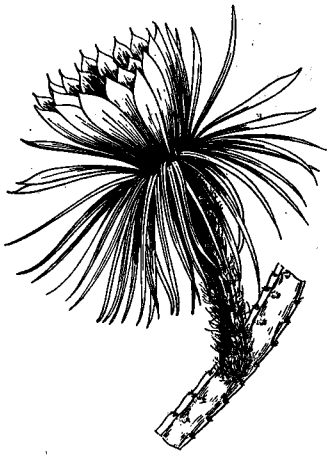
This is the forty-second in Nature Magazine's series of educational inserts.

Cactuses

By E. LAURENCE PALMER

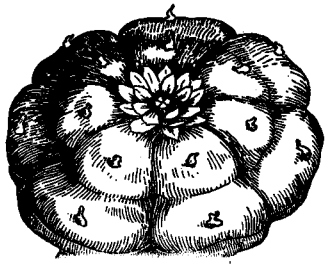
Illustrations by Betty Burckmyer

MULE CACTUS



NIGHT-BLOOMING CEREUS

SNAKE CEREUS



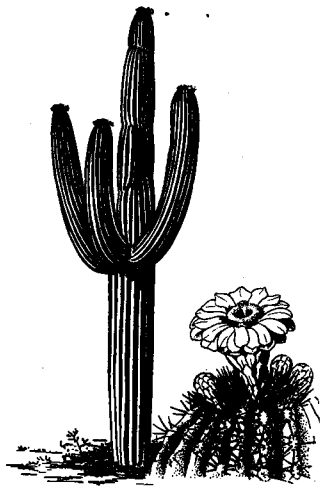
MESCAL BUTTON

PLEASURE derived from writing these inserts for *Nature Magazine* comes in no small degree from the reactions of hobbyists particularly interested in the subject under consideration. When we wrote about turtles, a young turtle fan wrote of a personal experience that enriched considerably the material included in the insert. When we wrote of sea-shells, we received excellent letters from hobbyists on both coasts, and from wounded soldiers in base hospitals. The insert on seaweeds brought a fiery letter from one who was excited about a mistake our artist had made, and the one on fungi stimulated some delightful comments on editorial offices in general.

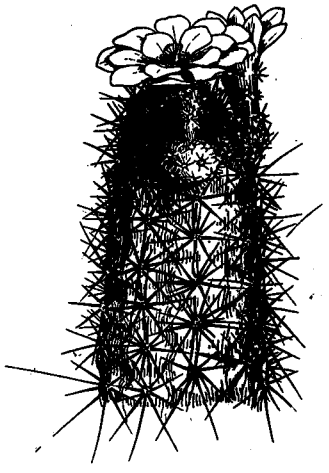
Perhaps we may expect equally interesting response to a cactus insert. In any event, the presence of cactuses on the counters of every five and ten-cent store testifies to a public interest in these plants. Besides, there is the vigorous Cactus and Succulent Society of America, whose post-office box is 101, Pasadena, California, and whose members have shown remarkable ability to carry on a popular natural history program and still remain scientific. They offer to buy plants, sell them, classify them, doctor them. They will do everything in their power to establish a happy relationship between you and the group of plants in which they assume you cannot help but be interested.

We have a National Academy of Science in which, it is said, members try their best to present the latest thinking in the field of their specialization in such a way that the other members can understand. It is not certain that they always succeed in this admirable attempt. Would it not be worth while, perhaps, to establish a National Academy of Popular Science, bringing together the more substantial Nature hobbyists, letting each try to convert the rest of the assemblage to a genuine appreciation of the outstanding importance of his own specialty. I can picture some of my conchologist friends giving up their hobby for some of my cactus friends, or either group giving in to the blandishments of those whose consuming interest is in bats, butterflies, fishes, snakes, orchids, willows, palms, thrips, geodes or Indian artifacts. Whatever your hobby may be, there are many people who feel sure that it will fade into insignificance if you will only risk an acquaintance with the cactuses.

Raised, as the writer was, in the Northeast and in the days before five and ten-cent stores, a cactus was something literally "out of this world" for many, many years. There was a decrepit *Opuntia* that decorated the window of a newspaper office, but it did little to stimulate any real interest in the plants. So it came as a surprise when we learned in high school biology that what we had thought were leaves were really stems. A greater surprise came, however,

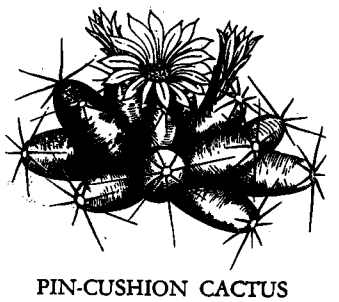


SAGUARO

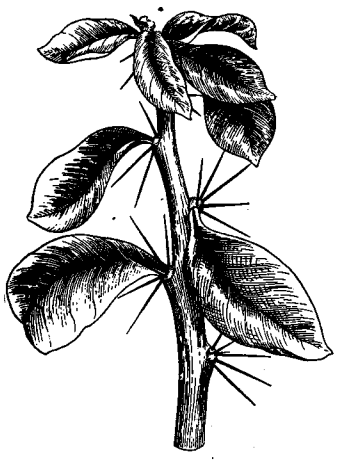


HEDGEHOG CACTUS

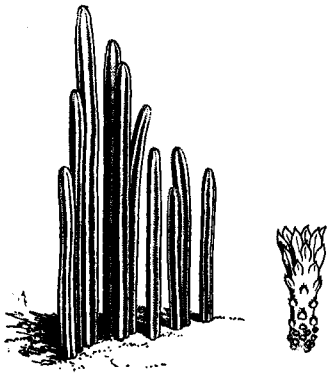
COCHINEAL CACTUS



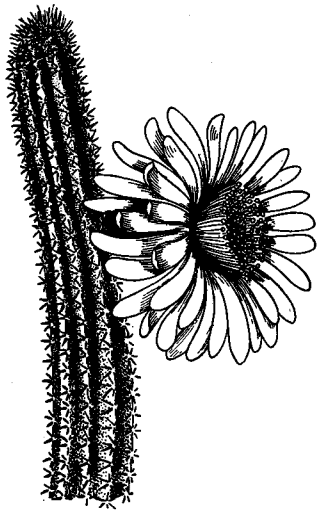
PIN-CUSHION CACTUS



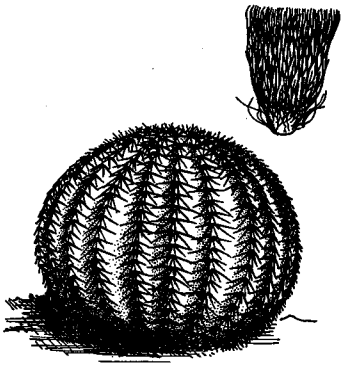
LEMON VINE CACTUS



ORGAN-PIPE CACTUS



HEDGE CACTUS



GOLDEN CACTUS

when we saw our first cactuses growing on some rocks near Washington, D. C. They were neither so big as we had expected, nor were they so terrifying.

These preliminary introductions to cactuses whetted an appetite for more experiences, and when the time came for our first trip through a western desert it is difficult to say whether the cactuses, the road runners or other bizarre organisms of the region held the greatest interest. Later, plenty of opportunities came to wander around among the cactuses at various times of the year, and of the day.

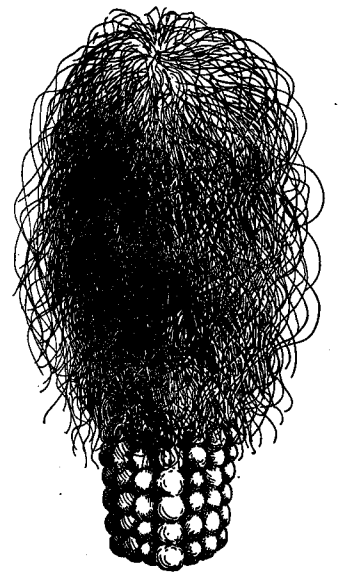
A cactus is, of course, a flowering plant, like corn and apples and roses. A few of them have leaves such as one would expect to find on any self-respecting flowering plant. But it is their stems, and the spines that are borne on those stems, that provide a major interest. Yet a few of the plants do not have spines, and some of these can be grown on land that would not support the plants we ordinarily feed to cattle that provide food for us. And the prickly pear, in some of its forms, may be sufficiently free of spines to be eaten safely by cattle, and may mean economic success or failure to many land owners.

Not a few of the cactuses have fruits that are eaten by man, and some of these are considered in the chart section of this insert. Usually, these fruits must be peeled or otherwise treated to remove objectionable material, and some people do not think that even they are worth the effort. Nevertheless, such cactus fruits do provide a welcome change in diet to many Mexicans, and others whose diet is decidedly limited as to variety, if not in quality. New growths of some of the opuntias may be eaten raw as a salad. Usually, these are peeled, diced, boiled to remove a mucilaginous substance in them and then fried in deep fat. The "nopals" of some of the cook books are made in this way from cactuses. Fruits of prickly pears are more commonly known as tunas. These are processed variously to produce a variety of edible dishes. Such Mexican dishes as *fuesco, miel* and *mecocha* are processed from prickly pears. Cactus candy is made largely from a sugar extracted from such barrel-like cactuses as the species of *Ferocactus*. The candy is not sufficiently intriguing, however, to warrant the destruction of the much more satisfying plants from which it is extracted.

As for getting drinks from cactuses, we find many storybook myths about cactus interiors filled with clear, sparkling water. Apparently, nothing is farther from the truth. A wet mush may be taken from the interior of some of the barrel cactuses, but it would be satisfying ordinarily only to one driven to drink by an all-consuming thirst.

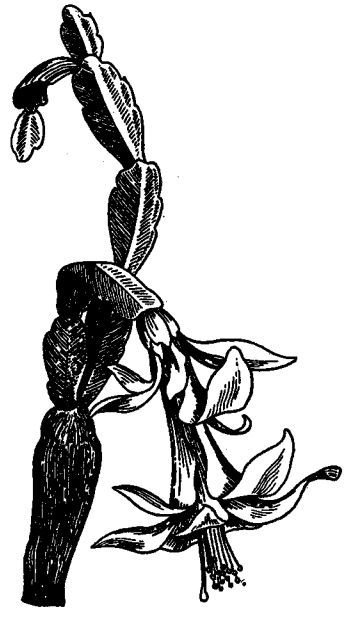
The little cactus known as Indian whiskey cactus packs such a punch that its use in the making of drinks has had to be outlawed. The narcotic effect of the drink taken from this plant causes an almost complete loss of any sense of time, provides the users with remarkable imagination and has a "hang-over" period characterized by prolonged wakefulness. The Mexican drink *pulque* (pronounced "poolka") does not come from a cactus but from agave, a group of plants that yields us a fiber of considerable value. (See insert 26 on fibers.)

Some medicines are taken from such cactuses as *Seleni-*



OLD-MAN CACTUS

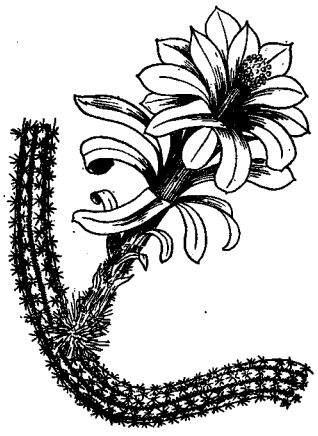
ORCHID CACTUS



CHRISTMAS CACTUS

PRICKLY PEAR CACTUS

NIGHT-BLOOMING CEREUS



RAT-TAIL CACTUS

cereus grandiflorus, and these are reputed to have a tonic effect on the heart. The first view of one of these plants in full bloom would have a similar effect.

Some of the cactuses produce considerable quantities of seeds, and, where these are abundant, Indians have been known to grind them to form a meal with which they can prepare cakes and other foods. Plenty of cactuses yield products that have been seized upon by culinary cranks to prepare different salads, jams, conserves, pickles and such. One cactus lover remarks that serving up your choice cactus as a salad would be like carving up a household pet as a roast.

The wood of some cactuses is used in making desert novelties, and, where it is sufficiently abundant, it may provide a basis for fire-building material. It is usually easily identified by its lightness and by the regular holes generally to be found in it.

Other practical uses for cactuses include their employment as fencing material. Any plant well armed with spines, as is an average cactus, is likely to discourage any experienced marauder. Aside from the practical effectiveness of a fence of cactuses, they have artistic importance. I can hardly think of the island of Jamaica without recalling fence after fence made of the organ-pipe cactus.

One of the most practical uses ever made of cactuses involved the cochineal industry. Cochineal dye was made from a microscopic insect that lived on a species of *Nopalea.* It provided a startling dye that had the advantage of not being too permanent, and, because of this, demanded replacements that helped make a sustained market. Along came the discovery of analine dyes and a superior product was produced at a much lower figure, and the cochineal industry went on the rocks.

There is every reason to believe, however, that there are more people today interested in cactuses as a hobby than were ever concerned with their economic importance. Of course, there is a commercial value in supplying the needs of hobbyists, but we will not go into that. Suffice it to say that the cactuses provide a splendid field of activity for Nature fans because of their great variety in shape, flowering habits, coloring and so on.

Variety breeds a nomenclature that may be based on shape, color or other characters. We have such cactuses as the barrel, hedgehog, leaf, organ-pipe, old-man, snake, rail-tail, pin-cushion and others. Night-blooming cereus refers, of course, to the flowering habit, and since there are many night-flowering cactuses like *Cereus,* we get into difficulties in describing accurately the plants to which we refer. Hobbyists will find that there is merit in using a scientific name in preference to a common name because the scientific name is usually more stable.

The giant saguaro, so adequately protected now in a National Monument near Phoenix, Arizona, was for years known to scientists as a species of *Cereus.* Then, in 1862, it was placed in the genus *Philocereus.* In 1908, Britton and Rose had the happy idea of giving a generic name to the most outstanding of this group of cactuses and they called it *Carnegiea.* It is interesting to note that twelve years after this the Carnegie Institution of Washington published the four-volume work by Britton and Rose on the Cactaceae. This series of books, now worth about $150, is undoubtedly the most important work on this important family of plants, and one wonders how much effect the naming of a genus after Mr. Carnegie had on getting the support of his institution for this expensive publication. The writer is not enough of a systematic botanist to pass judgment on what happened in this group, though he took his doctorate in systematic botany. Suspicions as to the validity of the judgment, if not of the motive back of the naming of this genus, are strengthened when one reads in Britton and Rose's description of what they call a "monotypic genus" the statement that there are "a number of Mexican and South American species which are taller——." How there could be a number of other species in a monotypic genus is hard to understand.

Possibly, the above discussion may be discouraging to those who might like to explore the scientific names of the cactuses they buy at the five-and-dime. It is doubtful if too much confusion will be found, however. There is no group of organisms that has been studied thoroughly that has not yielded new species and new genera, if we are gen-

(Continued on the last page of this insert)

COMMON NAME SCIENTIFIC NAME	LEMON VINE LEAF CACTUS *Pereskia pereskia*	COCHINEAL CACTUS *Nopalea cochinellifera*	INDIAN FIG PRICKLY PEAR *Opuntia ficus-indica*	HEDGE CACTUS *Cereus peruvianus*
DESCRIPTION	Shrub that becomes a vine, with climbing, woody stems. Stems: to 30 feet long and branching. Related *P. grandifolia*: a shrub or tree, but not a vine. Spines on lower part of stem: 1, 2 or 3 in a group, slender and straight; axillary spines, usually in 2s and recurved. Leaves: to 3 inches long, short petioled.	Height: to 12 feet. Trunk diameter: to 8 inches. Branches: spreading or ascending, with oblong joints, spineless, or the older ones with minute spines; bright green, particularly when young. Leaves: small, awl-shaped and falling off early. Spine-clusters: bear many, small spines and an occasional larger one.	Tree or bush. Height: to 15 feet or even more. Stem: jointed, with units to 15 inches long, oblong or elliptic, thickened, usually spineless, and with a bluish bloom over the otherwise smooth surface. Main trunk: woody, rather cylindrical. Leaves drop off early and are very short.	Tree-like or somewhat sprawling, to a height of 50 feet. Branches: green, to 8 inches in diameter, sometimes smooth, with to 9 longitudinal ribs bearing clusters of 5 to 10, sharp, brown to black spines each to 1¼ inches long. Night-blooming cereus (*Hylocereus*) is a climber, with 3, thin ribs, and spine clusters of to 3 small spines.
RANGE AND HABITAT	Widely established in tropical America. Normal range: through West Indies, on east and north coasts of South America, and also grown in Florida and Mexico. Plants in Washington and New York greenhouses bloom rather regularly. Not grown more commonly as an ornamental largely because of its offensive odor.	Original home territory not known, but is found widely scattered in tropical and semi-tropical countries where it was cultivated. Spaniards found it under cultivation by Mexicans in 1518, and transplanted stock to Spain, from whence it spread to India, Africa, the Canary Islands and elsewhere.	Native of Mexico (?) but widely grown in warmer parts of world. Sometimes maintained under cultivation and sometimes escaped and established as somewhat troublesome weed. Over 250 species of *Opuntia,* all native of America; about 90 in western United States. *O. vulgaris* ranges Massachusetts to Florida, and west to Kentucky.	Native of southeastern South America, but widely planted and adjusted to existence in tropical America and other tropical parts of the world, and grown in greenhouses in temperate regions. There are over a hundred species of *Cereus,* all native of South America, though some are now considered as belonging to different genera.
REPRODUCTION	Flowers: white, showy, fragrant, sometimes pale yellow or pinkish, to 1½ inch across, in small clusters. Stamens: numerous. Lower part of the pistil: with scale, leaves or spines on it. Fruit: light yellow like a lemon, to ¾ inch in diameter; when mature, smooth and juicy. Seeds: black and somewhat flattened.	Flowers: usually abundant, appearing from the tops of the joints, about 2½ inches long, with scarlet petals and sepals, the petals being somewhat longer. Stamens: pinkish, many and extending about ½ inch beyond the petals and sepals. Fruit: red, about 2 inches long, rarely maturing under ordinary cultivation, as in greenhouses.	Flowers: yellow, to 4 inches across, with showy corolla and calyx blending apparently one into the other, with little differences between sepals and petals. Stamens: much shorter than petals. Fruit: over 3 inches long, red, edible, somewhat top-shaped, bristly, reddish-fleshed.	Flowers: about 6 inches long, white, with a thick tube, particularly abundant on lower part of stem, superficially like a waterlily except that they open at night instead of in bright sunlight. Fruit: globular, slightly fuzzy, about 1½ inch in diameter, with black, rough seeds; inside, fleshy and orange-yellow.
CULTURE	Species has been in cultivation in Kew Gardens, England, since 1760; and in others since earlier. In Argentine it is called Sacharosa, but this is not a correct use of this common name. Also known as Barbados gooseberry and West Indian gooseberry. Flowers: fragrant but odor of vegetation is most offensive to some.	Plants are set in rows about 4 feet apart. Cochineal insects, *Dactylopius coccus,* are placed on the joints or branches, where they multiply, and in about 4 months are collected by brushing off into bags. Two to three collections may be made in a year. Cochineal is a scarlet, brilliant dye, now mostly supplanted by analine dyes.	Forms free from prickles are grown as stock food and introduced from the Mediterranean area. Joints are broken and planted in well-drained, light soil 8 feet apart in furrows 12 feet apart. These begin bearing in 3 years and bear regularly thereafter. *O. vulgaris* commonest species in Northeast.	When grown in house or in greenhouse, care should be taken to provide suitable soil conditions and to place plant where temperature conditions are appropriate. These call for good drainage, an average temperature of around 70°F., and a soil that is not too rich, such as can be attained by mixing sand and garden soil.
USE	Cultivated in some parts of the world for fruits that have market value and grown as hedge plant and as cover for walls and for some kinds of buildings. Related *P. grandifolia:* common in greenhouse collections and can be distinguished by solitary, straight spines on young growth in place of the recurved pairs.	Microscopic cochineal insects killed by heat from stoves gives the natural silver-gray cochineal, while those killed by hot water provide what is called black cochineal. At one time, (1868) the Canary Islands produced and exported to England some 6,000,000 pounds of cochineal worth $4,000,000, annually. Insect origin discovered 1703.	Fine bristles that cover the fruit can be removed by rubbing with a leaf or cloth. Earlier varieties mature in June and the later in November. To prepare fruit for eating, remove thin slices from each end, slit the skin from end to end and unwrap the peel from the edible pulp inside.	The fruits of many members of genus are edible, but great use for plant is as a hedge and for its beautiful flowers, in spite of fact that these are only about one-half as wide as flowers of *Hylocereus*. Some species of genus are sprawling, vine-like climbers, while others are prostrate.

OLD-MAN CACTUS *Cephalocereus senilis*	ORGAN-PIPE CACTUS *Pachycereus marginatus*	SNAKE CEREUS *Nyctocereus serpentinus*	SAGUARO *Carnegiea gigantea*	NIGHT-BLOOMING CEREUS *Hylocereus undatus*
Erect columns, usually unbranched and rising to a height of over 5 feet, with trunk diameter to 1 foot. Branching, if present, is more likely at top, but may rarely be at base. Ribs: 20 to 30, of large wart-like units; with a head of long gray bristles, and with basal spines to a foot long.	Height: to 25 feet. Stems usually erect and unbranched. Ribs: 5 or 6, usually sharper in the younger plants, and much blunted with age. Spine clusters: closely crowded, their wool forming a dense cushion along the ridge of each rib. Spines: in a cluster, 5 to 8, with the center one conspicuous.	Stems: grow in clusters that are at first erect, but eventually clamber or hang, and reach a length of nearly 10 feet, with a diameter of not over 2 inches. Ribs: 10 to 13, low and rounded. Small areas on the surface: crowded, felted, with sharp or bristle-like spines that are to an inch long. Tips of spines: usually darker than remainder.	Height: to 40 feet. Composed of erect, cylindrical columns to 2 feet in diameter and unbranched, or up to 12 branches, the branches parallel to main trunk. With to 24 vertical ribs, each blunt and to over 1 inch high. Spines of two kinds, those above being yellow-brown; the lower ones, stouter and to 3 inches long.	Climbing. Stems adhere to walls, trees and similar supports by aerial roots, often to 40 feet long, green, with 3 ribs, thin and with a horny margin. Spines: short but effective, arranged in groups about 1½ inches apart and with 1 to 3 or 4 spines to a group. Whole plant may twist and wind around its support and branch freely.
Native of Mexico, where it is found wild in Hidalgo and Guanajuato, particularly on the limestone hills of eastern Hidalgo where it may be the most conspicuous plant on the landscape. At least 48 species known in the genus, but this is probably the best known and most widely distributed.	Native of Mexico and found wild in Hidalgo, Queretaro, and Guanajuato. Widely established in Mexico, Jamaica, Cuba and similar areas, where it is grown deliberately, or occurs as an escape from cultivation. There are at least 10 species of the genus recognized, all native of Mexico or of southern California.	Native of Mexico, probably from near the eastern coast. Not now known from the wild state but is widely cultivated and has escaped from cultivation in many areas. There are about 5 species of the genus supposedly native of Mexico and Central America of which this species is the one most widely cultivated.	Found in Arizona, southeastern California and in Sonora, Mexico. Known to science since 1848. There are some related Mexican species in other genera that are larger and would weigh more, of which *Lemaireocereus weberi* is considerably taller and stouter. J. O. Pattee was first Anglo-Saxon to see this plant. He saw it in 1825.	Native of Mexico but established in the tropics and sub-tropics generally as an ornamental and in greenhouses the world over as an interesting decorative plant. It is listed in literature as *H. tricostatus* and as *H. triangularis*. Other genera considered popularly as cereus are *Selinicereus, Aporocactus* and *Echinocereus*.
Flowers: numerous, to 4 inches long, red outside and rose within, with the tube bearing few scales. Fruit: egg-shaped, to 2 inches long, bearing at the top the base of the flower, which has a few scales and hairs still attached, violet. Seeds: black.	Flowers: funnel-shaped to under 2 inches long, including the supporting ovary. Tube and ovary: rough scaly, and often with bunches of wool and small spines at edge of scales. Fruit: globular, over an inch in diameter, covered with wool and spines that drop off at maturity, not particularly fleshy. Seeds: numerous, black and shining.	Flowers: borne at upper ends, sometimes literally terminal, white, to 7 inches long, to 3 inches wide, with tube and support exceptionally bristly, funnel-form. Pistil and stamens: of about same length. Fruit: red, covered with spines that drop off easily, to 1½ inches long. Seeds: black, rather large for such a small cactus fruit.	Flowers: to about 4 inches long and sometimes as broad as they are long, supported by a green-scaled, white-felted tube that is about 3/5 of an inch long and about an inch wide at the throat. Stamens: white (one flower had 3482). Pistil: white or cream-colored, to over 2 inches long. Fruit: red or purple, edible, ⅛ inch berry, with to 2000 seeds.	Flowers: about 1 foot long, with yellowish-green outer segments that turn backward and the numerous center ones erect. Abundant stamens: cream-colored. Whole flower looks like an enormous white waterlily superficially, and is fully as fragrant. Fruit: red, scaly, except when young, when it is smooth, edible, oblong, to 4½ inches through.
Young plants: covered with long, white silky hairs, giving the plant its name. Large plants rarely seen, though small plants are one of commoner popular cactuses for those who grow them as house plants. Little wood tissue, and largest may be cut down with a pen knife with ease.	Figures in lore of areas in which it grows, in part because it usually separates the terrain occupied by different families of natives. Properly cared for, it can provide an impenetrable hedge that is not unattractive, and, because of its spines, it is effective even though there are apparent openings at intervals.	Known as night-blooming cereus as are a number of other cactuses here considered. May be propagated by making cuttings from new growing areas. These plants can make an old rock pile attractive since they climb in and over the units and eventually burst into bloom at night. It is known in Mexico as junco or junco espinosa.	Fruits: eaten by Indians. There is a National Monument of 2000 acres of desert land 9 miles outside of Phoenix, Arizona on a rocky hillside where these plants will be forever protected. Largest individuals are considered to be to 200 years old. Plants 4 inches high, 10 years old; 3 feet, 30 years; then add 4 inches a year.	Flowers: appear at night remaining open until dawn. May be picked and kept open in an icebox for some time. It flowers in homes and greenhouses as far north as New York. Of the 16 species of the genus, the one here listed is undoubtedly the most popular as an ornamental or as a wall cover.
Great quantities of the small plants have been shipped to Europe and to other parts of the world for sale to cactus hobbyists. Old plants have weak, gray bristles at base that are a foot long, but such plants are not often seen except in the native areas.	Around estates and the lands of the poor, this plant takes the place of the old stump fence or stone wall in rural northeastern United States or of the wire fence area of today. It has a type of beauty not possessed by any of these devices. In its native area, it is sometimes called "organo" in reference, of course, to the organ-pipe like stems.	The scientific name, of course, means night cereus and because of this might claim for the genus priority on the night-blooming cereus common name. However, its common name of snake cereus is even more appropriate and it will probably be the name by which it is known by most people.	Primitive peoples used heavy rods from stems for building construction; fruit and seeds, for food and drink. In wet seasons, plant may be 98% water most of which is lost in May and June. Woodpeckers burrow into the trunks and pygmy owls nest in abandoned woodpecker holes. Wounds in rainy seasons may become badly infected with bacteria.	Until one has the opportunity to observe a hedge of this in full bloom he has not been able to get one of the real thrills that comes to a Nature lover in the tropics. Commercial reproduction is largely by cuttings and rooting the slips in sand.

COMMON NAME SCIENTIFIC NAME	NIGHT-BLOOMING CEREUS *Selenicereus pteranthus*	RAT-TAIL CACTUS *Aporocactus flagelliformis*	HEDGEHOG CACTUS *Echinocereus polyacanthus*	MESCAL BUTTONS INDIAN WHISKEY *Lophophora williamsii*
DESCRIPTION	Trailing or climbing plants, but relatively stout, with stems to 1½ inches or more in diameter. Stems: blue green to purple, conspicuously 4- to 6-angled, with the ribs on the younger branches to 1/6 inch high. Spines in clusters: 1 to 4, short, dark, rarely over 1/8 inch long but effective at that.	Slender, vine-like creeper that twists and turns over its supporting tree or wall, or sometimes hangs suspended from such a support. Stems: weak and rarely over ¾-inch in diameter, with 10 to 12, low, inconspicuous, somewhat warty ridges and well supplied with clusters of many brown spines. Has aerial roots.	Height: a few inches, 5-inch plants bearing flowers. Stems: cylindrical, but narrower towards top, making whole thing somewhat like a typical plump cucumber. Stems: often grouped to make a mass. Ribs: 9 to 13. Radial spines: stout, 8 to 12, lower one longest, being to about 1 inch long; upper, ½ inch, white to red and dark tipped.	Globular. To 3 inches in diameter arising from a coarse taproot extending to a depth of 4 inches or more. Ribs: 6 to 13, nearly vertical, or irregular and indistinct and composed of a series of tubercles each of which is crowned with a delicate bunch of spines; dull, bluish green.
RANGE AND HABITAT	Native of Mexico, but known mostly from conservatories, where it has long been a most popular species. Probably commonest of conservatory-grown night-blooming cereus plants. There are 16 species in the genus ranging from southern Texas to South America, one extending down to the Argentine.	Native of Mexico, Central and South America. It was reported to have been found growing wild on trees on the coast of Jamaica, but has not been known wild from that island in recent times. It is best known in temperate regions from greenhouses and sometimes as a house plant. Five species of the genus.	Found native from Chihuahua and Durango in Mexico to western New Mexico and southeastern Arizona. Described in 1848 by Engelmann, but confused in its classification for some years. Now found rather commonly in cactus collections together with the purple-flowered *E. pectinatus,* the true hedgehog cactus, *E. engelmanni;* rainbow cactus, *E. regidissimus.*	Found from central Mexico through southern Texas. Looks so much like mushroom that it has been considered to be one by some, and bears common name of sacred mushroom, as well as a host of other names. There seems to be but one species in spite of fact that some writers consider there are two.
REPRODUCTION	Flowers: to a foot long, 15 inches across, white, very fragrant, the tube and throat about half length of flower and swollen in upper part. Lower cluster of stamens: attached to petals tube for about 3 inches. Fruit: red, globular, about 2½ inches in diameter, covered with long white, silky hairs or bristles.	Flowers: to 3 inches long, pink to crimson, with the outer segments more or less bent backwards, and the inner spreading only slightly, and with all of these parts relatively narrow. Stamens: in somewhat of a tube that is terminated by the yellow anthers. Fruit: to ½-inch through, red, bristly, globular, with yellow pulp.	Flowers: scarlet to salmon, 2½ inches long, lateral but held erect, with a funnel-form base and wide-spread showy parts. Flower-tube: yellow and the spines on the flower base well intermixed with a cobweb-like wool. Fruit: spherical, about 1 inch long, spiny, greenish-red, uncommon. Some authors claim fruit is unknown.	Flowers: found at the top of plant, white, to 1 inch across when fully opened, surrounded by a mass of relatively long hairs, the outer flower parts being greenish on the back and somewhat swollen at the tips. Stamens and the pistil much shorter than the surrounding parts. Fruit: under an inch long, naked, pink. Seeds black.
CULTURE	Flowers open in night and produce remarkable effect because of their beauty and fragrance. Some species are reported to have medicinal value, but beauty and fragrance of flowers should have a therapeutic effect on most confirmed of pessimists. Not surprising that flowering time is announced in the papers.	Flowers: remain open or go through opening process for 3 to 4 days. In Mexico, the dried flowers are sold as a household remedy under the name of "flor de cuerno," and this is sometimes found in drug markets under the same name. It is a common window plant in Mexico.	Fruits of some of members of genus are edible, the spines that cover them being easily removed when fruits have become mature and skin being unusually thin. Seeds: black and bear small tubercles in most of members of genus. Some 60 species known in genus of which nearly one-half are grown as ornamentals.	Yields the narcotic anhalonin, although the narcotic effect may be caused by resins. Drug causes persons using it, in drinks or otherwise, to lose all sense of time, as does hasheesh from *Cannabis indica.* Drug users also have remarkable visions. Its use dates to pre-Columbian times and is forbidden by law.
USE	A plant that can be grown in a 10-inch pot and produce flowers that may be 15 inches across across is bound to hold interest of almost anyone. Related *S. grandiflorus* yields a heart tonic extracted from the green branches and originally discovered in Naples in 1889. The medicinal agent is probably an alkaloid.	Apparently, was introduced into Mexico from Peru about 1690, but it is not known in a wild state anywhere at present time. Mexicans frequently plant it in the open end of a cow's horn and suspend this on the outside of the house where the plant does well. Flowers from mid-December to mid-January. Easily grown.	Some members of the genus have sprawling stems. In this species, the small scarlet flowers separate it from many of other common species whose flowers are crimson or purple but not scarlet. In *E. pectinatus,* there are several central spines in spine group; while in *E. rigidissimus,* there are none.	Indians used the plant in "breaking fevers" and in religious rites. Plants are cut and dried to make "mescal buttons." Indian names include xicori, pellote, peyote, peyotl, hiculi, camaba, seni, huatari. A "spree" with the drink is followed by a long period of wakefulness.

MULE CACTUS *Ferocactus wizlizeni*	GOLDEN CACTUS *Echinocactus grusonii*	ORCHID CACTUS *Epiphyllum ackermannii*	CHRISTMAS CACTUS *Zygocactus truncatus*	PIN-CUSHION CACTUS *Mammilaria (Dolichothele) longimamma*
Height: to over 6 feet. At first, almost spherical but when mature forms a cylinder. Usually unbranched but if injured may bear several heads or branches. Ribs: to 25 or more, about an inch high. Spine groups: with one, central, strongly-hooked spine surrounded by many smaller ones and by brown, felty areas.	Large balls. Sometimes, to nearly a yard in diameter, unbranched. Ribs: from 21 to 37, thin and high. Spines varying in color from golden-yellow when young, to pale or even white, and, finally, to dirty brown; with the radial spines, to over an inch long and the usually 4 central spines up to 2 inches long. Plants usually growing singly.	Stems: many, to over 3 feet long, somewhat recurved, with branches that are, for most part, under 1 foot long, unarmed, with middle and side ribs. With short bristles on the younger and the lower portions. The flat, 2-edged branches have margins that are waved or shallow-toothed, as in some leaves of other plants.	Plant hangs in large bunches from trees and similar supports. Stem: flat, with joints 1 to 2 inches long and ¾ to 1 inch wide, thick, green, soft, blunt at tip of each joint; with upper part of each joint more or less curved inward like a blunt horn. Whole stem: relatively weak, and somewhat succulent.	Form: rather large clumps of tubercle-like structures, each to about 2 inches long and terminated by a circle of about 6 to 12 spines, each about 1 inch long, with whitish hairs when young but naked with age. Spines: arranged like the spokes of a wheel and sharp, white or pale yellow. Whole plant takes a general dome shape.
Found growing wild from El Paso, Texas, through southern New Mexico and Chihuahua to Arizona and Sonora, and possibly on to Lower California. Reported, probably erroneously, as from Utah. There are some 30 species of the genus, all globular or cylindrical, and all with well-developed, straight or hook spines.	Native of Mexico and is found wild from San Luis Potosi to Hidalgo. It is a popular plant in collections maintained by hobbyists and by greenhouse operators. The genus, has at least 9 species of which this is probably the best known. The other species lack the bright yellow spines that give the group its common name and its popularity.	This is not known in wild state, though most of other members of genus come from Mexico, Central America, and northern South America. By some writers, this is considered a hybrid and not a natural species. It was originally described from material sent by Ackerman from Mexico. It may represent *Epiphyllum* and *Heliocereus.*	Native of Brazil. Many of the cultivated forms found in houses and greenhouses are hybrids of different species of the genus, or hybrids of these with forms of *Cereus* or of *Epiphyllum,* the last of which is normally found growing on trees as does the typical Christmas cactus.	Native of central Mexico. Cultivated to some extent for unique ornamental qualities. At least 150 species known, of which nearly 1/3 are considered of importance as ornamentals by hobbyists.
Flowers: to 2½ inch long, yellow, supported by green-scaled, tubular base. Some flowers may be reddish or orange, borne only on younger growth just above spine clusters. Stamens: very numerous, borne in throat of flower and much shorter than the showy parts of the flower. Fruit: to 1½ inch long, yellow, oblong. Seeds: dull black.	Flowers: red and yellow, borne at the top and center, to 2½ inches long, and opening fully only in bright sunlight. Stamens: yellow, numerous, forming a cylinder. Pistil: yellow, divided at the top into 12 lobes. Fruit: spherical, bearing pointed scales, with an abundance of wool in their axils, to ¾ inch long. Seeds: blackish, smooth and shining.	Flowers: to 6 inches across, blooming in the daytime, flaming red or scarlet outside and carmen within, with a greenish-yellow throat and very short tube. Tip of pistil: pink. Flowers closely resemble those of *Heliocereus,* a genus not here considered. Lower part of pistil is more or less bristly.	Flowers: solitary growing from the ends of young joints, showy, magenta red, 2½ to 3 inches long, with calyx and corolla alike and composed of many curled-back segments. Stamens: many, with long, pink filaments. Fruit: pear-shaped, red, to nearly ½ inch in diameter.	Flowers: lemon-yellow, with many pointed, petal-like parts surrounding shorter stamens and pistils that are crowded to center. Whole flower: to over 2 inches across, and borne in the woolly axils between the tubercles. Fruit: nearly smooth and berry like.
Grown as an ornamental to some extent. Related *F. glaucescens* is smaller and has no curved spines. Usually, the pictures showing a Mexican drinking water from a "barrel cactus" represents a plant of this genus. It is doubtful if the plants can be considered a source of water except in case of dire need, and then the amount will not be abundant.	Woolly crown; woolly, thin-skinned fruit and smooth seeds are characteristic of the genus; the golden spines, of the species. It is one of the most popular plants for collectors, but large specimens are not commonly seen. The plants may bloom at 6-month intervals through the year, beginning about mid-May. Flowers will open in 3 days under good condition.	Culture of plant is usually by cuttings and rooting of the sections in suitable earth. Some prefer to cover the young shoots with glass until they get a start, and bottles with the base broken off may serve this purpose well.	Flowering time: late winter. Commonly reproduced by stem cuttings. Ideal soil: about 2/3 garden soil and 1/3 sand, with good drainage. Should be placed in a sunny window where it will not be disturbed, provided with water sparingly except at blooming time, and kept at temperature between 60° and 70°F. to be at best.	These bright green spiny cushions are relatively common in greenhouses. In the southern part of the United States, may be grown outdoors where soil conditions are suitable. Some species of the genus may be found in flower from March through November.
While the interior may consist of a moist pulp, it is not filled with clear, cool water, as some writers or publicity agents would have us believe. The plants have a unique beauty that should justify their continued protection. Small plants are grown indoors by hobbyists quite commonly. *F. ancanthodes* is the barrel cactus, and *F. johnsonii,* the devil's big toe.	New plants are obtained from seeds, or a large plant is cut off at top, stimulating development of buds that are removed and started as new plants. Flowers: sunken rather deeply in stem and surrounded by felt cushion so that to be collected they must be actually dug out of surrounding tissue.	One of at least a half-dozen of genus that have long been popular as house plants and in warmer parts of the country as outdoor ornamentals. Name, of course, means "on leaf" and no doubt refers to the fact that the flowers appear on what seems to be the leaf, though it is really the stem.	After the house plant has bloomed, water should be withheld for some time. Plant should be kept in same pot for years without changing; usually, the pot has much broken "crockery" in it. Plant responds to treatment and unless used sensibly may be disappointing instead of an outstanding delight.	Species commonly grown for flowers include *M. dlbicans, M. bocasana, M. camptotricha, M. elegans, M. elongata, M. hahniana, M. hemisphaerica, M. microhelia, M. parkinsonii, M. parbella, M. rhodantha* and *M. trichacantha. M. macdougalii* known as pin-cushion cactus, *M. fragillis* as thimble cactus, *M. dioica* as candy cactus, and *M. plumosa* as featherbed.

erous enough in our definition of what these groups may be. There will always be systematists who wish to get their names in print after a name, or who have other motives for describing a new genus or species. Some of these are simply too lazy to look up the literature, or to examine collections to be sure that what they think is new has not already been described by someone else and cannot therefore be named again. This is all a part of the game of taxonomy in the field of biological science. There are those who think that it is the most important of all sciences, and they have arguments to prove it.

The Cactaceae include more than a thousand species of plants of the order Opuntiales, so there is plenty of room for a number of specialists to work on the group. It is suggested that amateurs begin to get a general picture of the more important groups, and then to explore whatever group offers the greatest appeal or the greatest opportunity for study.

There is a rich literature on the group, but amateurs will find *Cacti for the Amateur* by Scott E. Haselton, published by Abbey Gardens Press, Pasadena, California, in 1940, a most welcome introduction. In this book there are abundant suggestions for caring for the plants, transplanting them, doctoring them and studying them. It should be in every cactus fan's library. *The Cactus and Succulent Journal,* also published in Pasadena, should serve to keep hobbyists up on the latest developments. If one has the money or the opportunity to have access to Britton and Rose's *The Cactaceae,* published by the Carnegie Institution of Washington, D. C., he will have the most exhaustive study that has been made on this group. Unfortunately, its keys are based largely on the flowers or fruits, which are usually conspicuous by their absence. Here is a chance for someone to come to the aid of all good cactus fans and bring out with a monumental work on cactuses with emphasis on their vegetative characters. We might suggest, as an initial step, the naming of some conspicuous or useful cactus after Guggenheim.

Inserts to Date

THIS, the forty-second in this series of special educational inserts, rounds out this representative and useful group of Nature features. The series will, of course, continue, but a listing of the inserts that have gone before is in order for the benefit of readers and users. With the exception of inserts Numbers 30, 32 and 40, which have been entirely sold out, individual copies of these features are available. Single copies sell for twenty cents each; ten or more copies for fifteen cents each; fifty or more copies for ten cents each, and one hundred or more copies for five cents each. They may be ordered by number from Educational Department, American Nature Association, 1214 16th Street, N.W., Washington 6, D. C.

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3. The Sky at Night (Star guide)
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5. Some Common Food and Game Fishes
6. Some Common Rocks and Minerals
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26. The Tie that Binds (The story of fibers)
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28. Your "Yarb" Garden (Herbs)
29. A Universal Star Chart
30. Some Common Amphibians (Out of print)
31. Cereals and Kindred Grasses
32. Some Eastern Birds in Winter (Out of print)
33. Some Eastern Ornamental Trees
34. Pacific Coast Shells
35. Some Common Mushrooms
36. Household Enemies on the Home Front (Insect pests)
37. He Who Runs May Read (Animal tracks)
38. Seaweeds
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40. Shore Birds (Out of print)
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42. Cactuses