











“SAGUARO BLOSSOMS”

R. C. Proctor  
Arizona State Flower

“DESERT PANORAMA”

Hobart Pribbenow

## Saguaro: MAJESTY OF THE DESERT

By  
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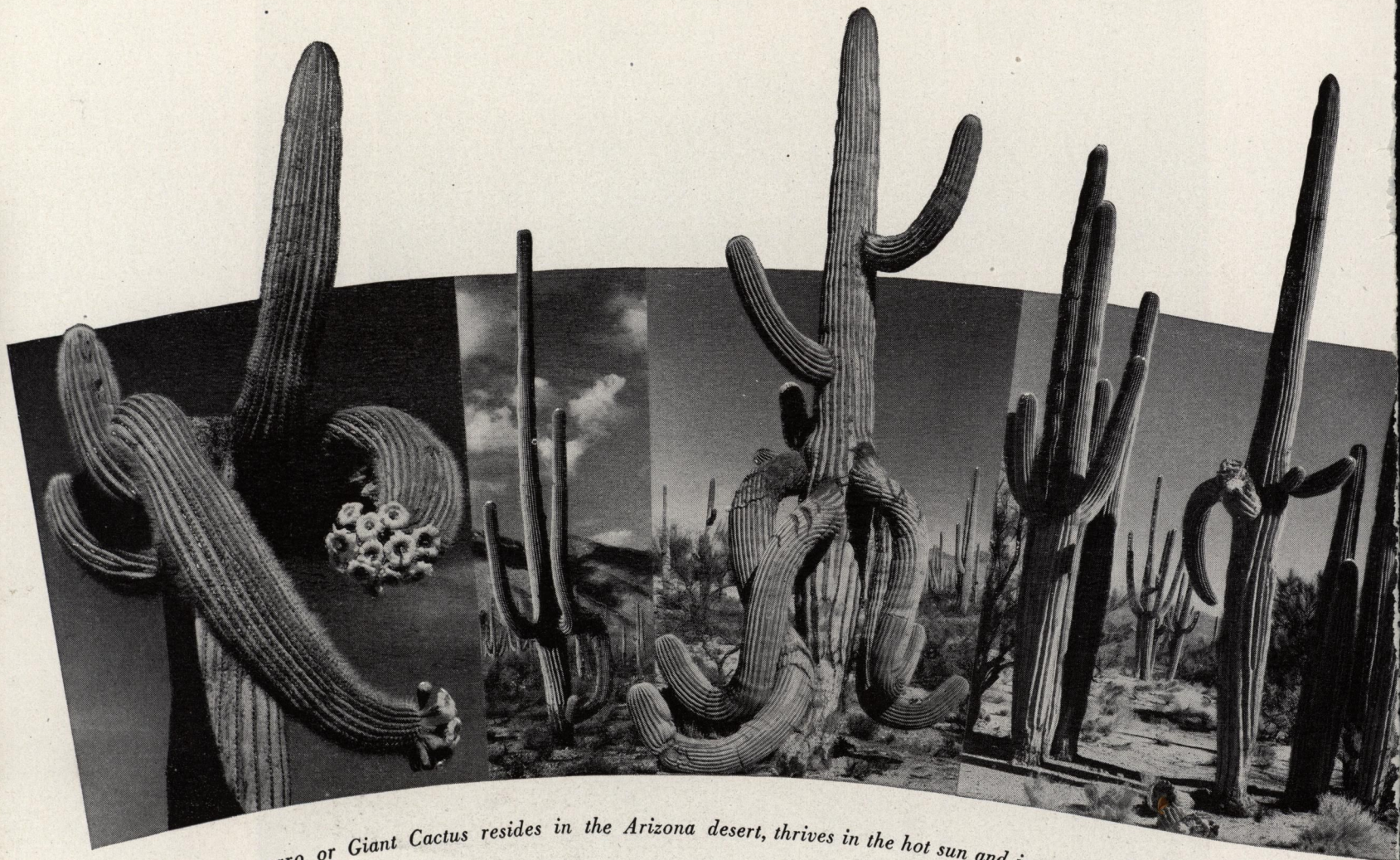
The Arizona desert is a land of far horizons, distant blue-veiled mountain ranges, blazing sunlight on wind-swept dry expanses, deeply tinted rocks and a vegetation fantastic and grotesque, suggesting an elemental and yet unconquered world. For life of the desert regions—whether plant or animal—is distinctive. It differs both in appearance and habits from life in more moist environments, these changes having taken place so slowly that it is difficult to measure in time of human history.

The Giant Saguaro (*Cereus giganteus* or *Carnegiea gigantea*) towering thirty to forty feet above the lesser members of the cactus clan, dominates the landscape of southern Arizona. Forests of these massive tree cacti cover the desert floor and hillsides between elevations of 2,000 and 3,000 feet, following

the principal rivers of central Arizona. One such forest, comprising 63,284 acres near Tucson, has been set aside by the Government as the Saguaro National Monument, to preserve these giant cacti, the bloom of which is the State Flower. Traveling through this forest of giants is a never-to-be-forgotten experience, and the impression gained is one of being in a gigantic botanical garden, where efforts have been made to display the plants in all their diversified forms, yet in a harmonious manner. A few plants are scattered over the border on the California side of the Colorado River and extend in diminishing abundance far down into Sonora, Mexico, where it is known locally as *Pitahaya Dulce*, or sweet pitahaya.

In spite of its gigantic proportion, the saguaro possesses a





*The Saguaro or Giant Cactus resides in the Arizona desert, thrives in the hot sun and is equipped to endure long droughts.*

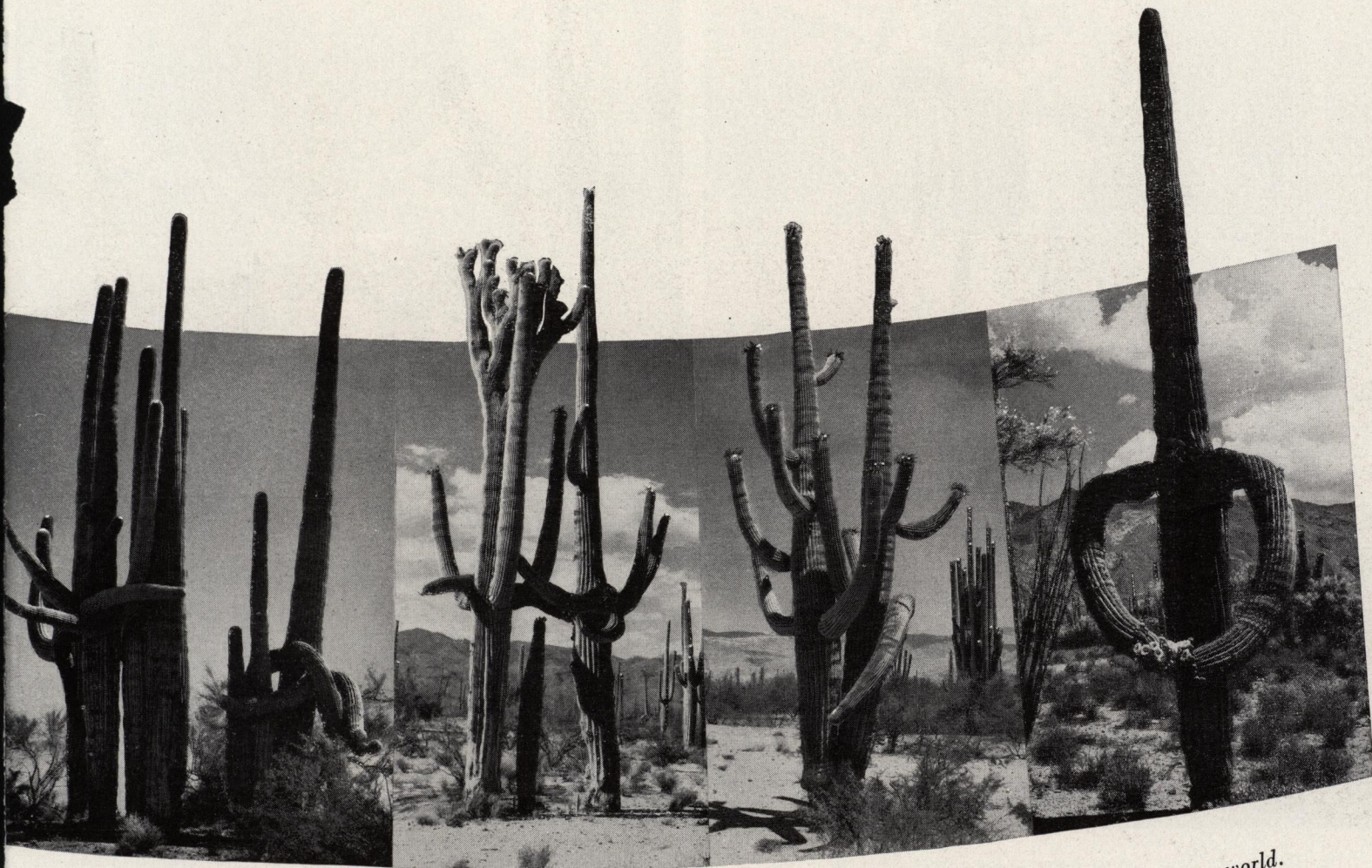
shapeliness and beauty unexpected in a plant wholly devoid of foliage. Nature has constructed for the plant a strong cylindrical core of rods, like a network of fishing poles extending the full height of the plant and joined together with succulent tissue on the inside as well as outside of the core. These dozen or more rods from one to two inches in diameter support the tremendous weight of the plant throughout life. The entire plant is covered by long parallel ridges converging at the apex, and armed with long straight rows of dull black spines with protective felt at their base, giving a finishing touch of uniformity to its massive columns. It is the simplicity of its form and well rounded stems that gives the saguaro its distinctive appearance. The trunk grows singly for ten or more feet before branching. The "arms" leave the trunk curving abruptly erect to assume a nearly vertical position—no matter how many arms a saguaro has, there is always an artistic and mechanical balance about the whole. The ridges or fluting expand as the plant's root system absorbs water following a rain and contracts as the stored moisture is being used up. The body of the plant is enclosed in a thick pale green cuticle with a waxy covering to prevent evaporation of moisture, except at the numerous small, rounded areas of growth called areoles from which the spines and later the flowers grow. As an additional protection against loss of moisture the spine bases are covered by grayish felt.

The spines, entirely of cellular tissue, develop from the base and for a century or more remain unaltered, sharp and hard. On some of the old plants the lower half of the trunk is almost spineless, and the pale green skin covered with grayish brown

scar tissue, evidence of its battles with angry elements and animal enemies alike. Spines of two kinds are produced by the saguaro. For the first sixty or seventy years the juvenile plants bear heavy reddish brown spines that soon turn dull gray or almost black. On reaching maturity or flowering age, there is a change in the character of the spines, the new growth produces spines that are needle like, yellowish brown in color and densely white felted at the base. Just above these spines flowers and fruits are borne annually. Often a few flowers will appear on the south side of the young plants, when they are in the transition stage, and the spines at the growing area at the apex will represent a mixture of both types. The spines are understood to represent branches in their historical origin, in spite of their structure being different from that of the stem of the plant, and their development was a direct physiological effect of the dry atmosphere and scant water supply on the desert. Cacti given a more humid environment and a regular supply of water have a tendency to grow shorter spines or become spineless. On windy days, of which there are many on the desert, the spines of the saguaro emit a whistling murmur like the sound of distant surf, and the plant sways slowly and stiffly in the wind.

A man walking on the Arizona desert during the summer months requires from sixteen to twenty pints of water every twenty-four hours, but the saguaro is so constructed that extreme heat and low temperature does not affect it unfavorably at any time. The protoplast of its cells has a mucilaginous consistency which undergoes little or no change when subjected to intense heat. Growth will cease at 146° but no damage to the plant will





*These grim, old desert-dwellers, often with twisted arms, appear on the landscape like relics from some long-forgotten world.*

result; neither will  $20^{\circ}$  below freezing injure it. To live and reproduce the saguaro demands the hottest, driest soil that the southwestern desert affords.

The numerous round holes up and down the stem and branches are the nesting places of the Saguaro Woodpeckers. The plant lines the excavation with scar tissue, providing a cool nesting place far above the danger from visiting rodents and snakes. After using the cave for one season the woodpecker builds a new nest and the tiny "elf" owl, no larger than a sparrow, takes possession and enjoys the cool comfort of his new home without any effort and rent-free. When the plant dies these scar tissue casts, resembling wooden shoes, are often found among the skeleton poles and are used by the Indians as containers for dried cactus fruit, seeds and even saguaro fruit jam, since they are strong and watertight.

The amazing root system of the saguaro can absorb enough water after a warm rain to swell its stem as much as an inch, and after the rainy season, when there is one, the long flutings on the plants are expanded several inches giving it a fat and sassy look. Rainfall on the desert results in wetting the soil only an inch or two, so the root system developed by a large plant will spread from thirty to forty feet horizontally in all directions from the base, and penetrate the rocky soil from twelve to eighteen inches, absorbing every particle of water held in the shallow layer of soil. It is hard to believe that such shallow roots can support a base of less than two square feet, projecting thirty to forty feet above ground, and containing five to six tons of water, without yielding more than a few

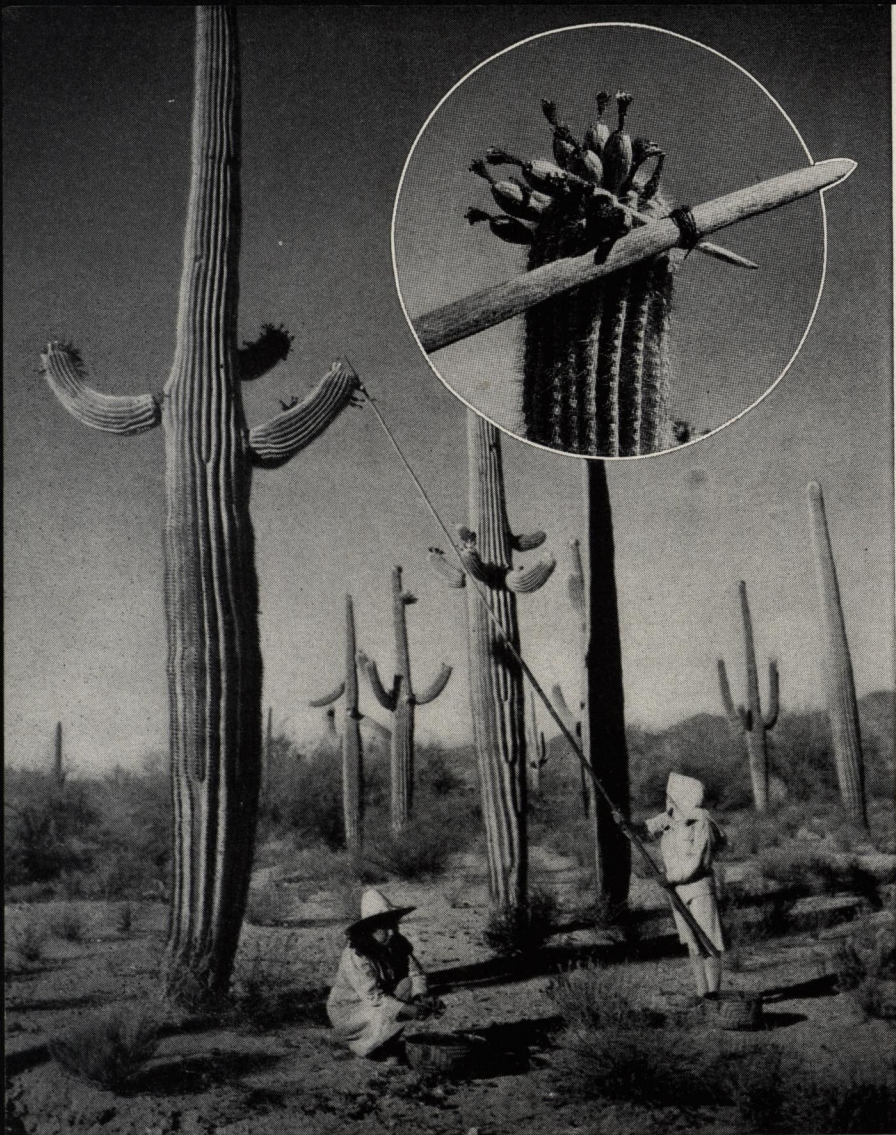
inches to the strongest gale. Prolonged winter rains accompanied by high winds will bring down some of the older giants as the numerous skeletons found on the desert prove. The smaller plants found on the ground can usually be attributed to vandals.

When rainfall is plentiful during the growing season the saguaro can store up enough water to last three or four years, bearing flowers and fruit annually regardless of drought. As the plant uses up its stored water supply without replenishing it, the long fluting of the ribs contracts and the plant becomes gaunt and its branches begin to droop. In older plants recovery is never complete and results in one or more arms ultimately hanging far below their original position, and often near the ground with the growing tip turning upward, bearing flowers and fruit until these long arms break off because of excessive weight.

The saguaro at all times gives the impression of being proud and dignified, but during May and early June when each arm reaching toward the sky terminates in large clusters of white blossoms, some twenty to forty feet above the desert floor, these majestic plants take on an air of snobbishness. Occasionally one is fortunate enough to find a weary old giant, who, grown mellow with the years and now with drooping arms, offers to share his beautiful bouquet with you.

A close examination of the flowering tip shows the tight round buds and flowers occurring singly on the upper part of the areole just above the cluster of needle like, yellowish spines. The numerous flowers opening at the same time gives the effect





*The Papago Indians, whose home is the desert, have for centuries harvested the fruit of the saguaro cactus. From the fruit they make syrup and delicious jellies.*



*Whole families make long expeditions into the desert in the hottest part of the summer when fruit ripens. Temporary camps become the center of harvest activity.*

Photographs by

of the blossoms growing in clusters. The white petals of the funnel-shaped flowers have a carved-out-of-wax appearance, with hundreds of pollen tipped stamens lining the throat of the blossom. The blossoms open in the darkness of the desert night with only the stars to witness their unfolding, closing at mid-day, unless it is cool and cloudy when they remain open until late afternoon.

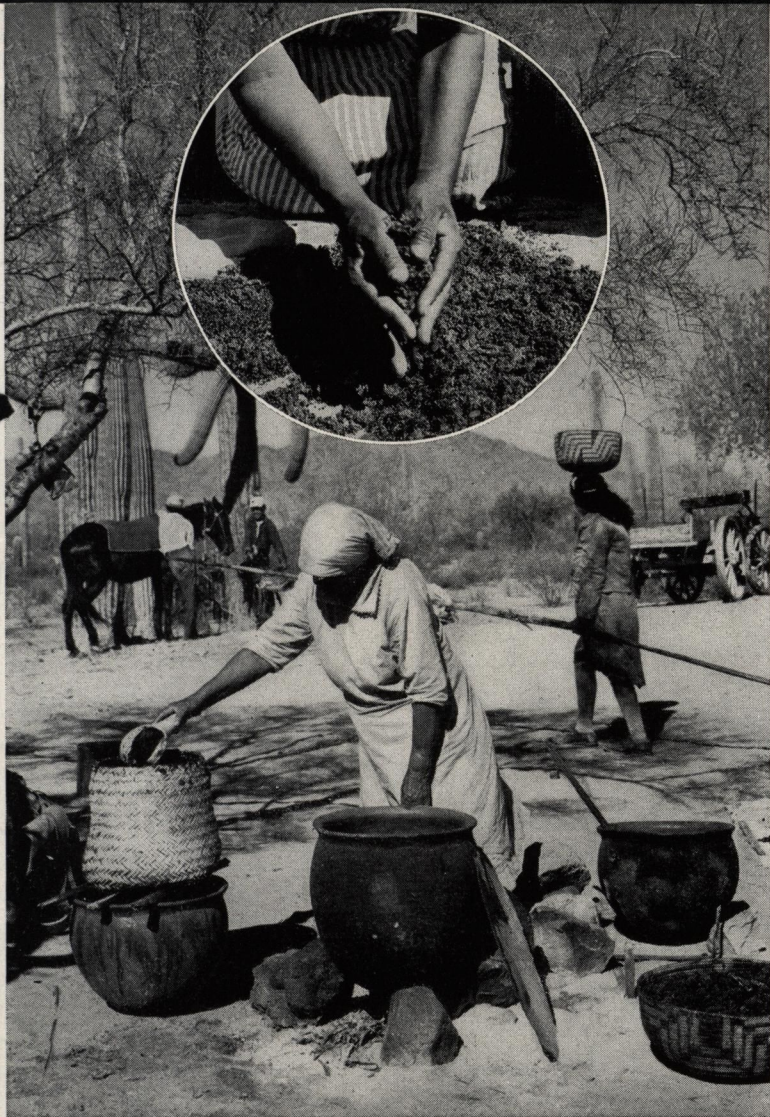
The egg-shaped fruit about three inches long and half as thick, ripens in late June and July when it splits into two or more segments that curl back exposing a scarlet lining and small shining black seeds embedded in bright red pulp. The ripe red fruit is often mistaken for red flowers. The Papago Indian begins his New Year with the first fruiting of the saguaro, and to the Pima Indians the month of July is known as the Saguaro Harvest Moon. Since pre-historic days the Indians of the desert have called this plant "Suwarrow" and have depended on it for food and building material and to a great extent still do today. The fruit is removed from the high arms by splicing two long ribs of a saguaro skeleton, to the top of which a wire hook is fastened, and with only a slight push or pull the fruit falls to the ground where it is gathered and the pulp removed from the outer skin and placed in large clay ollas or gathering

baskets made for that purpose. The fruit has many uses. Jam and preserves are made from it and sealed in clay jars, some of the fruit is converted into saguaro wine and much is simply dried in the sun and eaten as a sweetmeat. The high sugar content of the fruit and the slight acidity of its flavor make it quite delicious either fresh or preserved. The seeds after being separated from the pulp are ground into a meal and made into cakes.

Delicious jelly can be made out of the fruit by simply adding a small amount of warm water to the pulp and letting it soak for an hour or two, then putting it through a fine strainer to eliminate the seeds. For each cup of juice add one tablespoon of powdered fruit pectin, and allow it to come to a boil. Add one and a quarter cups of sugar and a little lemon juice to bring out the flavor, boiling this mixture until it jells. For candy add sugar to the saguaro fruit juice and make a heavy syrup, pour this over small squares of watermelon rind and cook slowly until the rind has absorbed most of the syrup, roll in granulated sugar and dry in the sun if possible.

The White-wing dove, a favorite Arizona game bird, feeds largely on the seeds during the fruiting season and in turn is responsible for the distribution of the seeds under palo verde





*The bright red fruit has high sugar content. When it is ripe, visitors often mistake the fruit for flowers. The seeds are ground into meal and used to make cakes.*

Charles W. Herbert



*Saguaro harvest is a productive period for the Papago Indians. The gathering and preparation of the fruit is a colorful activity. Festivities celebrate the harvest.*

and ironwood trees, whose shade is essential for protection from the sun. The seeds falling on the rich leafmold under the trees and protected by dense underbrush, germinate during the rainy season, grow to maturity and often crowd out their protectors. Seeds germinating without the protection of some shade usually dry up and die as soon as the hot weather comes. It is almost impossible to find young saguaro plants on the desert, while millions of seeds are produced annually, only a fraction of them germinate under favorable conditions and even fewer reach maturity. The ants and birds ravage the seed crop, while the rabbits and other desert rodents eat the young seedlings by pushing aside the small spines and devouring the succulent flesh of the young saguaros. The slow growth in infancy makes life hazardous for the young plant. At the age of ten years it has reached the height of approximately four inches and at seventy-five it may be no more than twelve feet tall and perhaps have started to grow an arm or two. At two hundred years the saguaro will rear up forty feet or more.

A few saguaros exhibit an abnormal type of growth in which the stem instead of being round will be unusually flat and often fan-shaped, having the appearance of several united stems. These plants are commonly known as "cristates." In the cristate there

is a long straight growing region, resulting in an undulating fan-shaped stem. Normal growth is carried on by the activity of a small circular group of cells. Botanists agree that an injury by fungus or bacterium may cause the circular cell group to become a long growing region. Birds or insects could also be responsible for such an injury. Such cristates have been artificially produced by cactus fanciers, the usual method is by cutting the center of the growing circle with a sharp penknife or pricking it with a long cactus spine to a depth of two inches.

Cacti are not closely related to any other family of plants, and botanists are uncertain from which group of plants they developed. We may not recognize it as such, but the peculiar plant life is an element in the fascination of the desert for us, and the saguaro attracts more attention and commands greater interest than any other plant in Arizona. Cacti have long been symbolic of the desert and to understand this fantastic form of plant life, requires familiarity with the region to which it is native. The turquoise skies and sun-filled days, the flaming wonder of sunsets followed by star-crowded nights, and the exquisitely colored flowers of the numerous members of the cactus family that burst into bloom during the first days of spring, all go to make up the mysterious realm of the Fantastic Clan.





*"Winter in Yavapai"*

*Norman Rhoads Garrett*