conditions, they are not much used in house plant collections. *used for stocks. not primitive form.*

Selenicereus (Berger) Br. et R. is a genus of slender climbing or clambering cacti that are essentially tropical and usually must make considerable size before they begin to flower. The flowers are very large, very beautiful, very fragrant, nocturnal and usually white. If grown in pots, they usually can be trained back and forth over themselves and still flower well.

Trichocereus Riccobono is a South American genus with columnar stems tall in some species, dwarf in others with fine nocturnal, usually white flowers of good size. Plants do not want too much lime; should have good sunlight. Often slow growers.

Wilcoxia Br. et R. is a North American group usually grafted to avoid their large natural roots. They have slender cereuslike stalks with few but conspicuous ribs and rather good-sized flowers, red or pink, lasting more than one day.

Cristate and Monstrous Forms

At various times cactus plants have been discovered in nature in which there have been various degrees of fasciation. These are particularly conspicuous in old plants and are often as surprising in their conformations as corals. It is the usual horticultural practice to prepare these for the market by grafting them upon stocks which will carry them well above the soil line and give them ample support from a vigorous root system. Persons who care for these forms usually collect them avidly, often to the exclusion of all else. The value of the plant depends entirely upon the unique quality of the development.

Here the beginner would do well to view a collection before he decides to purchase.

SOIL AND POTS

Aside from the fact that the soil mixture must be of a type guaranteed not to retain any stagnant moisture, there seems to be considerable difference of opinion in regard to the mixtures recommended. To this one fact, which is unanimously accepted, may be added the idea that the soil mixture may be poor rather than rich, but that this is accomplished by adding to rich soil considerable inert material whether sand or gravel, broken brick or ~~stone~~ chipped flower pots, ^{which accomplish} All of these ~~assist~~ in the drainage ^{desired}.

The following are recommendations from various sources:

(Borg) General mixture: Bulk material such as powdered granite or river sand or gravel, or powdered brick, "with a good allowance of fine garden loam*** with a suitable proportion of calcareous matter above referred to.

Some old leaf mould, thoroughly rotted *****,"

(Haseltine) General mixture. "One-half loam, one-fourth humus or leaf mold. One-fourth sand. Addition of about ten per cent or less of charcoal and a little of the mortar."

Various modifications are noted. For genera needing poor soil increase the bulk (inert) material and lime rubble to one-half, e.g., North American Echinocactus. For many South American Cereii, increase the garden loam 25 per cent, e.g., Rebutia. For Epiphyllums and their ilk use a mixture of inert material one part, calcareous material one part, leaf mould one part with a little garden loam for good measure. The mixture ^{is given below} in use here ^{It} and plants have remained in ^{it} these with apparently normal growth without repotting, ^{for two and three years}

- 1 part coarse sand
- 1 part garden loam (basic mica schist)
- 1 part leaf soil
- with a sprinkling of lime.

Notes to C.H.: These have to be combined



Digitized by Hunt Institute for Botanical Documentation

There seems to be almost as much difference of opinion on the subject of pots as on that of soil mixture. All authorities seem to agree, however, on one point, namely, that all pots should be small with a minimum of size in excess of the diameter of the plant. The most disputed question is whether or not it is desirable ever to use glazed pots. European books seem to decry it - American texts offer no objections. As far as has been discovered here, there have been no undesirable results from glazed pots,

but not enough have been ^{used} grown to warrant ^{final} statistical reporting. *These pots show completely glazed inside*
Which are glazed only on the outer surface seem a *trifle better than* those
The chief point that should be raised is that all pots must have adequate drainage holes. This is specially mentioned because the public is often offered glazed dishes without drainage in which are planted various tropical plants, among them cacti.

Digitized by Hunt Institute for Botanical Documentation

Light

All cacti must have good light - many of them prefer strong sunlight. If they can be grown where light comes in from all sides, they will be most successful. Various notes will be entered where the genera are discussed to show those forms that need shade. Cacti should be considered as carefully as other plants on this score and not be left to scorch from too great heat and light.

Water and Watering

Most texts recommend the use of rain water. This is desirable for any plant but ordinary city water has served well in all practical work done here.

Watering should be adequate during all the season when the plant shows active vegetative growth and reduced to a minimum thereafter. In one excellent text, it is suggested that plants be watered only once a month in winter and then watered thoroughly and drained out. This would scarcely be satisfactory under living-room conditions in the modern American house, unless the temperature ^{is} maintained were very low. The plants grown here under office and living-room conditions were watered very sparingly once a week. From the species grown it would seem that in most cases active growth does not commence until the weather is ^{outside} warm and the sun fairly high, usually late April to mid-May. It appears to continue until November. The plant will usually show when it is time to grow and then watering can begin - not before. Low ?

Water should be given so that it does not ^{touch} cover the plant, ^{body} as is the case with a sprinkling can or watering pot. If the plant needs washing, this should be done early in the morning on sunny days and with a fine spray that will quickly dry. For ^{the home} a ~~small~~ collection a ^{small} little atomizer is useful. It is also useful to administer a dry clean ^{way} blowing off dust with dry air. Those species with plant forms that shed water most easily are least likely to be hurt in careless watering, while those with deeply mammillate forms or with depressed growing points are most easily injured by water settling in the depressions.

Insects

From experience here, the most troublesome insect is a soft scale () which often is brought in on new plants and rapidly spreads to all unless checked. The most effective spray is used at ten day intervals for two months to be sure that all eggs are caught as they hatch. Red spider is not often really troublesome but, if troublesome, should be sprayed with . Mealy bugs are more difficult to dislodge. The best treatment, if available, is a fumigation with methyl bromide under expert care. This has the advantage of killing any mealy bugs that may be under the soil level and so out of reach of sprays.

Needless to say, spraying should be done on days when the plants will dry off as quickly as possible and this without the aid of direct sun.

Summer Care

Aside from the necessity of watering to promote growth and insure flowering, there are two things that may need special attention, one is repotting, the other bedding out.

Repotting may ~~be~~ safely be done at almost any time, but it is more desirable to do it during the active, growing season. Shifts should be made gradually, choosing pots as little larger than the pot then in use, as can be had, using a similar soil mixture and taking care to add little water. Cacti must not be treated like ordinary plants at this time and kept drenched with water. If repotting is done in winter, no water need be given unless the potting soil is dust dry.

Many people like to plant their cacti out-of-doors during the summer and repot in the autumn. This has some advantages, but for those who live where there is summer rain, there are some hazards for all except the tropical species that are used ~~for~~ to rains. It does have the advantage of giving the plants a greater root run for the time, a greater amount of light which is conducive to good growth and flowering.

DIFFICULTIES

Although various difficulties may arise in nature, those which are most common in collections of potted plants should be mentioned briefly.

Watering. Although repeatedly discussed in the text, it should be recalled here that water is useful only during the growing seasons and in such quantities that none is left to make the soil waterlogged.

Drainage. There must be adequate drainage in the flower pot and the soil mixture must have enough coarse sand, gravel or other such material to permit water to move through it quickly.

Mealy bugs. These are sucking insects protected by a more or less waterproof outer coat that must be penetrated for effective control. They usually attack plants in the most tender spots and are often difficult to reach because of their tendency to work in crevices or angles of the plant or, worse still, underground on the roots. is an effective spray. Fumigation with methyl bromide is effective in the hands of the professional operator.

Scale insects. The usual scale is which may attack any parts of the surface. The scales multiply rapidly and sooner or later kill the plant unless destroyed. Infestation should be handled quickly as even small attacks disfigure the plants by marring the surface. Sprays of or have proved effective. If repeated at intervals of days for a period of weeks. This treatment should catch all insects that might be missed in earlier sprayings.

PROPAGATION

It is not often that the beginner undertakes the propagation of cacti and it seems unnecessary to give full details in this publication. The most simple method is by cuttings and offsets for those types of cactus that furnish this sort of material. Such plants as Opuntia, Epiphyllum, Zygocactus can be broken apart at the joints; such plants as Cereus, Selenicereus, Harrisia can be cut in sections and then treated as cuttings; such plants as Echinopsis, Rebutia and the like produce offsets that can be removed and treated as cuttings if they have no roots at removal.

Cuttings. Any portion of a cactus plant to be treated as a cutting should be allowed to dry for ^{2 weeks?} \wedge days until the cut surface has a thin dry surface. It can then be inserted in ^{moist} dry sand and kept without watering until roots form. Watering then should be moderate until the plant shows signs of active growth. Specialists with greenhouse equipment may use another procedure with higher temperatures and great humidity but this lies outside the beginner's usual facilities.

Seeds. In recent years as seed supplies have become more abundant and the advantages of vigorous young plants more apparent, the growing of cactus from seed has become a more regular nursery procedure. For the amateur it is less interesting but not important as young seedlings usually can be bought at low prices. Seed should be sown thickly in pots or flats of soil similar to that used for large plants, taking the usual precautions for perfect drainage. The seed can be pressed into the surface of the soil and then covered with a thin layer of very fine gravel which prevents the development of moss on the soil surface and gives young plants a dry surface layer in which to develop. Germination may be quick or long delayed depending upon the species and the freshness of the seed. As soon as the seedlings are a good size to handle they can be transplanted and evenly spaced in similar

large pots or flats. The next transplanting can be to small pots.

Grafting. This proceeds on the same principles as in any other plant but with modification in details. A technical manual should be consulted or a good nursery visited before the beginner attempts this.

Digitized by Hunt Institute for Botanical Documentation

add: Books - Selected bibliography.

Aporocactus	flagelliformis	1.00
Ariocarpus	fissuratus	.35
Astrophytum	myriostigma	1.00
Cephalocereus	senilis	5" .75
Chamaecereus	Silvestrii	.25
Echinocactus	Gussonii	1.00
Echinocereus	papillosus	1.00
Echinopsis	cupressii	1.00
Epiphyllum	complanatum	1.00
Terocactus	latispinus	1.00
Lobivia	Pentlandii	1.00
Mammillaria	albescens	.50
	blossfeldiana	.75

Digitized by Hunt Institute for Botanical Documentation

	gibbularia	1.00
	whitaciana	1.00
Nopalea	dejecta	.50 ?
Opuntia	calmaliiana	.50
	invicta	.75
	davisii	
	mammillata	.50
	microcaryota	1.00
	not set	.50
Rebuta	minuscula	
Zygocactus	truncatus	1.00
		67
		<hr/> 18.15

$$\begin{array}{r} 250 \\ \underline{23} \\ 750 \\ \underline{500} \\ 6750 \end{array}$$

$$\begin{array}{r} 11 \\ 9 \\ \underline{10} \\ 10 \\ 12 \\ 10 \\ \underline{12} \\ 11 \\ \underline{12} \\ 12 \\ \underline{12} \\ 109 \end{array}$$

aver, 11 words per line
 13 lines

$$\begin{array}{r} \sqrt{83} \ 6750 \quad (11.5) \\ \sqrt{83} \\ \underline{920} \\ \sqrt{83} \\ \underline{583} \\ 3370 \end{array}$$

Digitized by Hunt Institute for Botanical Documentation

MS not about 6750 word -
 circular average $\sqrt{83}$ word per solid page.
 therefore, 11.5 pages ~~at present basis~~
 of full page titles +

Aporocactus flagelliformis

Ariocarpus fissuratus

Astrophytum myriostigma

Cephalocereus senilis

Chamaecereus Silvestrii

Echinocereus Tussonii

Echinopsis Eyresii

Epiphyllum - (hybrid)

Ferocactus latispinus

Lobivia Pentlandii

Mammillaria - several

Digitized by Hunt Institute for Botanical Documentation

~~Hoplosa defecta~~

Opuntia - several

Rebutia minuscula

Zygocactus truncatus -

<i>Cleistocactus trichotrieni</i>	75
<i>Coryphantha erecta.</i>	.75
<i>Epistoa lanata</i>	1.00
<i>Gymnocalycium sagione</i>	.50
<i>Harrisia martini</i>	1.00
<i>Heliocereus speciosus</i>	1.00
<i>Lemairocerus stellatus</i>	1.00
<i>Lechtenthergia principis</i>	.50
<i>Lophophora williamsii</i>	.50
<i>Peniocereus greggii greggii.</i>	1.00

Pereskia > omit

Digitized by Hunt Institute for Botanical Documentation

<i>Selenicereus macdonaldii</i>	.50
<i>Trichocereus schickendantzi</i>	1.00
<i>Wilcoxia tamaulipensis.</i>	.50
	<hr style="width: 100px; margin-left: 0;"/>
	10.00

<i>Malacocarpus</i>	—
<i>Notocactus haselbergii</i>	75
<i>Parodia nivosa</i>	1.00
<i>Stenocactus rastropinus</i>	1.00
<i>Thelocactus fossulatus</i>	1.00
	<hr style="width: 100px; margin-left: 0;"/>
	3.75

18.15

10.00

3.75

31.90