CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG

PART 1

Beginning in 1954, the writer has studied the genus Agave in field, herbarium, library and under cultivation. Field trips extended to Arizona, Nevada, Utah and some 25 miles beyond the International boundary into Baja California. Consequently, the photographs reproduced in the following pages, all made by the writer, are largely restricted to species under cultivation in southern California.

The genus *Agave* (Family Amaryllidacea) appropriately meaning "noble" was first described by Linnaeus in 1753. The first species of Agave known to science is *Agave americana* described by Linnaeus in 1753.

The genus is distinguished by having flowering stems from a more or less woody caudex or a short, erect rootstock; leaves succulent, numerous, imbricate, forming a basal rosette; scapes tall and stout, ending in an elongated bracted raceme (subgenus *Littaea* Tagliab.) or panicle (subgenus *Euagave* Baker); flowers numerous with tubular or funnel-form perianth and thick-walled many-seeded capsules. After flowering, the rosette and flower stalk dies in nearly all species but in *Agave parviflora,* the rosette persists.

In the United States, the species of Agave are colloquially known as "century plants" because of the erroneous belief that the plants only flowered when they had attained an age of a hundred years. This belief is probably based on the fact that in cultivation many species rarely bloom. In this paper the botanical names only are cited. Under favorable conditions, the life cycle of an Agave plant is 10 to 12 years.

Indigenous to North America, the genus Agave is widely distributed, ranging from Utah in the north to Central America and the West Indies in the south with the center of population in Central Mexico. No attempt is here made to indicate the number of Agave species. Owing to the morphological variability exhibited by various species, numerous forms have been described as distinct species. Consequently, the number of Agave species, in the broad sense is probably considerably less than previously believed. However, occasionally new species are being described adding to the total number known.

In hardiness they range from tender tropical species in the West Indies and Central America to those withstanding subzero temperatures occurring on the high plateaus of Mexico and the more northern latitudes of the United States. Owing to their tender tropical nature, few, if any of the Agave species native to the West Indies are cultivated in California.

Agaves have an aesthetic value which cannot be measured. No other group furnishes such a variety of decorative plants.

They range in size from *Agave pumila,* only a few inches across and weighing less than a pound, to the massive *Agave atrovirens* weighing more than a ton. Agaves have long been prized for ornamental planting in conservatories, formal gardens, lawns, terraces and rock gardens. Their varied shape and other attractive features make them especially valuable for this purpose. Agaves, like palms, serve to advertise a mild climate. The opportunity to observe the rapid growth of the tall flower stalks and opening of the numerous flowers is a further reward for raising an Agave plant to maturity.

Agave plants propagate by seeds, vegetative offsets or suckers and bulbils in the inflorescence. Depending upon the species, certain ones propagate by seeds only, others by seeds and offsets, while still others may propage by all three methods.

Much has already been written on the economic products of Agave plants. Briefly their utilization includes: food, drink, soap, clothing, rope and other fibers, needles and thread, paper, glue, weapons, military instruments, medicines, red coloring matter, forage and ornamental and hedge plants. It has been stated that Agaves were outranked only by maize and potatoes by the early Aztec, Maya and other Indians of Mexico.

To stimulate greater interest and become better acquainted with the nomenclature of this magnificent group of plants, the writer has photographed all the species, varieties and forms

known to him. They are reproduced in the following illustrations which include brief descriptions, notes accompany each photograph indicating locality where photographed, cultivator, etc.

The writer wishes to extend his sincere thanks and appreciation to the many persons who granted permission and cooperated in obtaining these photographs. Comments, suggestions and correspondence is invited: Mr. August Breitung, 1416 S. Glendale Ave., Glendale, Calif.

AGAVE

The genus is divided into two natural subgenera; *Littaea,* having a spicate inflorescence and *Euagave* having a branched inflorescence. In this treatise approximately 50 entities are recorded for the *Littaea* and 60 entities in the *Euagave.* In addition, unidentified species are recorded in the appendix, some of which are probably new and undescribed species of *Agave.*

1. Subgenus LITTAEA; Flowers in spikes or spicate clusters.

Agave polyacantha Jacobi

A. multiflora Todaro

Distribution: Veracruz; type cultivated in Europe, from an unspecified source about 1800.

Leaves green though transiently glaucous, 5 to 15 cm. wide, 25 to 60 or 100 cm. long, with dark firm spine 2 to 3 mm. wide and 15 mm. long, rather small close-set brown teeth 3 to 5 or 10 mm. apart and 2 to 3 mm. long; spike sometimes budding at tip and base.

FIG. 19

Agave polyacantha Jacobi. Grown by H. S. Gentry, Murrieta, California

Agave xalapensis Roezl ex Jacobi

Distribution: Veracruz; above Cruz Verde, Las Vigas; type cultivated in Europe, from unrecorded locality.

Rosette single or with few offsets; leaves green or glaucous, 5 to 12 cm. wide, 25 to 75 cm. long with dark firm brown spine 3 to 5 mm. wide and 5 to 30 mm. long, red or blackish strong flat teeth 5 to 7 mm. apart and 5 mm. long.

Agave macrantha Todaro

Distribution: Mexico; type cultivated in Europe without citation of locality.

Rosette single or often mound-forming by numerous offsets; leaves spatulate-obovate, uncurved, glaucous, as much as 10 cm. wide and 30 to 50 cm. long with chestnut spine 8 mm. wide and 20 to 30 mm. long, firm brown teeth 6 to 15 mm. apart and 2 to 3 mm. long; flowers June-July.

Agave micracantha Salm-Dyck

A. oblongata Jacobi
A. chloracantha Salm-Dyck
A. mitis Salm-Dyck

Distribution: Hidalgo or Veracruz?; type cultivated in Europe from an unrecorded locality.

Leaves gray-green, 8 to 12 cm. wide, 40 to 60 cm. long, with slender weak spine and small close-set dark teeth, these are sometimes almost suppressed.

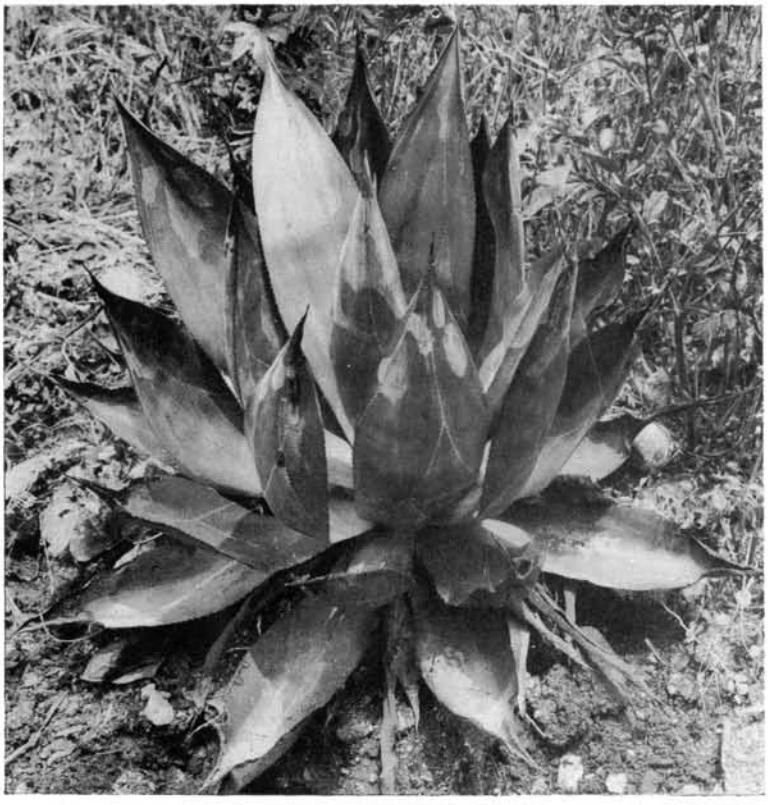


FIG. 20
Agave micracantha Salm-Dyck. Grown by L. Ellenwood, San Fernando, California

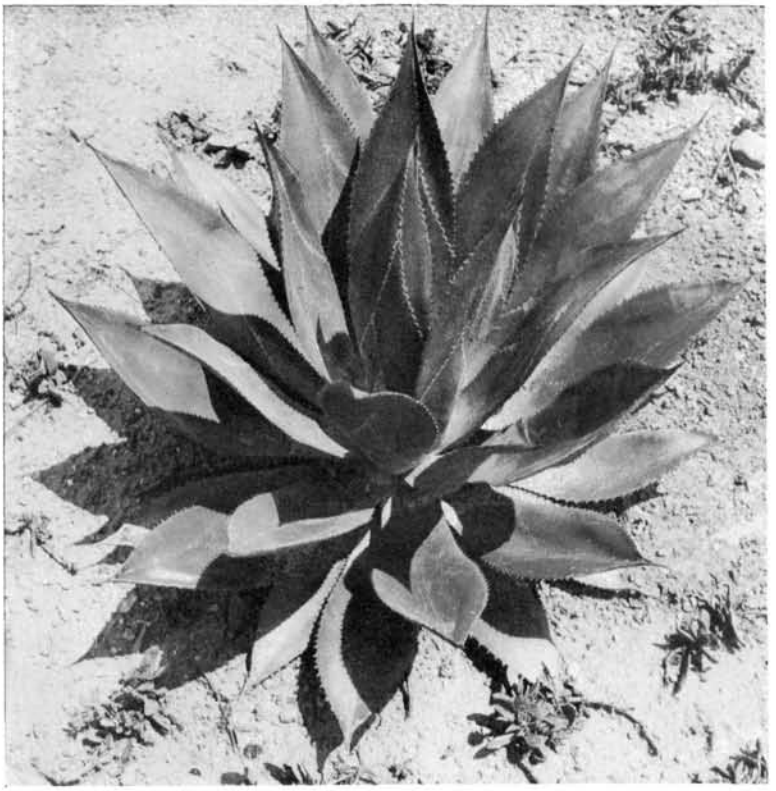


FIG. 21
Agave xalapensis Roezl ex Jacobi. Grown in the Huntington Botanical Garden, San Marino, California

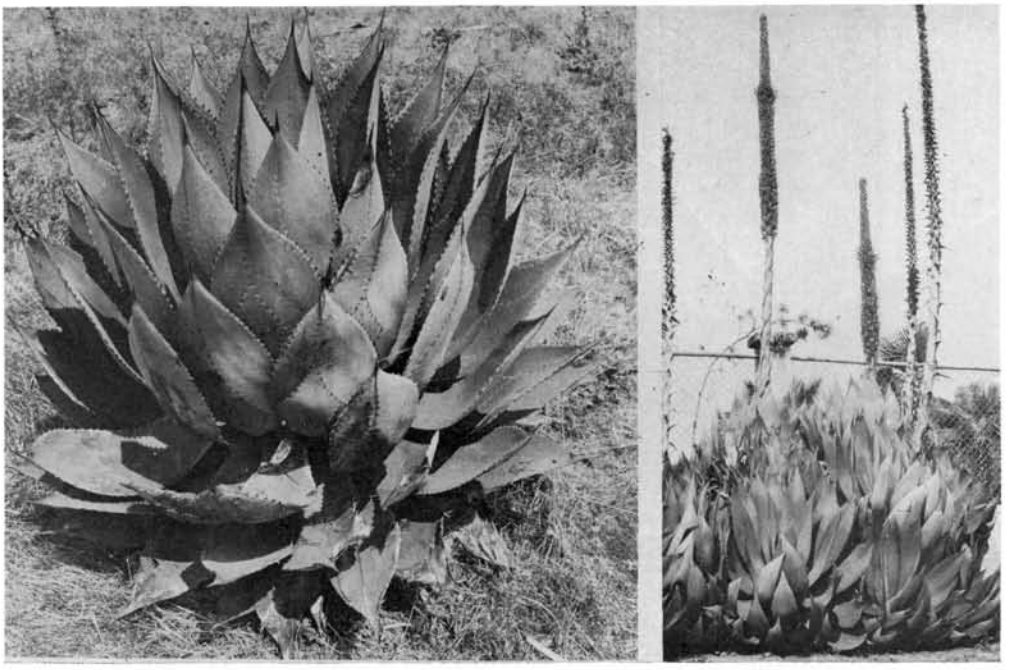
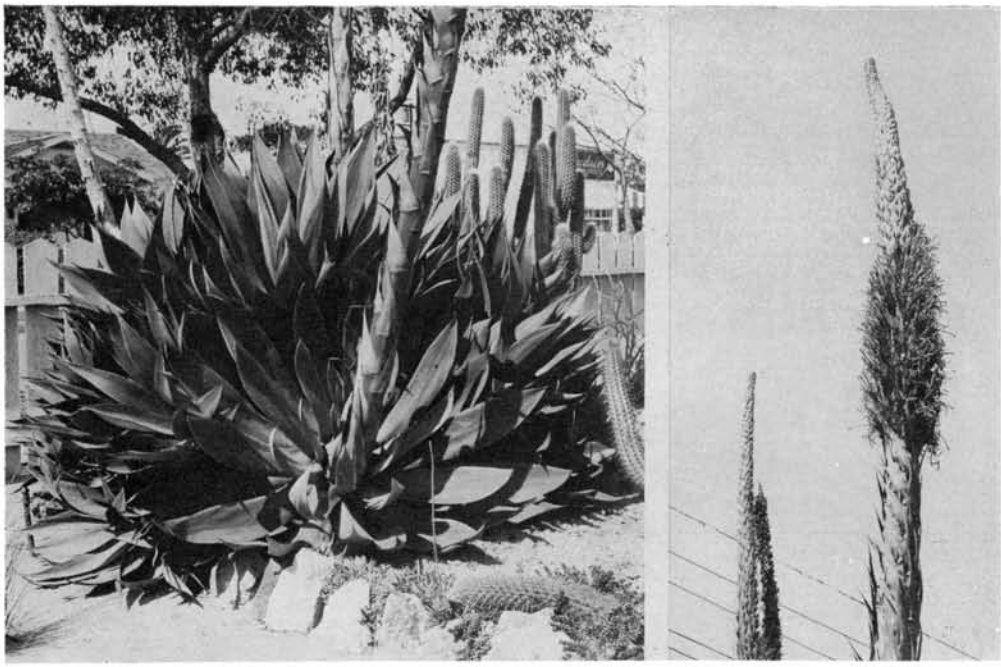


FIG. 22
Agave macrantha Todaro. Grown in the Huntington Botanical Garden, San Marino, California



Agave micracantha Salm-Dyck. Grown by G. H. Tegelberg, Inglewood, California

Agave albicans Jacobi
A. celsii Hooker

Distribution: San Luis Potosi; type cultivated in Europe from an unrecorded locality.

Leaves glaucous, 10 cm. wide, 30 to 40 cm. long; spine slender, weak, 1 mm. wide and 5 to 10 mm. long; teeth brown-tipped, very irregular, close-set or confluent, 5 to 10 mm. apart, 2 to 3 mm. long. Flowering in May.

Agave albicans Jacobi. Grown by L. Ellenwood, San Fernando, California

soms, and is 22" above the pot with a wooden fence around it to keep it from uprooting itself." From C. & S. Robin No. 6, Aileen Campbell writes, "I have been thinking I should get some plants that bloom in the winter, like some Neoporteria, to add some winter color to my collection." In reply, Mildred Wellbaum wrote, "You will love the Neoporterias," mentioning a dozen species and singling out one, N. castanoides, to say, "It has been in bloom since November. I bot these for winter bloom." Although Irma Huch mentions interesting plants in her letter of this Robin, I thought her idea useful when she said, "I have made me a miniature hothouse with a large aquarium. I put a piece of clear plastic over the top. If it needs air I just fold the corner back.' She was rooting a number of plants in it.

The new Epiphyllum Robin has made its first round and in it Lois Covey writes, "Since I have no beautiful large live oak tree with hanging branches for epiphytes, I had to build a substitute—a lathhouse 12′ x 24′, with lath on the top and south side and both ends. Vines growing up on the outside, all giving a wonderful filtered shade. In this I grow all sorts of shade-loving plants—Bromeliads, some orchids and an endless variety of foliage plants, and for several years have been trying out the various shade-loving cacti with fine results."

Now to the business of our Robins. I have a request for a Propagation Robin, which would include seed grafting. If this sounds like something you would enjoy please let me know that I may put your name on the list. One more member is needed from this country for International Robin No. 5. A new Robin on Echeverias will be in flight shortly and if there is anyone especially interested in these beautiful plants there will be room for several in it. A number of Robins are still on my waiting list for more members among them the Stapelia Robin, Opuntia Robin, the Tree-Type Cactus Robin. Of course anyone who wishes a Cactus and Succulent Robin or another group on Euphorbias, or other special Robin, may ask for it. It sometimes takes a while to collect enough members to make it ready for flight but if you have patience perhaps it will become an actuality. Special Robins are apt to take longer to form than the general subject ones. Whatever you choose, I send you a cordial invitation and will try to find a place for you, given time.

Gladys Panis, Box 705, Falmouth, Mass.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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PART 2

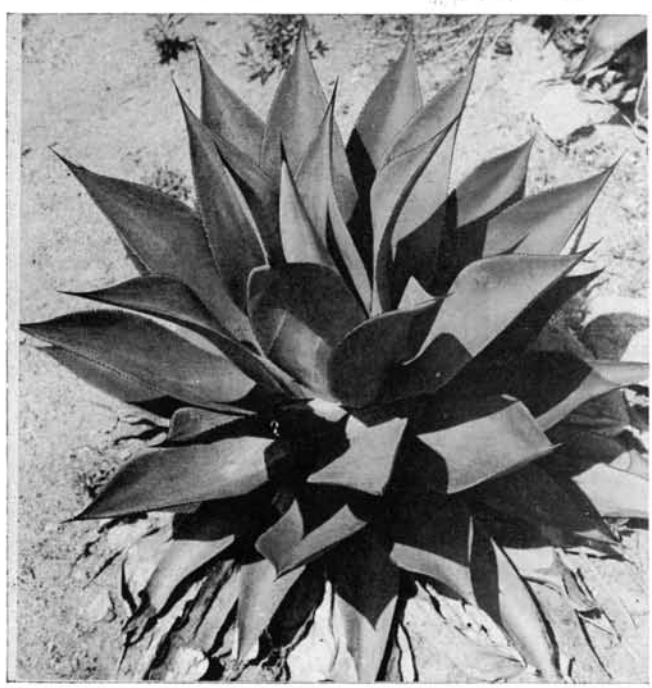

FIG. 44

Agave micracantha

Grown by F. Crosby, Malibu, California. Approx. 1/9 natural size. This is an offset shown on top of this Journal, page 48, Vol. 31, No. 2. According to Berger in Die Agaven, page 59, the plant coincides with the description of *Agave chloracantha*. However, Trelease in Standley, Trees and Shrubs of Mexico, Cont. U.S. Nat. Herb. 23(1): 135, 1920, includes this and several other closely allied forms as synonyms of *A. micracantha*.

FIG. 45
Agave pumila
Photograph by the Missouri Botanic Garden in 1909; negative No. 50-06-15. Approx. natural size.

Section 2. PERICAMTAGAVE Berger[1]

Agave pumila De Smet ex Baker, Amaryllidaceae 172, 1888 [2].

Distribution: unknown.

Rosette very small, scarcely 5 cm. in diameter and 3 cm. high; leaves 5 to 8, grayish-green, fleshy, concave above, rounded and dark-lined beneath, abruptly contracted into a short, soft, whitish spine and few small recurved teeth connected by a whitish margin.

Agave lecheguilla Torrey, Bot. Mex. Bound. 213, April 1859.

A. poselgeri Salm-Dyck, Bonplandia 7: 92, April 1859.
A. lophantha var. *poselgeri* (Salm-Dyck) Berger, Die Agaven 93, 1915.
A. lophantha var. *pallida* Berger, Die Agaven 93, 1915.

Distribution: Texas, Coahuila, Chihuahua and Zacatecas; type locality, near Del Rio and along Devils River, western Texas.

Rosette 75 cm. in diameter and 45 cm. high, stolons numerous, eventually producing colonies up to 50 square meters in area; leaves falcately ascending, green or bluish, 20 to 35 cm. long, 2.5 to 3.5 cm. wide, upper surface with scarcely evident stripe, back with narrow green lines; spine 1.5 to 2 cm. long, brown, soon gray, sides decurrent with the straight detachable horny borders about 1 mm. wide; teeth gently recurved 3 to 5 mm. long, 1 to 2 cm. apart; inflorescence 4 to 5 m. high, slightly bent. Flowers June-July.

Agave glomeruliflora (Engelmann) Berger, Hort. Mortol. 12, 1912.

Agave heteracantha forma *glomeruliflora* Engelmann, Gard. Cron. II. 19: 48, 1883.
Agave lecheguilla forma *glomeruliflora* (Engelmann) Trelease, Cont. U.S. Nat. Herb. 23(1): 136, 1920.
Agave chisosensis Muller, Amer. Midl. Nat. 21(3): 763-765, 1939.

Distribution: Texas and Coahuila; type locality, Guadalupe Mts. in western Texas.

Rosette up to 1 m. in diameter; leaves fleshy, narrowly ovate-lanceolate, glaucous green, smooth with few and scarcely evident dark lines on back surface, 30 to 60 cm. long, 4 to 8 cm. broad; spine 2.5 to 5 cm. long, 5 mm. broad at base, dark brown, glaucous, becoming grayish, sides decurrent with the horny margins; teeth 6 to 13 mm. long, strongly appressed retroflexed, 3 to 5 cm. apart, the basal teeth smaller and close set; inflorescence 5 to 6 m. high, very strict, flowers in short compact glomerules on branches 4 to 6 cm. long forming a narrow panicle rather than a spike.

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[1]In the previous issue of this journal, page 45, between lines 14 and 15, add: Section 1. ANACAMPTAGAVE Berger.

[2]No living specimen has been seen by the author to date, but included here because other species have sometimes been mistaken for *Agave pumila*. Should any readers have living plants of this species, please advise the writer.

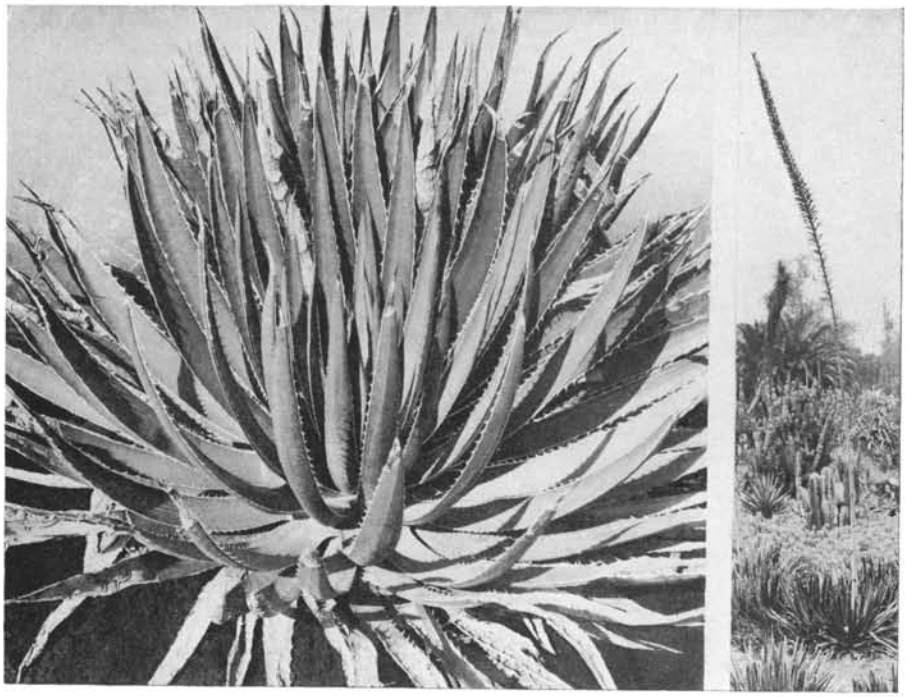

FIG. 46
Agave lecheguilla
Grown in the Huntingon Botanic Garden, San Marino, California. Rosette approx. 1/8 natural size.

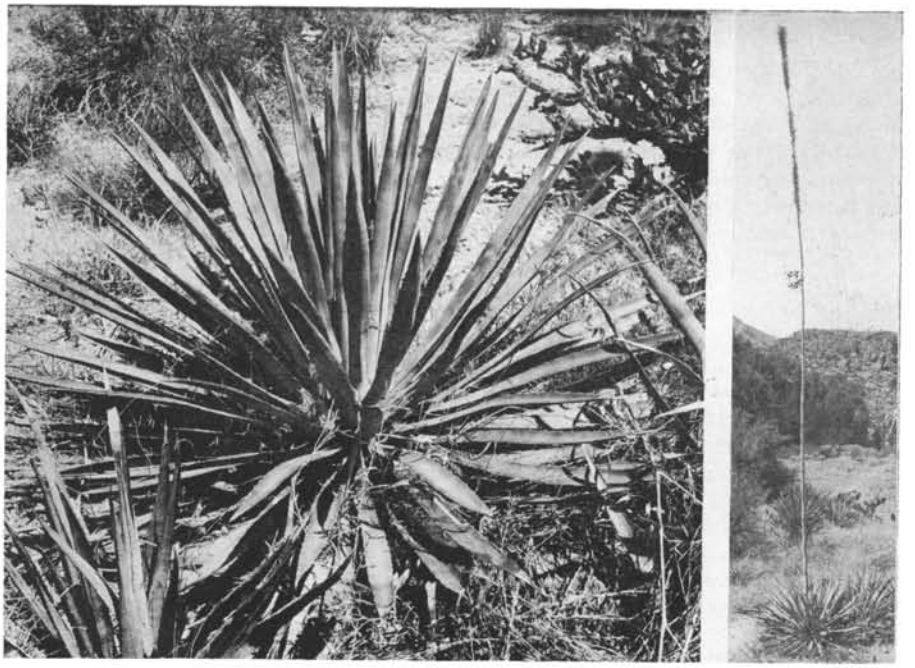

FIG. 47
Agave funkiana
Grown by Boyce-Thompson Southwestern Arboretum, Superior, Arizona. Rosette approx. 1/12 nat. size.

Agave funkiana Koch & Bouché, Wochenschr. Ver. Beford, Gartenb. 3: 47, 1880.

Distribution: Nuevo Leon and Tamaulipas; type cultivated in Europe without citation of locality.

Rosette 1 m. or more in diameter and 100 cm. high, stoloniferous; leaves scarcely falcate, green or glaucous with pale central stripe above and narrow dark lines beneath, 60 to 80 cm. long and 3 to 4 cm. broad; spine brown at first becoming gray, 15 mm. long; teeth 2 to 5 cm. apart, 3 to 6 mm. long, broad based, recurved, joined by a nearly straight detachable horny border 1 mm. wide; inflorescence 7 to 10 m. high. Flowers June-July.

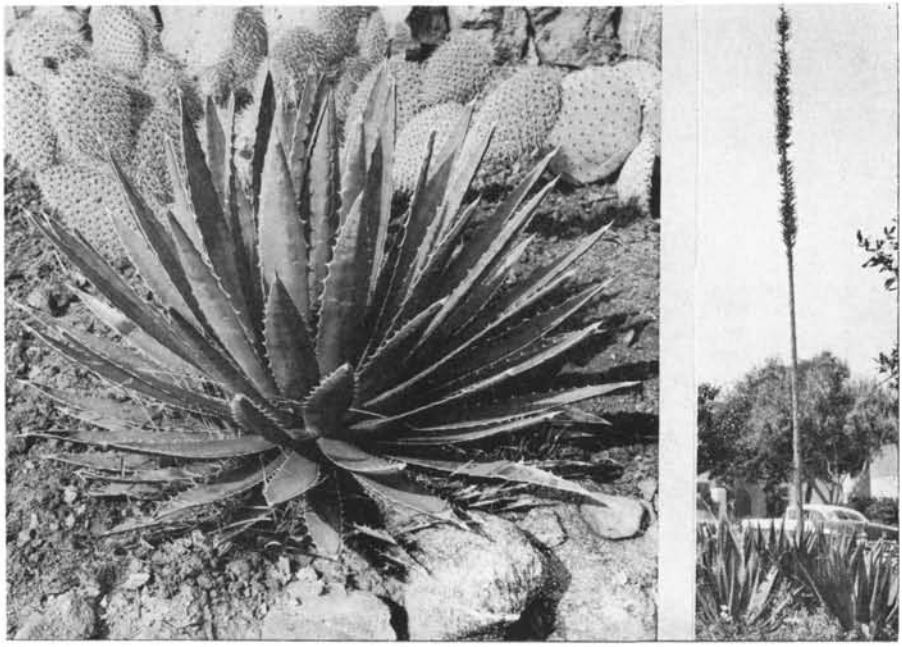

FIG. 48

Agave univittata

Left: rosette grown by George Glade, Tujunga, California. Approx. 1/8 natural size. Right: grown in the late F. Bullard's desert collection, Santa Monica Blvd., Beverly Hills, California.

Agave univittata Haworth, Philos. Mag. 10: 415, 1831.

Agave lophantha Schiede ex Kunth, Enum. 5: 838, 1850.

Distribution: Coahuila and Veracruz; type locality, Malpais de Naulingo.

Rosette to 85 cm. across and 45 cm. high, stoloniferous; leaves uniformly spreading, clear green often with pale ventral stripe and dark dorsal lines, 20 to 30 cm. long and 3 to 4 cm. broad; spine brown soon becoming gray, 10 to 15 mm. long, decurrent into the continuous horny leaf margin .05 mm. wide; teeth narrowly triangular, variously curved, unequal, 3 to 7 mm. long and 20 to 30 mm. apart; inflorescence 4 m. high, strict. Flowers June.

NEW MEXICO SOCIETY — Continued

such long central spines on E. viridiflorus, since most plants of this species either lack centrals entirely or have very short ones. Thus there was speculation that we might have a hybrid until Ann found a picture and description in Texas Cacti which dispelled all doubt from her mind. Ann Chabai was most impressed by Mammillaria microcarpa which she found growing in cracks of the rock, high on the cliffs above Dog Canyon. Echinocereus stramineus were the most numerous plants represented and Echinocactus horizonthalonius was a close second. A few Escobaria tuberculosa were found on the cliffs, and a very few very beautiful Mammillaria lasciacantha var. denudata were found which were a soft baby pink in spine color. Some Coryphantha macromeris were located. They visited John Leasure's "Cactus Acres" in El Paso before returning to Albuquerque.

To be continued

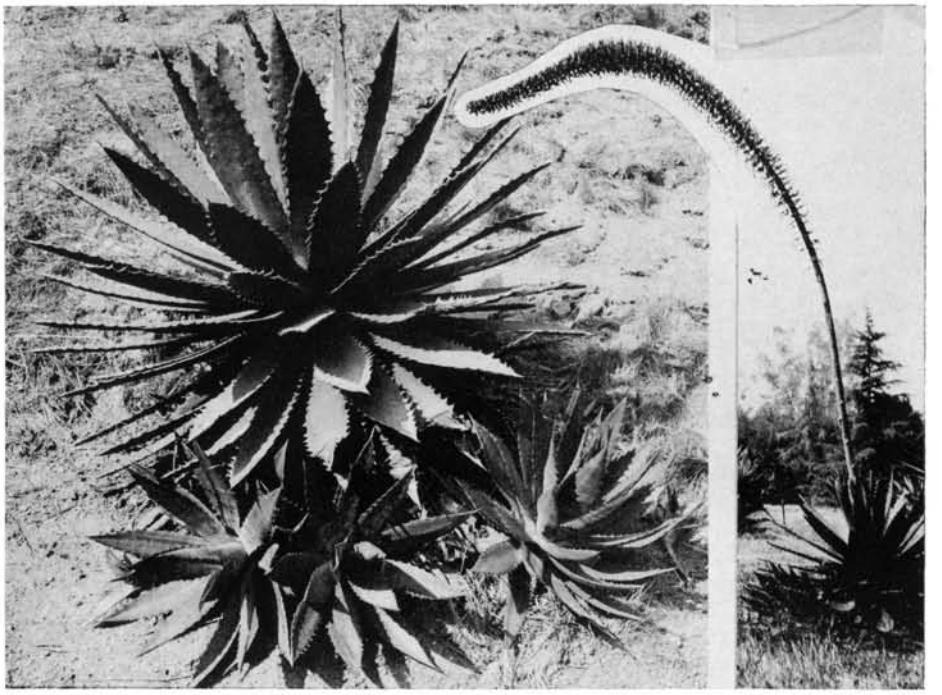

FIG. 46
Agave univittata var. *latifolia*
Grown in the Huntington Botanical Garden, San Marino, California. Rosette approx. 1/8 natural size.

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AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 3

Agave univittata var. **latifolia** (Berger) Breitung, **comb. nov.**

A. lophantha var. *latifolia* Berger, Die Agaven 92, 1915.

Distinguished from the typical species by the broader leaves armed by larger, variously bent and curved teeth on fleshy prominences and no dark lines on lower side of leaves.

Agave univittata var. **carchariodonta** (Pampanini) Breitung, **stat. nov.**

A. carchariodonta Pampanini in Nuovo Giornale Bot. Italia, 591, 1907.

Similar to var. *latifolia* but distinguished by the interrupted horny margin which extends from spine to first pair of teeth and then continuous from middle to base of leaf. Rosette shown in accompanying illustration is 1.30 m. in diameter with leaves 60 cm. long and 10 cm. broad at the middle.

Agave univittata var. **heteracantha** (Zuccarini) Breitung, **stat. nov.**

A. heteracantha Zuccarini, Nov. Act. Acad. Caes. Leop. Carol. 16(2): 675, 1833.
A. ensifera Jacobi, Nachtr. 1: 138, 1868.

Distinguished from the typical species by its gray-green more or less rough leaves, larger, variously curved and bent often paired teeth saddling fleshy prominences.

Evidently, *A. univittata* is exceedingly variable in leaf characteristics and the inflorescence may be erect or more frequently bent.

FIG. 47
Agave univittata var. *carchariodonta*
Grown by H. S. Gentry, Murrieta, California. Approx. 1/12 natural size.

FIG. 48
Agave univittata var. *heteracantha*
Grown by George Glade, Tujunga, California. Approx. 1/9 natural size.

FIG. 49
Agave xylonacantha
Grown by E. R. Le Roy, Atherton, California. Approx. 1/6 natural size.

Agave xylonacantha Salm-Dyck, Bonplandia 7: 92, 1859.

A. amurensis Jacobi, Hamb. Gart. Zeit. 20: 548, 1864.

A. kochii Jacobi, Hamb. Gart. Zeit. 2: 117, 1866.

Distribution: Hidalgo and San Louis Potosi; type cultivated in Europe, said to be from San Louis Potosi but later records include Ixmiquilpan and Real Del Monte.

Rosette single, to 1.30 m. in diam.; leaves loosely spreading, undulate and contorted, dull, mostly grayish green, scabrous, the lower surface with darker lines but no median stripe above, 6 to 12 cm. broad, 35 to 60 cm. long; armature light brown, soon gray; spine flexuose 4 to 5 cm. long decurrent into the continuous 1 to 2 mm. wide horny border; teeth very irregular or confluent 20 to 40 mm. apart, 10 to 15 mm. long and nearly as broad over high prominences. Inflorescence 3 to 4 m. high, somewhat bent.

Agave splendens Jacobi, Abh. Schles. Ges. Vaterl. Cult. 1870: 147, 1870.

Distribution: Unknown, type cultivated in Europe.

Rosette with axillary branches, mound forming; leaves 15 to 20 cm. long, 5 cm. broad, green, pale median stripe above but no dark lines beneath; armature brown becoming gray; spine 1.5 cm. long, decurrent into the continuous horny margins .05 to 1 mm. broad; teeth 1 to 2 cm. apart, 3 to 5 mm. wide, usually bent downwards or hooked upwards; inflorescence not known to writer.

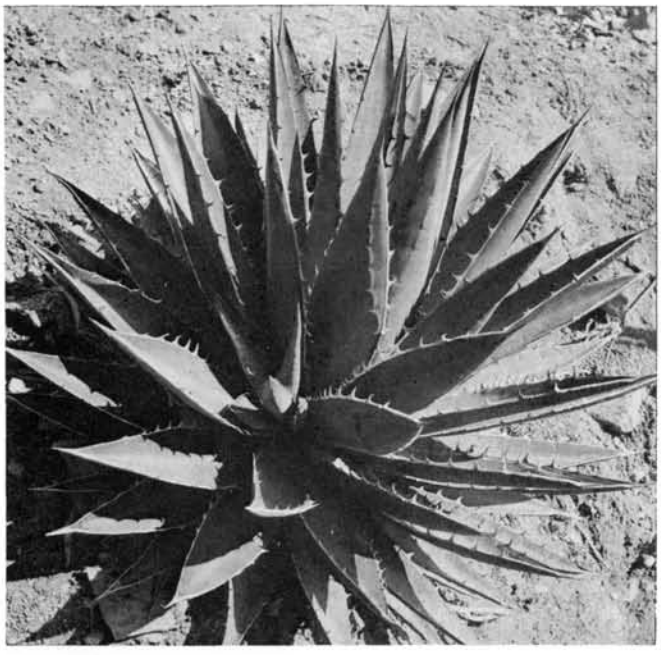

FIG. 50
Agave splendens
Grown by L. Ellenwood, San Fernando, California. Approx. ¼ natural size.

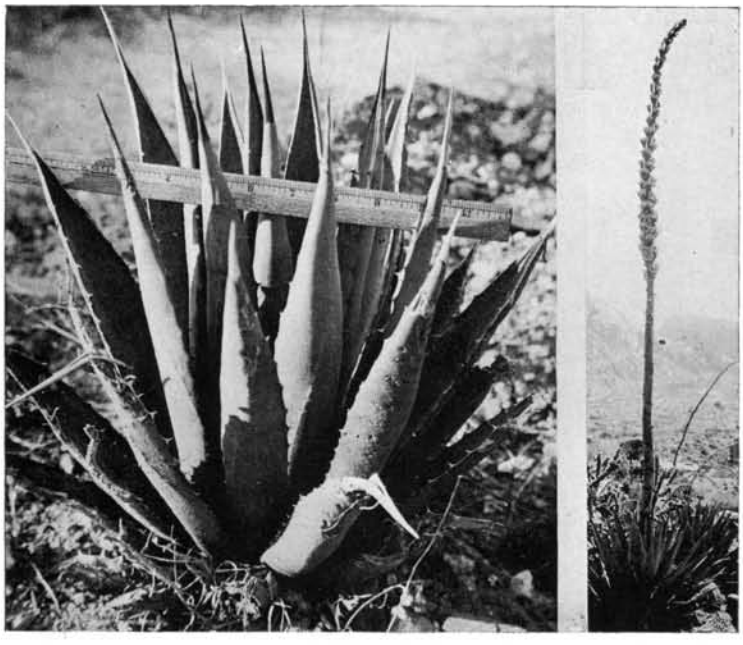

FIG. 51
Agave glomeruliflora
In natural habitat, Big Bend National Park, Texas. Photos by O. E. Sperry. Rosette approx. ⅕ nat. size.
For description see previous issue of this journal, page 91.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 4

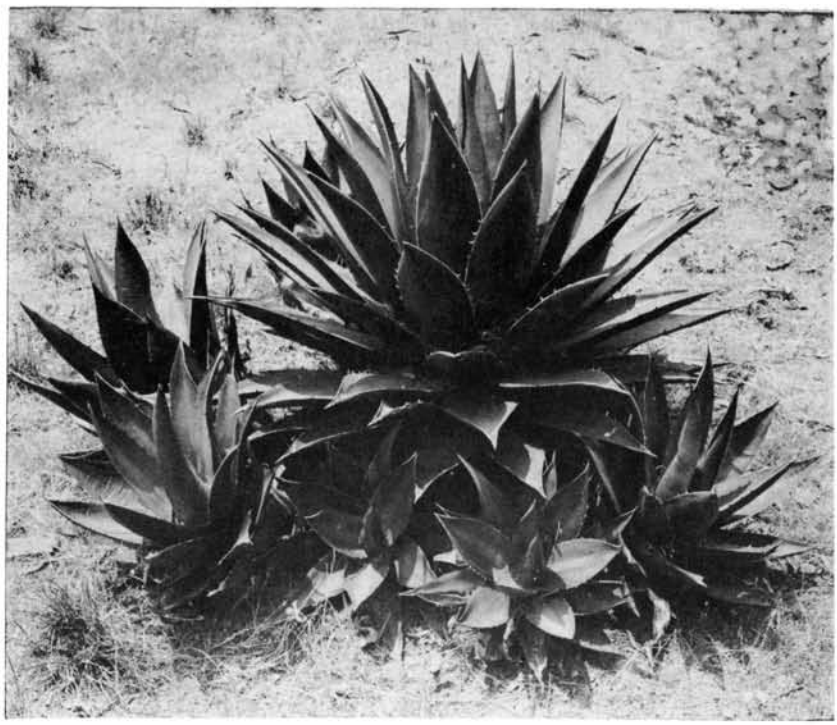

FIG. 63
Agave purpusorum. Grown by the University of California Botanical Garden, Los Angeles, California. Approx. 1/8 natural size.

Agave purpusorum Berger, Die Agaven 111, 1915.

Distribution: type cultivated in Europe, collected by C. A. Purpus (No. 465) from Puebla near Tehuacan.

Rosette 70 cm. in diameter, 40 cm. high, caespitose; leaves thick, stiff, clear green, broadly pale-striped above, not dark-lined beneath, 25 cm. long, 6 cm. broad, slightly narrowed toward the 25 mm. thick base; armature at first chestnut brown, eventually becoming gray; spine 1 cm. long, sides decurrent into the continuous .5 mm. broad horny leaf margins; teeth 10 to 15 mm. apart, 5 to 8 mm. long; flowers not known to writer.

Agave roezliana Baker, Garden Chron. new ser. 7: 528, 1877.

Distribution: type cultivated in Europe, collected by C. A. Purpus (No. 419) from Puebla near Tehuacan.

Rosette 1.60 m. in diameter, 1.30 m. high, caespitose; leaves 30 to 65 cm. long, 8 to 12 cm. broad, glabrous, light green, a broad light median stripe above, no dark lines beneath; spine and teeth chestnut brown at first, becoming gray; spine 2 to 3 cm. long, decurrent into the continuous horny 2 mm. wide margins; teeth 8 to 40 mm. apart, 5 to 10 mm. long, usually curved upwards or irregular, often with 1 or 2 smaller ones between the larger ones; inflorescence unknown to writer.

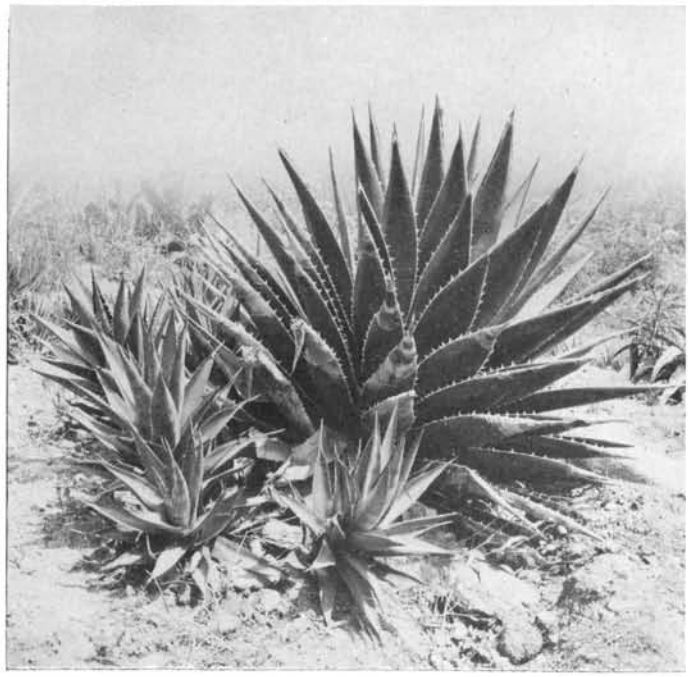

FIG. 64
Agave roezliana. Grown by L. Ellenwood, San Fernando, California.
Approx. 1/16 natural size.

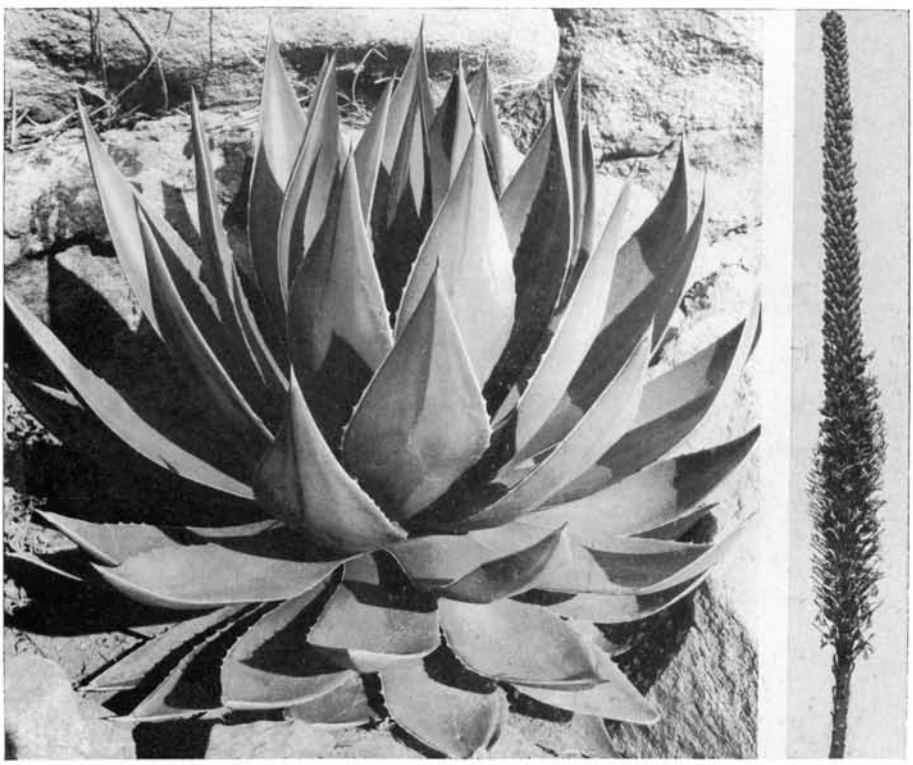

FIG. 65
Agave ghiesbrechtii. Left: grown by J. Buttner, Fallbrook, California.
Right: grown in Huntington Botanical Garden, San Marino, California.
Rosette approx. 1/7 natural size.

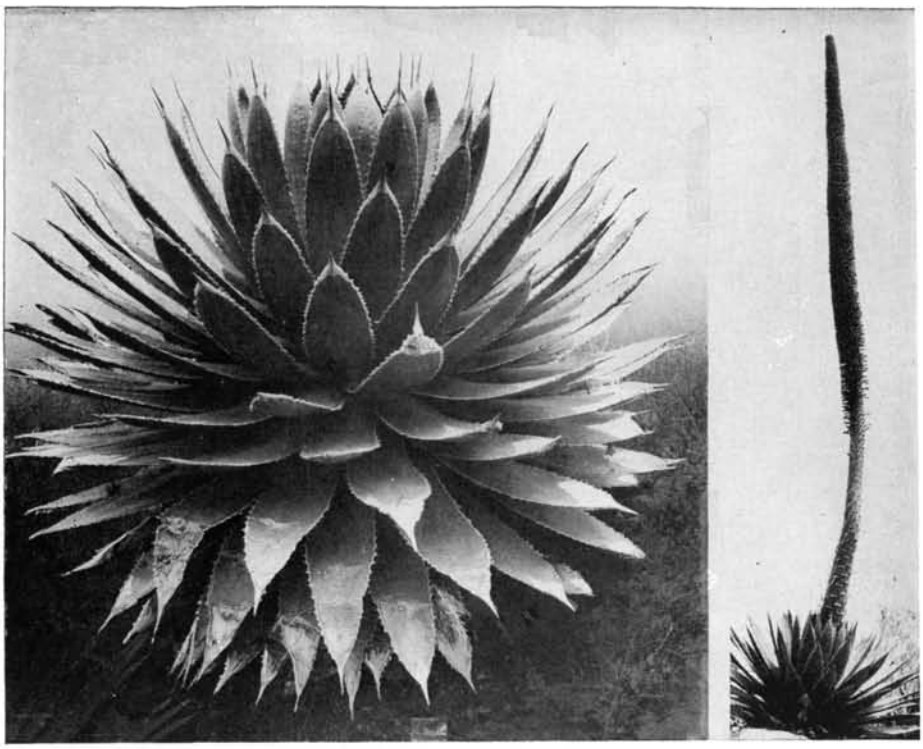

FIG. 66
Agave horrida. Grown by L. Ellenwood, San Fernando, California.
Rosette approx. 1/8 natural size; inflorescence greatly reduced.

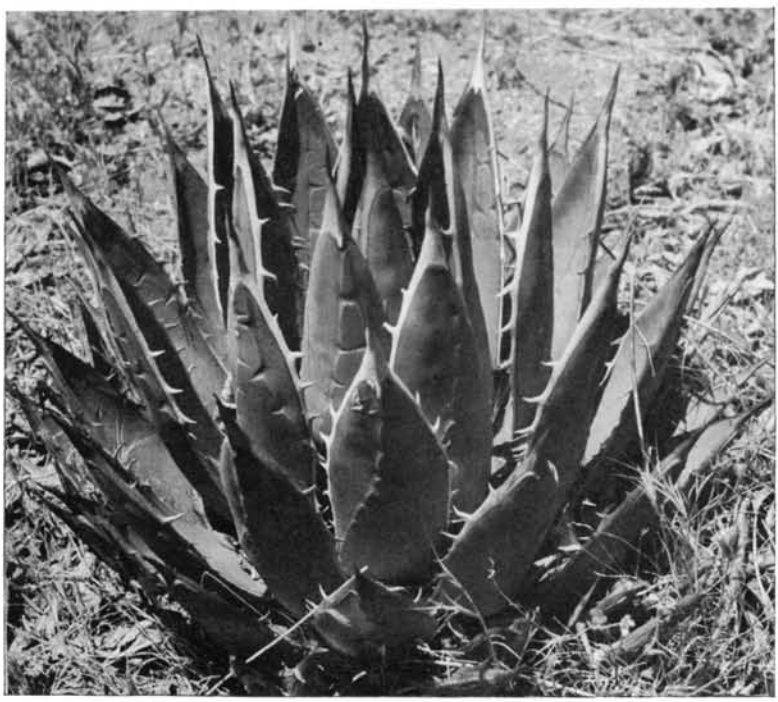

FIG. 67
Agave horrida var. *gilbeyi*. Grown by H. S. Gentry, Murietta, California. Approx. 1/3 natural size.

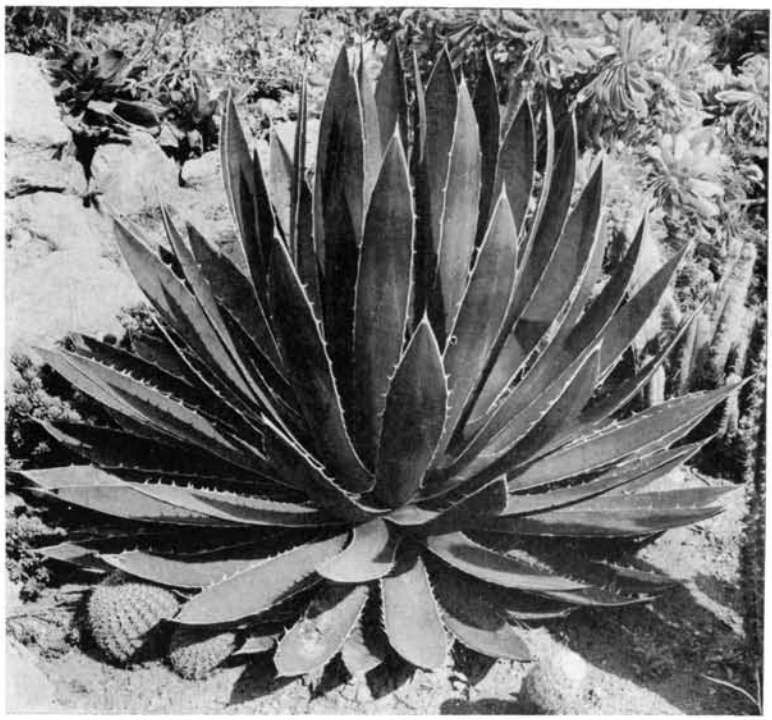

FIG. 68
Agave obscura. Grown by J. Buttner, Fallbrook, California.
Approx. 1/12 natural size.

Agave ghiesbrechtii Koch, Wochenschr. Ver. Beford, Gartenb. 5: 83, 1862.

Distribution: type cultivated in Europe without recorded locality.

Rosette usually with numerous offsets, eventually mound-forming, 50 to 70 cm. in diameter; leaves upcurving, concave, fleshy, grayish-green or bluish-green with faint ventral stripe and no dorsal lines, 25 to 40 cm. long 8 to 12 cm. broad; armature brown at first, soon becoming gray; spine 15 mm. long decurrent into the continuous 1 to 2 mm. wide horny leaf margin, entire above, lower three quarters armed with triangular teeth, 12 to 15 mm. apart, 3 to 5 mm. long; inflorescence 2.5 to 4m. high. Flowers March-May.

Agave horrida Jacobi, Ham. Gart. Zeit. 20: 546, 1864.

Distribution: Morelos, abundant above Cuernavaca on the lava fields, type cultivated in Europe without citation of locality.

Rosette single, 80 cm. in diameter; leaves numerous, uniformly spreading, 30 cm. long, 5 to 7.5 cm. wide; light green, rarely with pale ventral stripe and no dorsal lines; armature at first brown, soon becoming gray, spine 2.5 to 3 cm. long, decurrent into the 2 to 3 mm. wide undulate horny margin; teeth large, flat, variously curved and hooked, 10 to 15 mm. apart 5 to 10 mm. long; inflorescence 5 m. high, very dense. Two plants were observed flowering at L. Ellenwood's in 1956 and 1957. March-May.

Agave horrida var. **gilbeyi** Baker, Gard. Chron. 621, 1877.

A. gilbeyi Hort. Haage & Schmidt, Gard. Chron. 1305, 1873.

A. roezliana var. *nana* (Laurentius) Trelease in Standley, Trees & Shrubs of of Mexico, Cont. U.S. Nat. Herb. 23(1): 137, 1920.

Distribution: type cultivated in Europe from Tehuacan.

Distinguished from the typical species by its small size, rosette 30 cm. in diameter, leaves 15 cm. long, spine stout 2 to 3 cm. long, 6 mm. broad at base decurrent into the

continuous 2 to 3 mm. broad horny border, teeth 3 to 6 mm. long. Flowers unknown to writer.

Agave obscura Schiede, Linnaea 18: 413, 1844.

Agave grandidentata Jacobi, Hamb. Gart. Zeit. 22: 114, 1866.
Agave horrida var. *micracantha* Baker, Gard. Chron. new series, 7: 621, 1877.

Distribution: Veracruz; common on the lava beds about Limón; type locality, lava fields of La Joya.

Rosette single, 1.30 m. in diameter, leaves uniformly spreading, 45 to 60 cm. long, 10 cm. wide, dark green, stiff without light ventral stripe and no dark dorsal lines; armature at first brown, soon gray; spine 25 to 30 mm. long, decurrent into the 1 to 2 mm. wide horny margins; teeth triangular, straight or variously curved, 10 to 40 (average 20 to 30) mm. apart, 4 to 7 mm. long, flowers unknown to writer.

DESERT FLOWERS UNDER GLASS

The story of my experiences and delight in growing and flowering Cacti and Succulents in a small glasshouse in Christchurch, New Zealand

By MARJORIE E. SHIELDS

CHAPTER 13.

On the bench below the Beautiful Shelf is the last group along this side. These are the little Rebutias, looking so charming with their circles of beautiful flowers. This group was named after P. Rebut, a cactus dealer. All are from South America, usually being found in Argentina and Brazil. The plants being small take up little room and as they flower so freely and when quite young, can be recommended to those with limited space for displaying their treasures. When not in flower however,—and they have one period of blooming only—they are not spectacular; just neat clusters of small tuberculed plants—like and yet unlike some Mammillarias. As the sun is very hot in this Valley they need the broken sunlight provided by the Aloes behind them, this arrangement suiting them perfectly. If given well drained porous soil, plenty of water in summer and kept dry during the three winter months they will repay with a glorious display in the spring. Reminiscent of miniature crocuses aren't they, with their cup shaped flowers and loosely arranged stamens which appear to hang suspended and shine like glow worms in their differently coloured grottos? Most of mine are in various shades of red which is rather disappointing, especially as some could be either red or yellow. But we will find a salmon, a pink, a cerise, a buff and a yellow to add a little variety. Rebutias appear to be in two groups, those with the flowers produced in a circle around the base of the plant and those with their blossoms appearing on the elongated stem. Seed sets very readily, the pods soon bursting to spill their contents into the soil around the plant.

The first to flower is usually R. violaciflora. This name is really a misnomer, for these blossoms are brilliant cerise or shining rosy violet rather than real violet—a most unusual and striking colour. The flower is larger than some and its many white stamens and extended style with five white stigma lobes, and the clear colour of the wide recurved petals make it quite outstanding. R. xanthocarpa follows with smaller orange-red blossoms, soon to be replaced by the "yellow fruits" which give it its name. Then comes R. minuscula, meaning "rather small", and R. pseudo-minuscula with identically coloured fiery red flowers with long slender tubes. The difference between these two plants is that the latter is cylindrical and produces flowers and offsets from the side of the stem, whereas the former is a round flattish plant producing its flowers and offsets from the base. It looks really intriguing just now with its complete ring of babies, all exactly the same size, evenly spaced around it and between them and the mother plant a circle of bright red blossoms with some of the babies adding their flowers to the display. But look at R. steinmannii, with perhaps the smallest flowers, only an inch across. But what a glorious deep red they are! The wide petals breaking from a very short tube form a cup shaped flower and from the white throat long white filaments reach almost to the rim. The plant is a picture with its smother of blossoms.

Then there is R. ritteri. What could be lovelier? The two inch carmine flower, with a short tube and rounded petal tips, differs from the others in that it has a deep maroon throat, almost purplish, with a suggestion of the same purplish tinge colouring the outer petals. R.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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PART 5

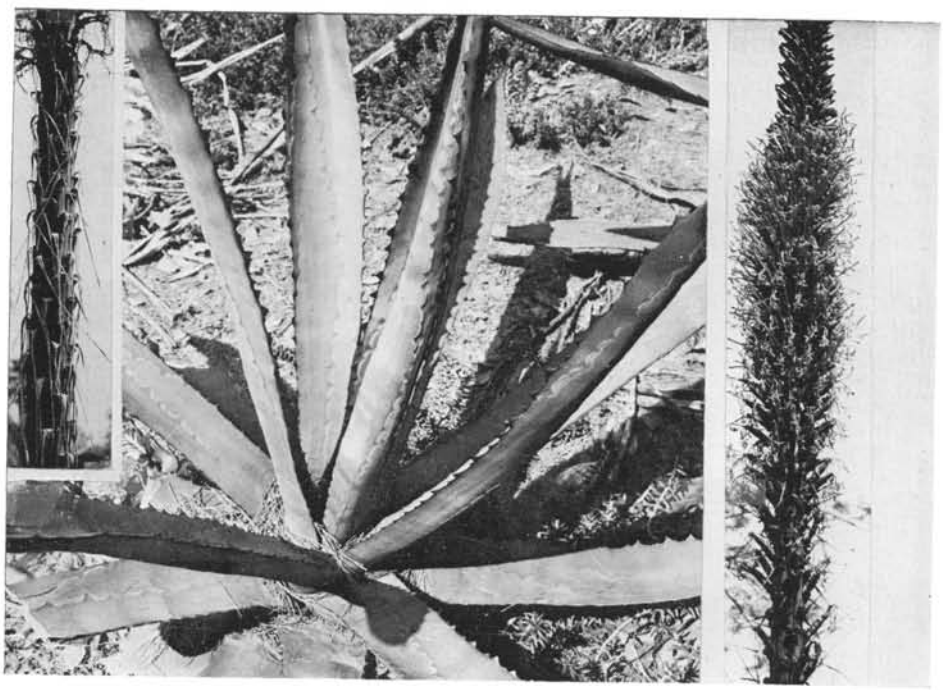

FIG. 86
Agave peacockii. Grown in the Huntington Botanical Garden, San Marino, California. Rosette approx. 1/10 natural size. Inserts: left and right show close-up of flowers and bracts.

Agave peacockii Croucher, Gard. Chron. 1873: 1400, 1873.

A. roezliana var. *peacockii* (Croucher) Trelease in Bailey Standard Cyclop. Hort. 1: 237, 1914.

A. henriquesii Baker, Gard. Chron. 732, 1887.

Distribution: Tehuacan, type cultivated in Europe.

Rosette single, 4 to 5 m. in diameter, about 20 leaved; leaves 60 to 75 cm. long, 7 to 10 cm. broad, glabrous, straight or somewhat falcate and plicate, base biconvex, 6 cm. thick, becoming thinner and shallower, boat-shaped above middle; armature chocolate brown, spine 2 to 3.5 cm. long decurrent into the continuout or sometimes broken horny margins; teeth 1.5 to 4 cm. apart, 3 to 5 mm. long, sometimes double-tipped, often 1 to 3 smaller teeth present between two larger ones; horny margin, when present, 2 mm. broad; inner leaves near inflorescence entire, acuminate; inflorescence 2.30 m. high, bracts spreading or reflexed, narrowly lanceolate to linear, 8 to 15 cm. long, soon dry and inrolled; flowers mostly in pairs, 5 cm. long, perianth 2 cm. long, purple tinged. April-May.

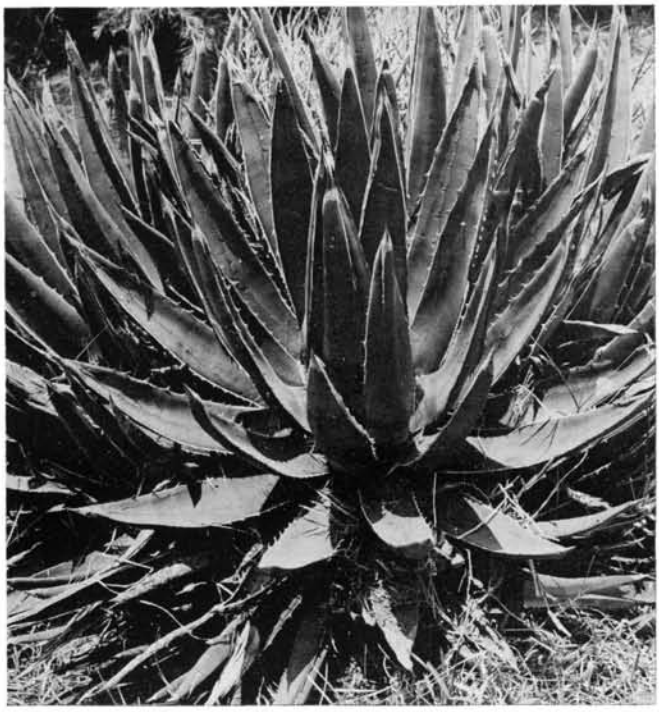

FIG. 87. *Agave triangularis*. Grown in the Huntington Botanical Garden, San Marino, California. Approx. 1/3 natural size.

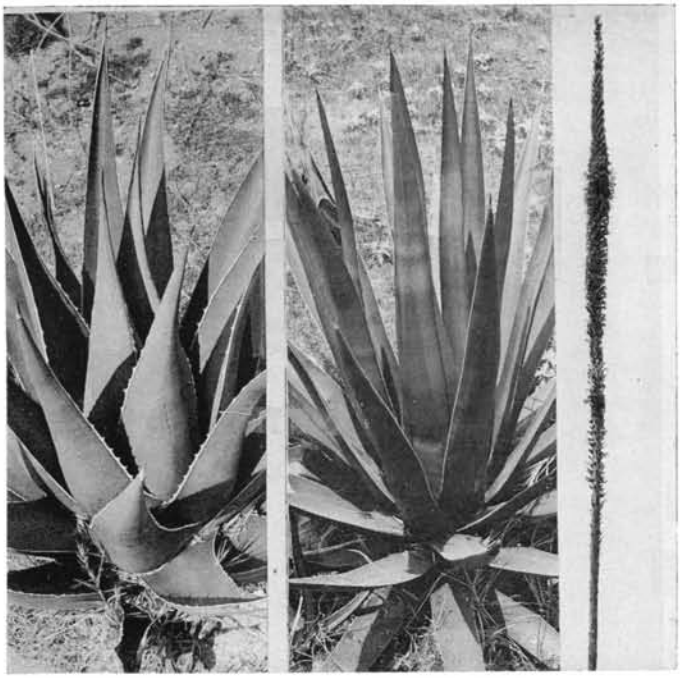

FIG. 88. Left: *Agave triangularis* var. *rigidissima*. Grown by L. Ellenwood, San Fernando, California. Approx. 1/7 natural size. Right: *Agave triangularis* var. *subintegra*. Grown in the Huntington Botanical Garden, San Marino, California. Rosette approx. 1/10 natural size.

Agave triangularis Jacobi, Wochenschr. Ver. Beförd. Gartenb. 1869; 178, 1869.

Distribution: type cultivated in Europe from near Tehuacan.

Rosette 20 cm. in diameter, stoloniferous, leaves thick and very rigid, dark green, triangular, lanceolate, 25 cm. long, 5 cm. wide without ventral stripe nor dorsal lines; armature light brown soon gray; spine triangular, 3 mm. thick, 20 mm. long; teeth gently curved or triangular 3 to 7 mm. long; 15 to 25 mm. apart, the nearly straight intervening horny margin 1 to 2 mm. wide; scape slender, 3 to 5 m. high, flowers cream-colored. August.

Agave triangularis var. **rigidissima** (Jacobi) Trelease in Bailey, Stand. Cycl. Hort. 1: 237, 1914.

Agave rigidissima Jacobi, Wochenschr. Ver. Beförd. Gartenb. 1869: 179, 1869.

Distinguished from the typical species by the larger, more robust rosette to 60 cm. in diameter with leaves 35 cm. long, 13 cm. broad and 3 cm. thick at base.

Agave triangularis var. **subintegra** Trelease in Standley, Trees and Shrubs of Mexico, Contr. U. S. Nat. Herb. 23: 138, 1920.

A. kerchovei var. *inermis* Baker, Gard. Chron. new series 7: 527, 1877.

A. difformis Berger, Die Agaven 95, 1915.

Distinguished from the typical species by having few small or no teeth on leaf margin and longer more slender leaves 65 to 70 cm. long with or without ventral stripe.

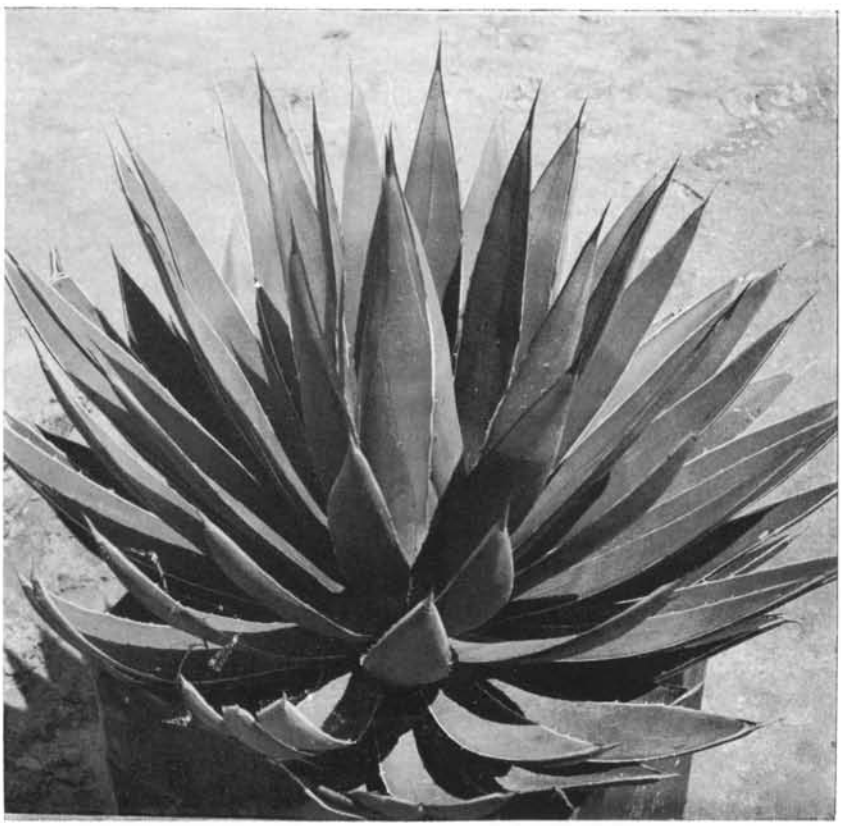

FIG. 89

Agave kerchovei. Grown by H. Johnson, Paramount, California. Approx. 1/6 natural size.

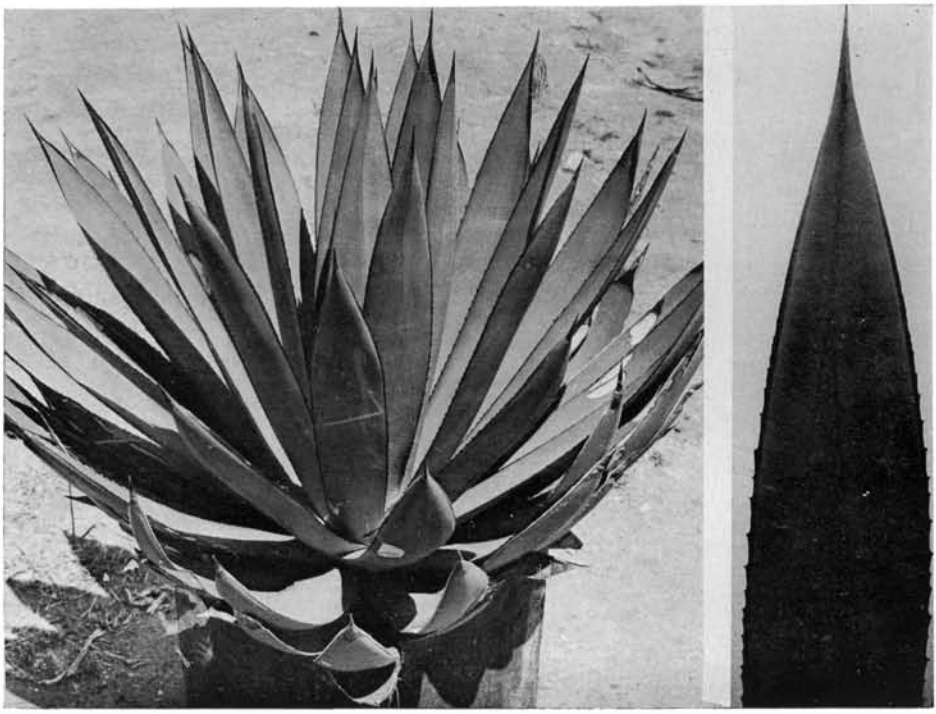

FIG. 90
Agave kerchovei var. *pectinata*. Grown by H. Johnson, Paramount, California. Rosette approx. 1/7 natural size. Right: close-up of leaf showing armature characteristics.

Agave kerchovei Lemaire, Ill. Hort. 11: 64, 1864.

A. beaucarnei Lemaire, Ill. Hort. 11: 65, 1864.

Distribution: Type cultivated in Europe, probably from Puebla.

Rosette single, 40 to 60 cm. in diameter; leaves 20 to 35 cm. long, 3 to 5.5 cm. broad, stiff near base, dark green, without ventral stripe or dorsal lines, armature dark purple-black becoming gray in age; spine 1.5 cm. long, continuous into the 1 mm. wide horny leaf margin, teeth 5 to 7 along middle of leaf margin, 1 to 2 cm. apart, .05 to 1 mm. long, entire near apex and base; inflorescence dense, erect.

Agave kerchovei var. **pectinata** Baker, Gard. Chron. new series 527, 1877.

Distinguished from the typical species by the close-set teeth 5 to 15, (average 10) mm. apart, occasionally with 1 to 2 minute prickles between two larger ones.

Agave vittata Regel, Gartenflora 7: 313, 1858.

Agave hynaldii Todaro. Hort. Panorm. 1: 88, 1876.

Agave toneliana Baker, Gard. Chron. 1881: 362, 1881.

Distribution: Nuevo León; type cultivated in Europe, probably from the mountains near Monterrey.

Rosette single or with few offsets, 1.3 m. in daimeter, leaves 50 cm. long, 3.5 cm. broad, dark green; spine purplish black, 1 cm. long, decurrent into the continuous, at first light brown, soon gray; horny margin .05 mm. broad; teeth 1.5 to 2 cm. apart, about 1 mm. long; scape 4 m. high, inflorescence dense, 2.5 m. long; bracts linear, involute, 6 to 13 cm. long, 15 mm. broad at base. May-June.

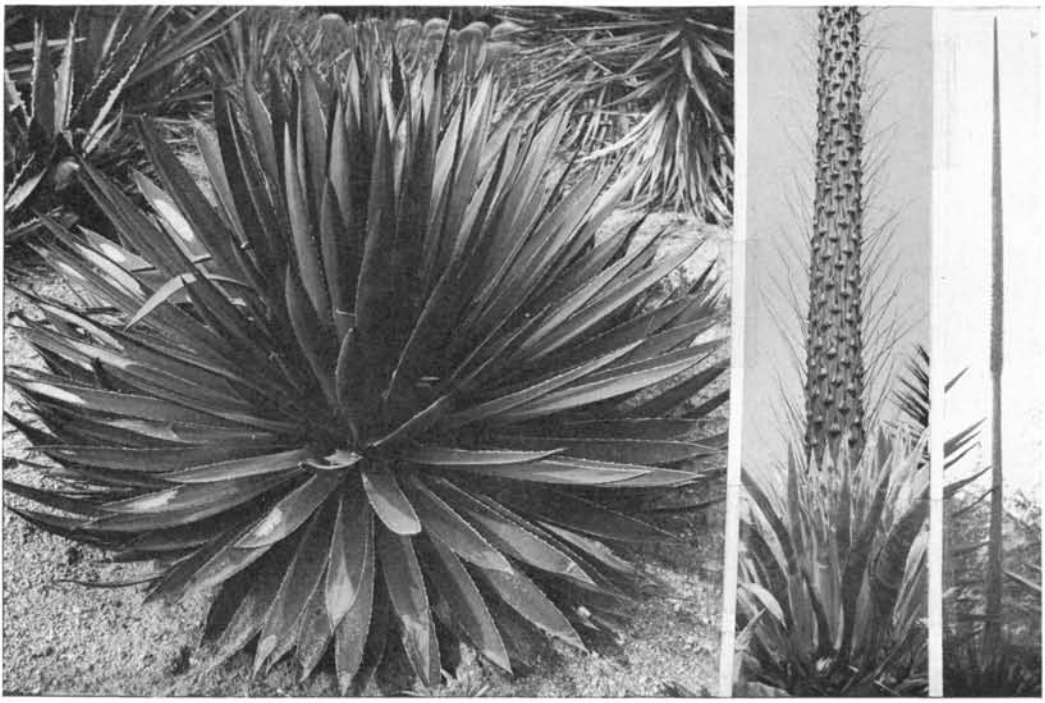

FIG. 91
Agave vittata. Grown in the Huntington Botanical Garden, San Marino, California. Rosette approx. 1/12 natural size.

TREASURER'S REPORT TO THE AFFILIATES

What do the affiliates get for their dues? We hear this complaint so often. Let us look over the Ledger to see what the figures reveal.

Affiliate dues collected the last two years (between conventions)	$245.00	
Received from Convention Treasurer 1959 (Registration fees less local expenses)	114.35	
	$359.35	$359.35
Convention expense		
Postage	66.75	
Stationery	13.52	
Badges	24.81	
Printing		
Envelopes	10.92	
Information sheets	88.40	
Reservation forms	26.00	
Programs	43.68	
Ticket books	39.00	
Initiation certificates	15.60	
	$328.68	$328.68
		$ 30.67
Affiliate Secretary Expenses & Slide postage to Affiliates		23.19
Balance in Affiliate Fund		$ 7.48

The Affiliate dues plus the registration fees at the convention just about balance the printing and mailing costs, not to say anything about some other expenses which were paid personally by some of the officers.

This leaves very little in the Affiliate Fund with which to obtain new slides and to provide other services which the Board of Directors would like very much to provide for the Affiliates if there were funds available. Many of the present collection of slides have been donated by various members.

The $4.00 membership and subscription fee goes entirely for the publication of the Journal. Here we are getting an outstanding publication for a price that is way below what other societies are paying for their magazines.

The Society has no source of income except the few Associate Memberships ($1.00) which are paid largely by the wives of the Board members and a few others. New Memberships at $4.00 sent in directly to the Affiliate Secretary net the Society $1 each.

All traveling and other expenses of the officers of the Society are paid by them personally and not by the Society.

In past years, there were some enthusiastic members who helped the finances of the Society by contributing to a Sustaining Fund. These contributions individually were not large but the total of all of them was a big help in maintaining the activities of the Society. Sorry to say this source of income has ceased. One very kind member did donate a small sum to the Society but this has been gradually reduced over the years.

R. T. CRAIG, *Treasurer*

EDITOR'S NOTE

This last issue of the Journal in volume 31 is mailed early to avoid the Christmas mail rush. If your subscription expires before the start of volume 32, you will receive an expiration notice that you should return promptly in order to be sure of the next issue.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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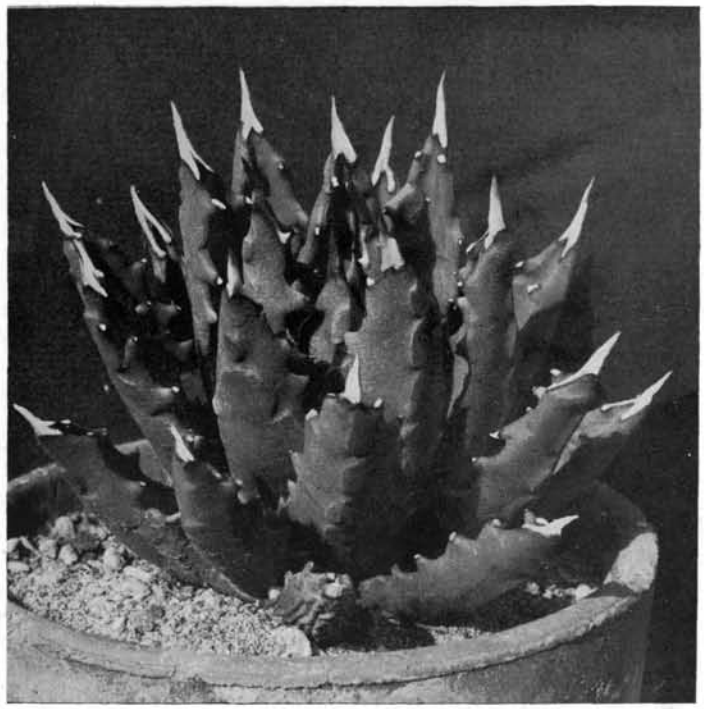

FIG. 9
Agave utahensis (typical). Grown by Don Skinner, Los Angeles, Calif., introduced from Beaver Dam Mts., vicinity of St. George, Utah. Approx. natural size.

PART 6

Agave utahensis Engelmann in S. Watson, Bot. King. Expl. 497, 1871.

A. scaphoidea Greenman & Roush, Ann. Mo. Bot. Gard. 16: 391, 1929.

A. utahensis var. *scaphoidea* (Greenman & Roush) M. E. Jones, Contrib. West Bot. No. 17: 19, 1930.

A. haynaldii var. *utahensis* Terraciano, Primo contributo ad una Monographia delle Agave, Napoli 28, 1875.

Field and herbarium studies indicate five rather well marked geographic entities of *Agave utahensis* designated here as varieties.

Key to the varieties of *Agave utahensis*

Spine 1 to 3 cm. long.
- Rosette 2 to 3 dm. in diameter, caespitose, usually producing numerous offsets; terminal spine sessile.
  - Leaf margin sinuate. . . . . *A. utahensis* var. *typica.*
  - Leaf margin straight. . . . . *A. utahensis* var. *discreta.*
- Rosette robust, 6 to 10 dm. in diameter, solitary; terminal spine decurrent for 10 to 15 cm. . . . . *A. utahensis* var. *kaibabensis.*

Spine 3 to 20 cm. long.
- Leaves glaucous-green; terminal spine slender, dark brown, 3 to 8.5 cm. long. . . . . *A. utahensis* var. *nevadensis.*
- Leaves olive-green; terminal spine stoutish, ivory colored, 10 to 20 cm. long. . . . . *A. utahensis* var. *eborispina.*

Agave utahensis var. **typica.**

Rosette caespitose, usually with numerous offsets, 2 to 3 dm. in diameter; leaves 12 to 20 cm. long, 2 to 3 cm. broad, glaucous; armature at first brown, becoming gray; spine 1 to 2 cm. long; teeth slightly curved, 1.5 to 2 mm. long, 2 to 3 cm. apart between which the margin is sinuate and herbaceous; flower-stalk 1.5 to 2.5 m. high, inflorescence a narrowly racemose panicle, flowers yellow 22 to 30 mm. long, including the ovary; fllaments inserted near the middle of the short, broadly funnelform perianth tube. June-July.

Distribution: desert and mountainous areas at 1,000 to 2,500 m. elevation; Utah, Beaver Dam Mts., north to Silver Reef; type locality, St. George.

Agave utahensis var. **discreta** M. E. Jones, Contrib. West. Bot. No. 17: 19, 1930.
A. newberryi Engelmann in S. Watson, Bot. King. Expl. 497, 1871.

Distinguished by the light green leaves, short spine, brown-based teeth between which the margin is straight.

Distribution: South of the Grand Canyon, Arizona, from Peach Springs (type locality of *A. newberryi*) to Oatman (type locality of *A. utahensis* var. *discreta*).

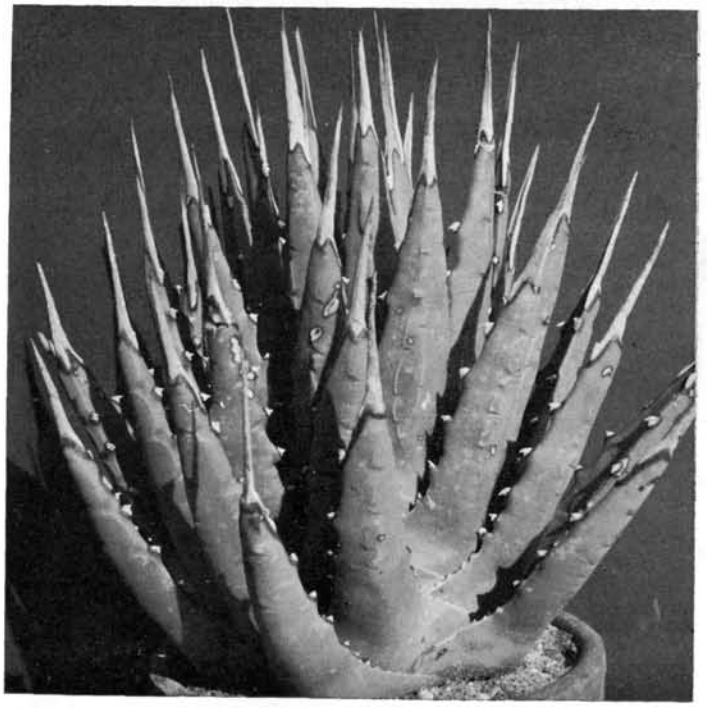

FIG. 10
Agave utahensis var. *discreta*. Grown by Don Skinner, Los Angeles, Calif. introduced from Peach Springs, Arizona. Approx. ½ natural size.

Agave utahensis var. **kaibabensis** (McKelvey) Breitung, **stat. nov.**
A. kaibabensis McKelvey, Journ. Arn. Arboretum, 30: 227, 1949.

Distinguished from all other variations of *A. utahensis* by its collosal size, mature rosettes measure from 0.7 to 1.4 m. in diameter, solitary, rarely with 1 to 3 offsets; leaves straight, 3 to 3.5 dm. long, 5 to 6.5 cm. broad, light green; armature gray, brown-based; spine 1 to 3 cm. long, decurrent for 10 to 15 cm.; teeth 1 to 2 cm. apart, 1.5 to 3.5 mm. long, curving either backward or forward; flower-stalk 4.5 m. high.

Distribution: Arizona; Grand Canyon and its tributaries (north rim below Kaibab Plateau, the type locality). Plants observed at Scenic View, Little Colorado Canyon 11 miles west of Cameron are identical with those at the north rim.

According to E. F. Castetter, et al, in "The Early Utilization of the Distribution of Agave in the American Southwest", Univ. New Mexico Bull. 335, page 37, fig. 4, 1938, mescal

pits occur at numerous localities throughout the Grand Canyon. Published photographs of this plant are cited by McKelvey, l.c. 229. In addition, photographs have appeared in the following publications: A. Berger, Die Agaven, 106, fig. 21, 1915, as A. utahensis; Check List of Plants of Grand Canyon National Park, Natural History Bulletin No. 6, 1936 (front cover); L. Benson & R. A. Darrow, Manual of southwest desert trees and shrubs, Univ. Ariz., Bull. 15: 91, 1944; Arizona Highways 21(4): 26, 1945 as "Yucca"; Arizona Highways 30(3): 35, 1954; Grand Canyon National Park, U. S. Dept. Interior, Washington, 1955 (front cover).

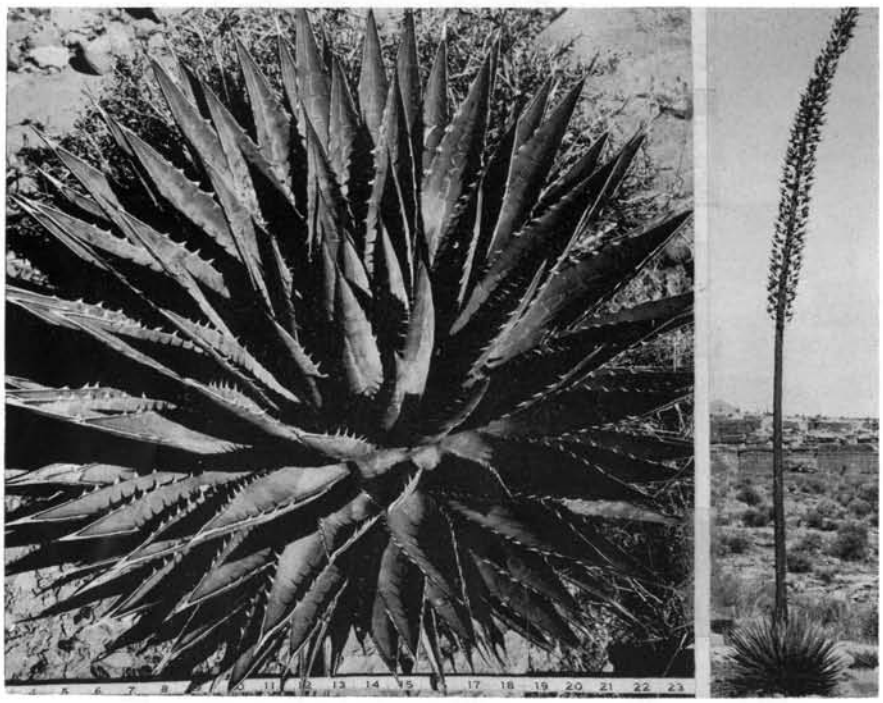

FIG. 11
Agave utahensis var. *kaibabensis* in natural habitat, edge of canyon of the Little Colorado River, 11 miles west of Cameron, Arizona. Left: rosette approx. 1/7 natural size. Right: inflorescence approx. 1/36 natural size.

Agave utahensis var. **nevadensis** Engelmann in Greenman & Roush, Ann. Mo. Bot. Gard. 16: 390, 1929.

A. nevadensis (Engelmann ex Greenman & Roush) Hester, Cactus & Succ. Journ. 15: 133, 1943.

Leaves glaucous-green as in var. *typica* but distinguished by the much longer terminal spine which is 3 to 8.5 cm. long.

Distribution: California: Ivanpah, Clark and Kingston Mts. (according to Munz & Keck in Calif. Flora, 1363); type locality, Ivanpah Mts. Nevada: Potosi and Charleston Mts.

Agave utahensis var. **eborispina** (Hester) Breitung, **stat. nov.**

A. eborispina Hester, Cactus & Succ. Journ. 15: 131-133, 1943.

The ivory colored spine 10 to 20 cm. long, large 5 to 7 mm. long teeth and light green, not glaucous leaves distinguish this variety.

Distribution: Nevada; Sheep Range Mts. (type locality: Peek-a-boo Mtn.) approximately 35 miles north west of Las Vegas and Sunrise Mtn.

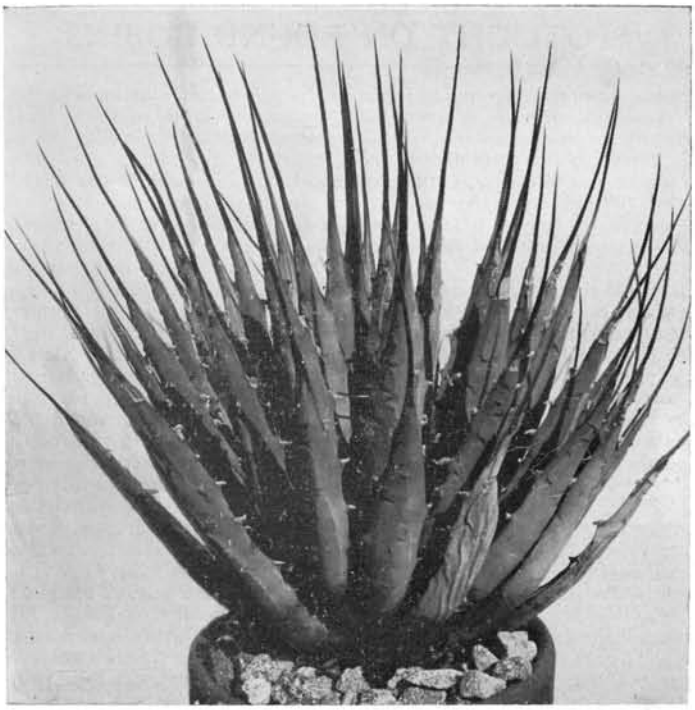

FIG. 12
Agave utahensis var. *nevadensis*. Grown by Don Skinner, Los Angeles, Calif., introduced from Mescal Ridge, Ivanpah Mts., Calif. Approx. ½ natural size.

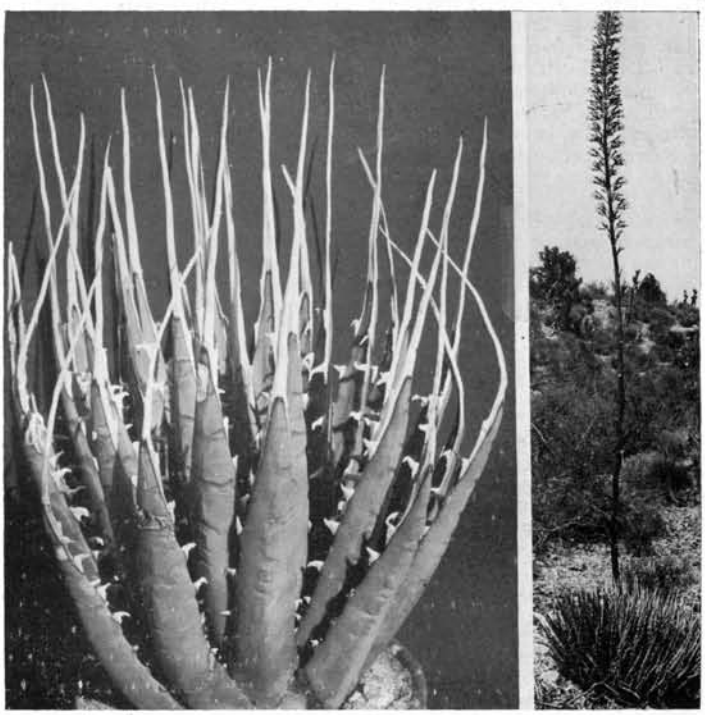

FIG. 13
Agave utahensis var. *eborispina*. Grown by Madame Ganna Walska, Santa Barbara, Calif., introduced from Peek-a-boo Canyon, Sheep Range Mts., Nevada. Left: rosette approx. ½ natural size. Right: flowering plant in natural habitat, 1/24 natural size.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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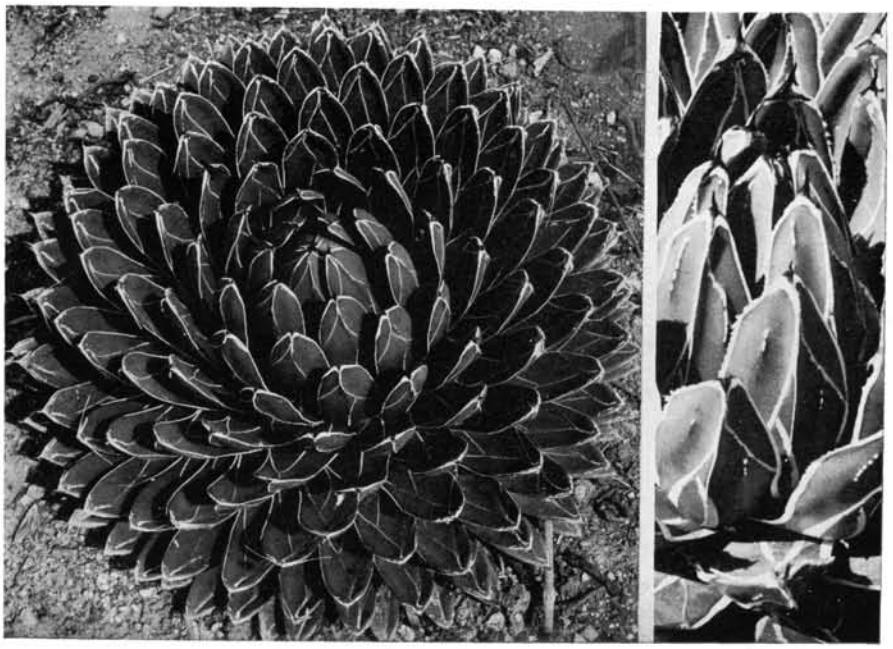

FIG. 21
Agave victoriae-reginae. Left: grown in the Huntington Botanical Garden, San Marino, California. Approx. 1/4 natural size. Right: *A. victoriae-reginae* forma *dentata.* Grown by Hubert Monmonier, Los Angeles, Calif., from seed collected in Mexico. Approx. 1/2 natural size.

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Agave victoriae-reginae T. Moore, Gard. Chron. new series 4: 484, 1875.
A. consideranti Carr. Rev. Hort. 1875: 429, 1879.

Distribution: Nuevo León, Coahuila and Durango; Type locality: near Monterrey, Nuevo León.

Rosette usually single or with few offsets, rarely densely caespitose, 5 to 7 dm. in diameter, very leafy; leaves 10 to 15 cm. long, 5 to 7 cm. broad, acute, abruptly narrowed to a rounded apex, straight or incurved, very rigid, glabrous, dark green with conspicuous irregular white markings or these rarely absent, concave above, convex beneath and sharply keeled above middle; terminal spine 1.5 to 10 mm. long, occasionally with 1 to 2 smaller auxiliary spines, at first dark brown, soon black, the white horny margin entire or rarely with small white teeth; scape 3 to 4 m. high, inflorescence dense; flowers cream-colored. July.

Eight rather well marked forms of *Agave victoriae-reginae* are described as follows:

Agave victoriae-reginae forma **typica.**

Rosette very leafy, leaves 10 to 15 cm. long, 3 to 4 cm. wide, abruptly rounded at the apex, terminal spine 2 to 5 mm. long.

Agave victoriae-reginae forma **dentata** Breitung, **forma nova.** A forma typica differt: foliorum parte media marginali aliquot dentibus brevibus albis retrorsis armata.

Distinguished from the typical form by having the middle of the leaf margin armed with several short, downward pointing white teeth.

Type No. 18161 deposited in Calif. Acad. Sciences, San Francisco.

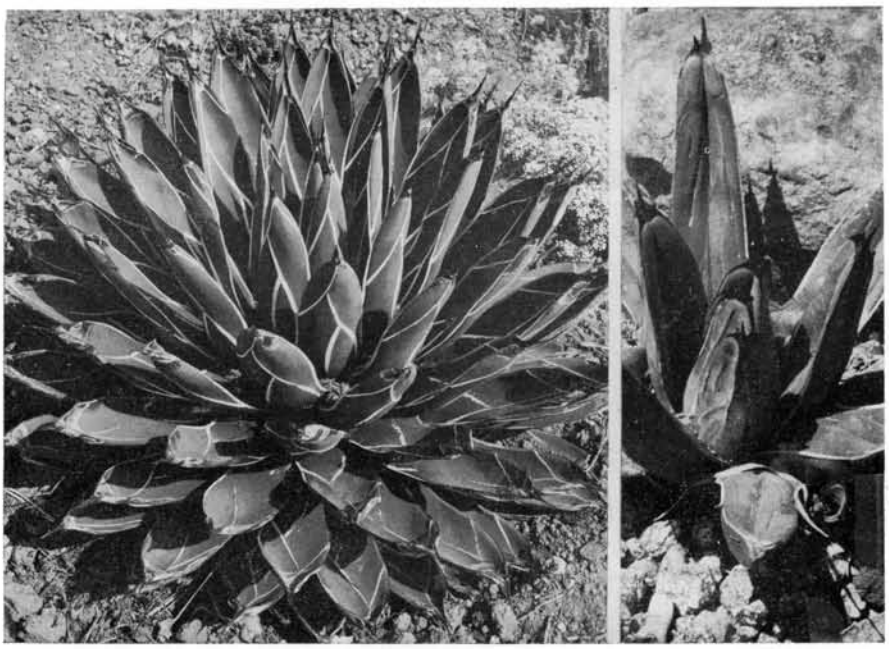

FIG. 22
Agave victoriae-reginae forma *nickelsii*. Left: grown in the Huntington Botanical Garden, San Marino, California. Right: *A. victoriae-reginae* forma *viridis*. Grown by Hubert Monmonier, Los Angeles, Calif., from seed collected in Mexico. Approx. ⅓ natural size.

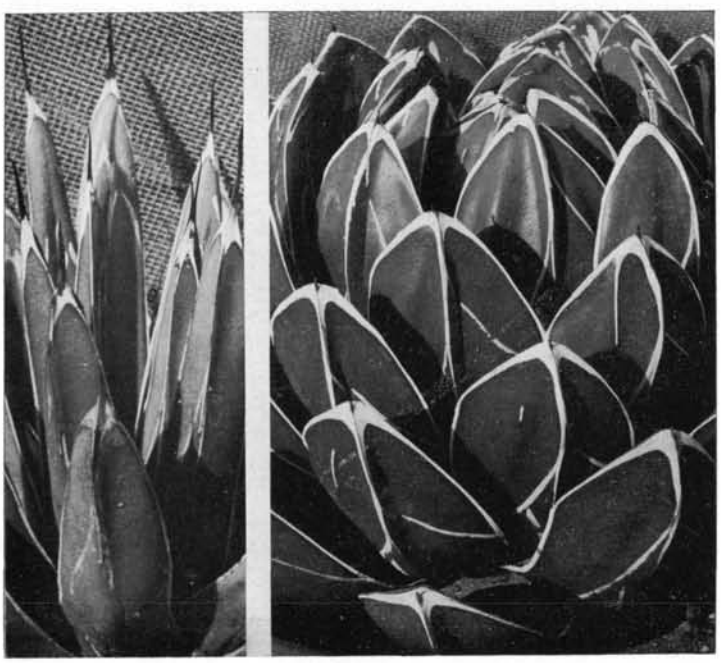

FIG. 23
Agave victoriae-reginae forma *longispina*. Left: grown by Hubert Monmonier, Los Angeles, Calif., from seed collected in Mexico. Approx. ½ natural size. Right: *A. victoriae-reginae* forma *latifolia*. Grown by Hubert Monmonier, Los Angeles, Calif., from seed collected in Mexico. Approx. ½ natural size.

Agave victoriae-reginae forma **nickelsii** (Hort. ex Rolland Gosselin) Trelease in Standley, Contrib. U. S. Nat. Herb. 23(1): 140, 1920.

A. nickelsii Hort. ex Rolland Gosselin, Rev. Hort. 1895: 575, 1895.
A. victoriae-reginae var. *laxior* Berger, Hort. Mortol 15: 364, 1912.
A. ferdinand-regis Berger, Die Agaven, 90, 1915.

Distinguished from the typical form by the fewer leaved, more open rosette; leaves acute from base to apex up to 22 cm. long; terminal spine 2 cm. long, usually with a pair of auxiliary short spines.

Agave victoriae-reginae forma **viridis** Breitung, **forma nova:** foliis omino viridibus, non albo-notatis.

The absence of white leaf markings distinguished this form.
Type No. 18162 deposited in Calif. Acad. Sciences, San Francisco.

Agave victoriae-reginae forma **longispina** Breitung, **forma nova:** foliis apice spinam perlongam tenuem nigram paulo torulosam, 2.5-3.5 cm. longam, basi 1.5 mm. latam ferentibus.

Distinguished by the unusually long, slender, terminal spine, 2.5 to 3.5 cm. long, black, slightly tortuose, 1.5 mm. broad at the base.
Type No. 18163 deposited in Calif. Acad. Sciences, San Francisco.

Agave victoriae-reginae forma **latifolia** Breitung, **forma nova.** Forma foliis perlatis, 4-6 cm. latis, insignis.

Distinguished by the unusually broad (4 to 6 cm.) leaves. The compact rosette composed of many broad, short, dark-green leaves with conspicuous white markings renders this as the most attractive and decorative form of *Agave victoriae-reginae.*
Type No. 18164 deposited in Calif. Acad. of Sciences, San Francisco.

Agave victoriae-reginae forma **ornata,** Breitung, **forma nova:** foliis plus minusve varie-

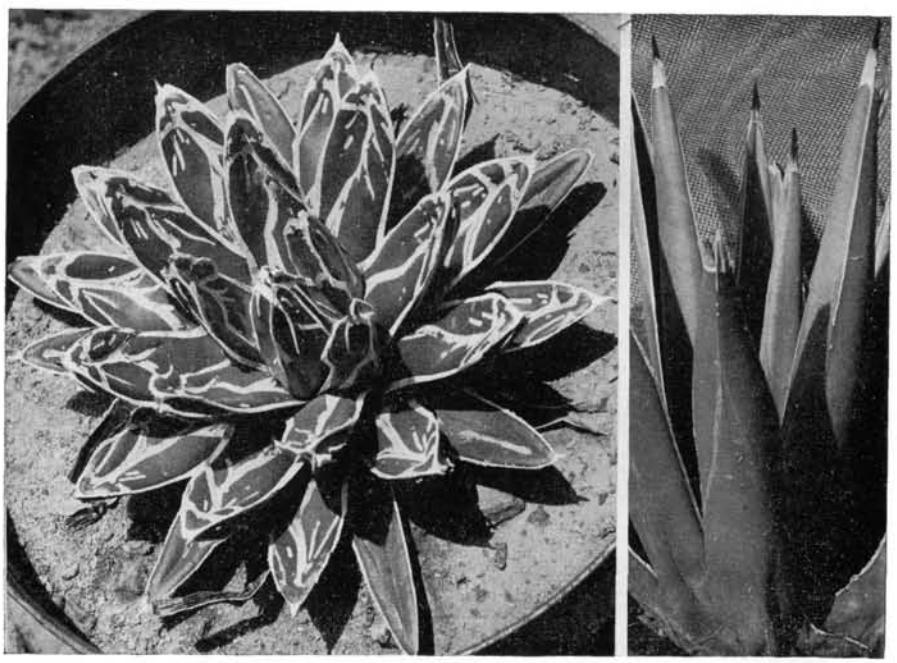

FIG. 24

Agave victoriae-reginae forma *ornata.* Left: grown by Hubert Monmonier, Los Angeles, Calif., from seed collected in Mexico. Approx. ⅔ natural size. Right: *A. victoriae-reginae* forma *longifolia.* Grown by Hubert Monmonier, Los Angeles Calif., from seed collected in Mexico. Approx. ⅓ natural size.

gatis, multas latas albas notationes ferentibus.

Agave victoriae-reginae forma **longifolia** Breitung, **forma nova.** A forma typica differt: foliis acuminatis perlongis, 2-3 dm. longis.

Distiguished by the long, acuminate leaves which are 2 to 3 dm. long.
Type No. 18165 deposited in Calif. Acad. Sciences, San Francisco.

FIG. 25 *Cryptocereus anthonyanus* was introduced by the author in 1950

CRYPTOCEREUS ANTHONYANUS

This monotypic genus is a recent introduction. The type locality is just north of Ocozocoautla, Chiapas, Mexico.

My experiences with Cryptocereus, in New York and in Mexico, indicate that it is one of the easier to grow of the epiphytic cacti. The known habitats are in the shade of rain forests at comparatively low altitudes, but under cultivation Cryptocereus tolerates a variety of temperature, light, and humidity conditions.

In the city of Oaxaca, with temperature and humidity considerably below those of its habitats, Cryptocereus grows well, and, where trained against a white wall in heavy shade, is extremely effective, both for the patterns made by the pads and for the deep, glossy green these assume.

The plant illustrated growns in the patio of Don Lisendro Maza, a mere "stone's throw" from the type locality. It would make a good story to say it was introduced to his patio from New York, and this could well be true because Cryptocereus was introduced to cultivation in Ocozocoautla only after it had been described from a plant grown and flowered in the New York area.

Actually, the plant illustrated was started as a cutting brought from the forest. As first it grew on a porch pillar, then spread to the roof tiles in the shade of the guarumbo tree shown. Both tree and cactus continue to grow, but, as may be observed, the latter has far outgrown its shade. In Oaxaca, under these circumstances, I think the pads would burn. Here there is only a slight yellowing.

In a patch of rain forest, on a broken limestone formation north of Berriozabal, Chiapas, Cryptocereus commonly clambers over rocks. Under house culture it could make an effective hanging basket.

The flowers of Cryptocereus are so striking one could wish for them to be more frequent and less fugaceous. A friend—not an early riser to be sure—once remarked, "it's too bad the flowers don't open wider."

T. MACDOUGALL

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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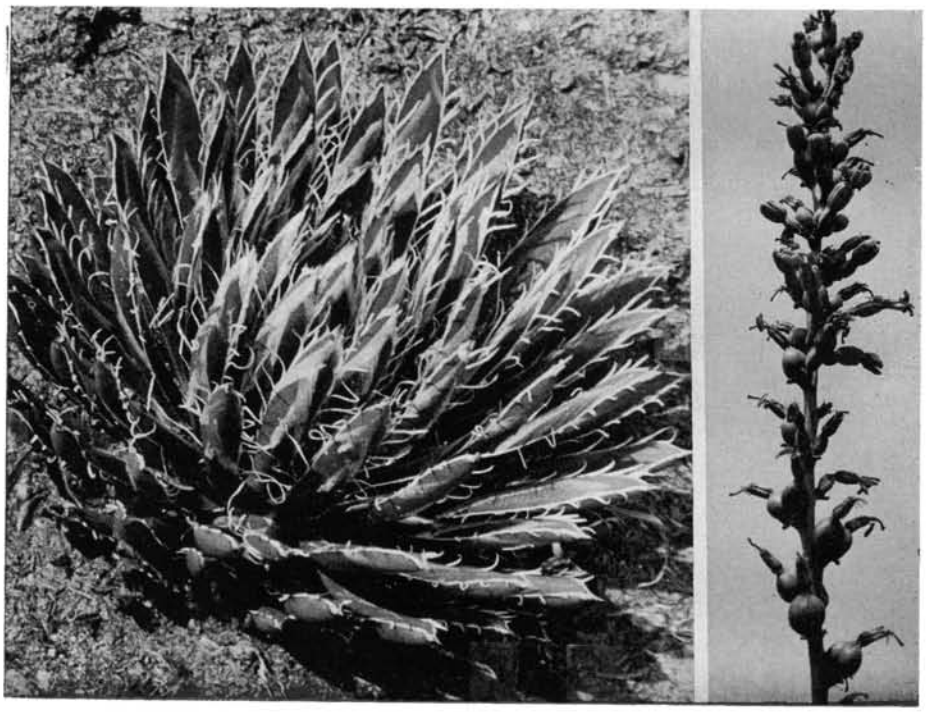

Fig. 39
Agave parviflora. Rosette grown by G. Glade, Tujunga, Calif. Approx. 2/3 natural size.

PART 8

SECTION 3. XYSMAGAVE Berger

Agave parviflora Torrey, U.S. & Mex. Bound. Bot. 214, 1859.
A. hartmani S. Watson, Proc. Amer. Acad. 26: 156, 1891.

Distribution: A rare species, known only from a few localities in northern Chihuahua, southern Arizona and adjacent Sonora; type locality: Sierra del Pajarito, Sonora.

Mature rosettes 7 to 18 cm. in diameter, single or stoloniferous; leaves 4 to 10 cm. long, 7 to 10 mm. wide, biconvex, dark green with conspicuous white markings, coarse marginal threads on upper two thirds of blade, serrulate at base; spine 4 to 7 mm. long, reddish-brown; inflorescence 0.60 to 1.10 m. high; flowers red tinged, glaucous, 12 mm. long including the ovary, filaments inserted at base of the perianth tube; capsules globose, 9 to 12 mm. long. June-July.

Agave toumeyana Trelease in Standley Contrib. U.S. Nat. Herb. 23(1): 140, 1920.

Distribution: South-central Arizona, type locality: Pinal Mountains.

Rosette caespitose, 3 to 8 dm. in diameter, leaves 15 to 25 cm. long, 10 to 25 mm. wide, concave on the upper surface, rounded and slightly keeled beneath, light green with white markings and fine marginal threads along upper two thirds, the base minutely denticulate; spine 5 to 8 mm. long; inflorescence 2 to 3 m. high; flowers 18 to 25 mm. long, including the ovary, pale yellow, filaments inserted at or near the summit of the perianth tube; capsules 11 to 15 mm. long. June-July.

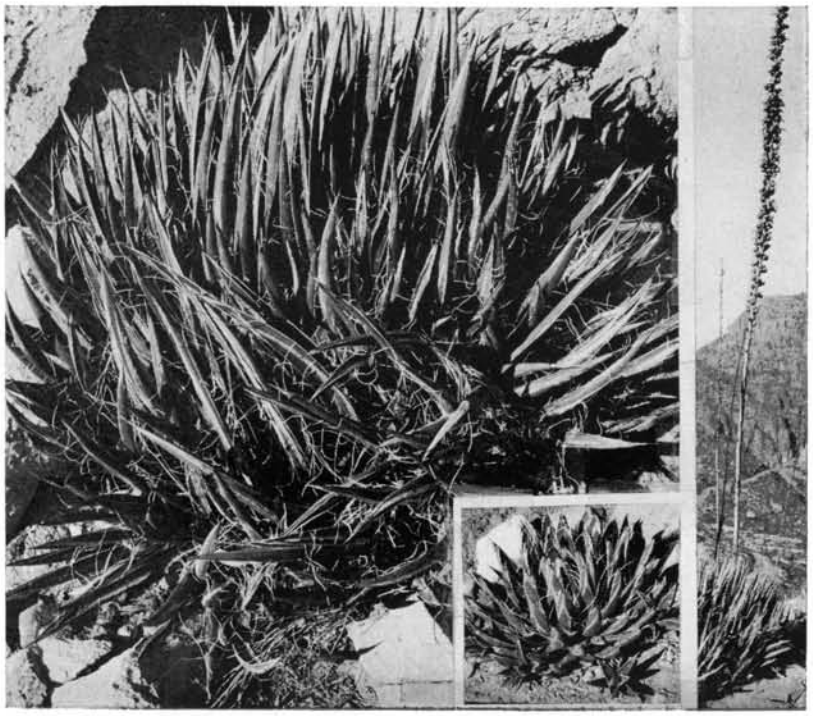

Fig. 40
Agave toumeyana. In natural habitat, Superior, Arizona. Rosette approx. 1/4 natural size. Inflorescence 1/50 natural size. In natural habitat, Superior, Arizona.
Inset: grown by G. Glade, Tujunga, Calif.

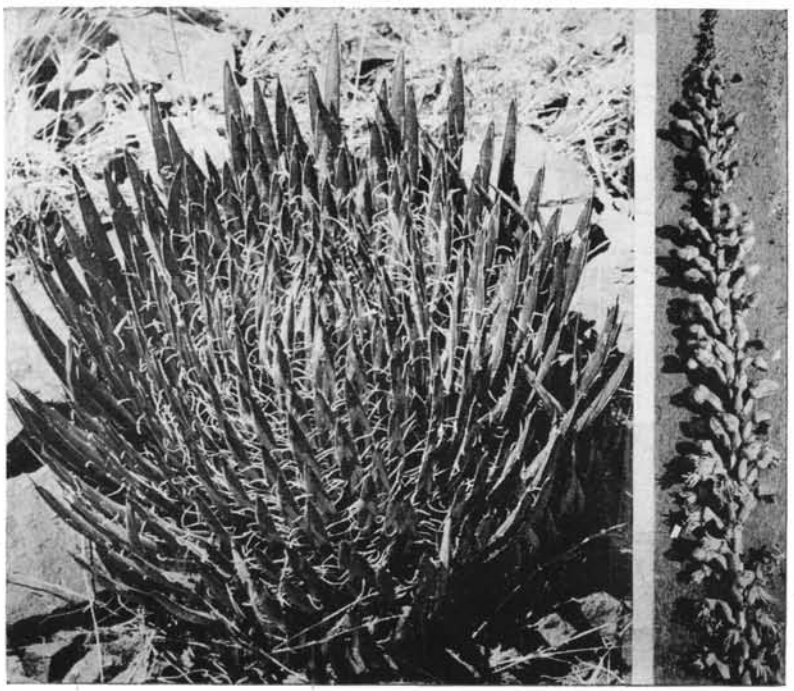

Fig. 41
Agave toumeyana var. *bella*. Left: rosette in natural habitat, 54 miles north of Superior, Arizona; approx. 1/2 natural size. Right: close-up of inflorescence from same locality; reduced approx. X 4.

Agave toumeyana var. **bella** Breitung, **var. nov.**

A var. *toumeyana* differt: foliis brevioribus crebrioribusque, confertis, rosulas densas effingentibus, etc.

Differs from the typical form by the shorter, more numerous leaves forming dense beautiful (hence "bella") rosettes; flowers as in typical *A. toumeyana.* Except for the more numerous leaves, the rosettes of this variety closely simulate *A. parviflora.*

Distribution: type locality, Parker Creek Canyon, Sierra Ancha Mts., 54 miles north of Superior, Arizona. Apparently restricted to the Sierra Ancha Mts. The absence of intermediate forms in this area suggest a well differentiated geographic race.

Type collected by A. J. Breitung & R. D. Gibbon, no. 18153, deposited in the Calif. Acad. of Sciences, San Francisco.

Agave schottii Engelmann, Trans. Acad. St. Louis 3: 305, 1875.

A. geminiflora var. *sonorae* Torrey, U.S. & Mex. Bound. Bot. 214, 1859.

A. mulfordiana Trelease in Standley, Cont. U.S. Nat. Herb. 23(1): 140, 1920.

Distribution: southern Arizona (type locality: Sierra del Pajarito), Rincon Mts., the type locality of *A. mulfordiana,* south western New Mexico, and northern Sonora.

Rosette caespitose, 35 cm. in diameter; leaves comparatively few, linear, falcate, 20 to 30 cm. long, 5 to 8 mm. wide, light green with glaucous markings, flat on upper surface, convex beneath, margin entire with fine white threads; spine slender, 8 to 10 mm. long, chestnut brown; inflorescence 1.50 to 1.75 m. high; flowers 30 to 50 mm. long (including the ovary), yellow. May-June.

Agave schottii var. **treleasei** (Toumey) Kearney & Peebles, Journ. Wash. Acad. Sci. 29: 474, 1939.

A. treleasei Toumey, Rep. Mo. Bot. Gard. 12: 75, 1901.

Type locality: Castle Rock in Santa Catalina Mts., and Ajo Mts., Arizona.

Distinguished from the typical species by the dark green leaves, 30 to 40 cm. long, 15 to 25 mm. wide and nearly flat on the upper surface.

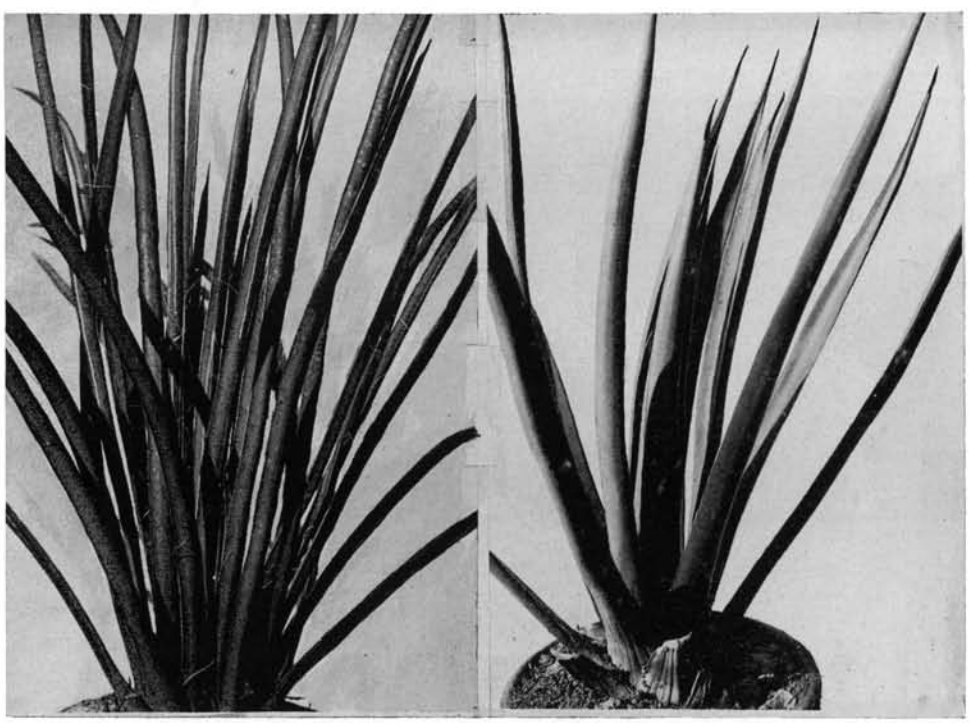

Fig. 42

Left: *Agave schottii,* grown by L. Ellenwood, San Fernando, Calif., approx. 1/3 natural size. Right: *A. schottii* var. *treleasei,* grown by G. Glade, Tujunga, Calif.; approx. 1/3 natural size.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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Agave schidigera Lemaire, Ill. Hort. 9: pl. 330, 1860.
A. filifera var. *adornata* Scheidw. Wochenschr. Ver. Beford. Gartenb. 4: 287, 1861.
A. vestita S. Watson, Proc. Amer. Acad. 25: 163, 1890.

Distribution: Mexico; Michoacan (type cultivated from vicinity of Volcán Jorullo), Zacatecas, Mexico and Jalisco (the type of *A. vestita* with more prismatic threads, from near Guadalajara).

Rosette single, 7 dm., leaves numerous, uniformly spreading, green or purplish, 20 to 30 cm. long, 1.5 to 2 cm. wide; spine 7 to 10 mm. long, brown; margin entire with rather numerous coarse and coiled, long, white marginal threads 2 mm. wide; scape 2 m. high with triangular bracts 15 cm. long and 15 mm. broad, inflorescence dense; perianth 50 to 55 mm. long, green, reddish tipped; capsule 25 mm. long.—August.

Agave angustissima Engelmann, Trans. Acad. St. Louis 3: 306, 1875.

Distribution: Mexico; Tepic (the type from "Ocotillo, direction of Tepic"), Nayarit to Sinaloa and Sonora.

Rosette usually single 7 to 9 dm. in diameter; leaves numerous, uniformly spreading or falcate, 40 to 60 cm. long, 2.5 cm. broad at the base, gradually acuminate, 1.5 cm. broad at middle, green with few glaucous markings, margin entire with slender, loosely coiled white marginal threads 4 to 10 cm. long; spine flattened, brown, 5 mm. long; inflorescence (according to Berger, l.c. 70) 2 to 4 m. high; flowers in pairs, yellow; capsules beaked, 18 to 20 mm. long.

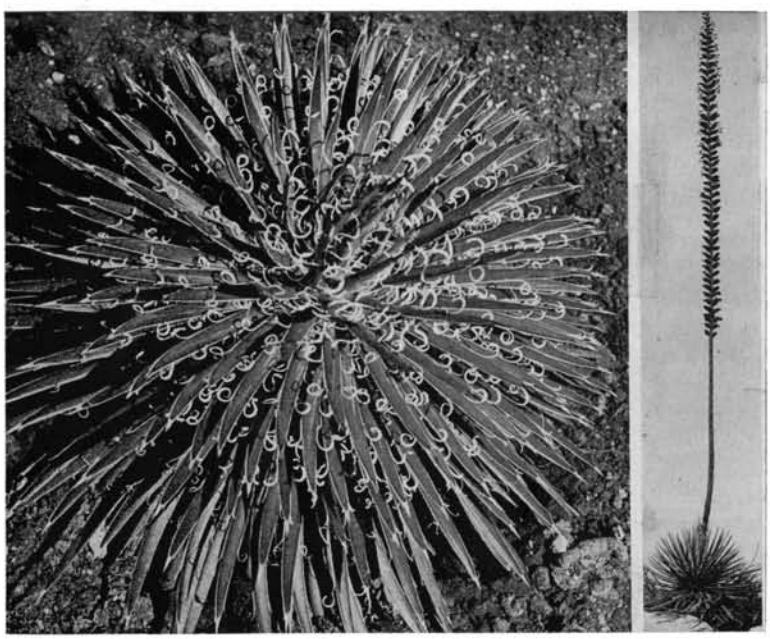

Fig. 55
Agave schidigera. Left. rosette grown by Lucie Wagner, Hollywood, California, approx. ¼ natural size. Right: grown by Judy Buttner, Fallbrook, California.

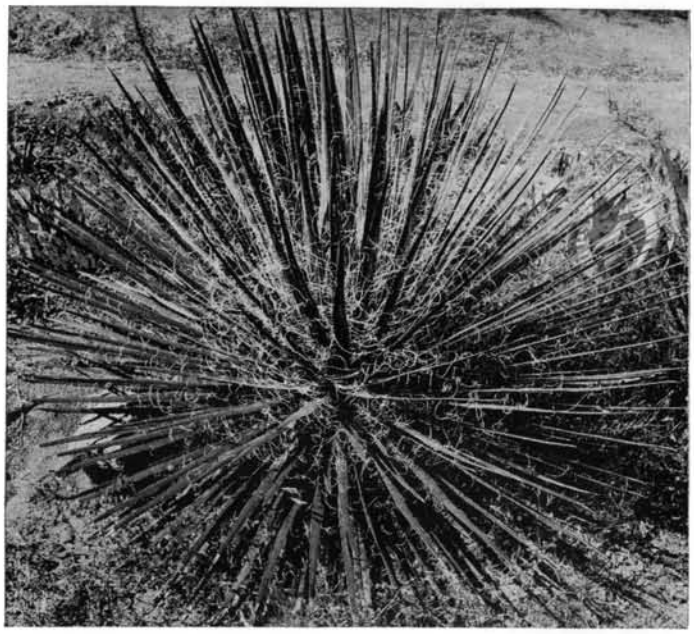

Fig. 56
Agave angustissima. Grown by H. S. Gentry, Murrieta, California.
Introduced from Sierra Charuco, Sonora.

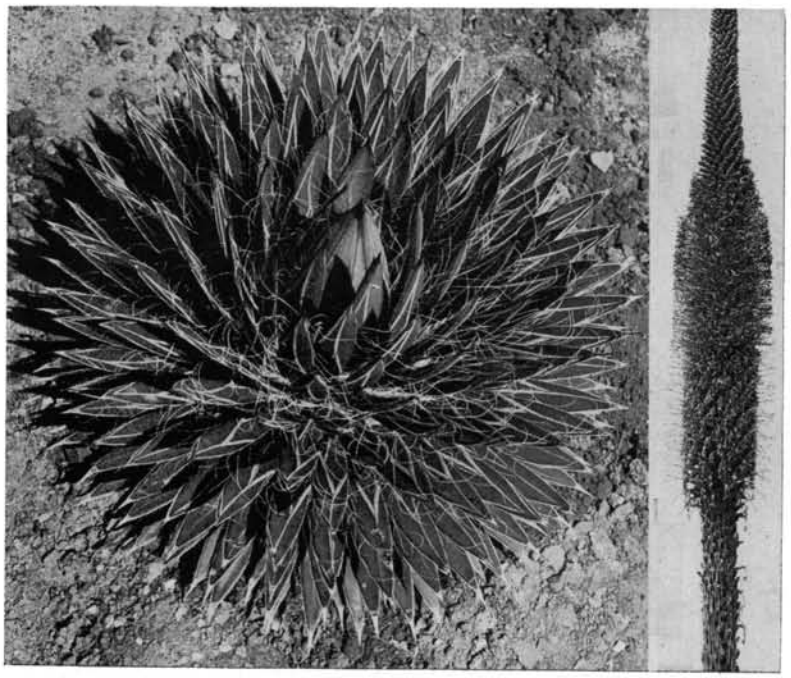

Fig. 57
Agave filifera. Rosette grown by Lucie Wagner, Hollywood, California, approx. 1/6 natural size.
Right: inflorescence in the Huntington Botanical Garden, San Marino, California, reduced approx. x4.

Fig. 58
Left: *Agave filifera* var. *compacta.* Grown by Frank Crosby, Malibu, California, slightly reduced.

Agave filifera Salm-Dyck, Hort. Dyck. 309, 1834.

Distribution: Mexico; Hidalgo and San Luis Potosi; type cultivated in Europe without citation of locality.

Rosette stoloniferous, 65 cm. in diameter, 50 cm. high; leaves numerous 20 to 25 cm. long, 2 to 3 cm. broad, dark green with white markings and numerous slender recurved white marginal threads or the latter sometimes absent; spine 10 mm. long, openly grooved, brown; inflorescence 2.5 m. high stout; perianth green, purplish-tinged, stamens long exserted, purple.—June.

***Agave filifera** var. **compacta** J. Verschaffelt, Cat. 9: 41, 1865-7.

A. perplexans Trelease in Bailey, Stand. Cylop. Hort. 1: 238, 1914.

Distinguished by the small rosette with short broad leaves scarcely 10 cm. long.

Agave geminiflora Kerr-Gawler, Journ. Science 2: 88, 1817.

A. geminiflora filamentosa Hooker in Curtis' Bot. Mag. 82, under plate 4950, 1856.

Distribution: Mexico, type cultivated in Europe without citation of locality.

Rosette single, or, according to Berger, l.c. 69, in age mound-forming, 4 to 7 dm. in diameter; leaves numerous, dark green, soft and pliable, narrowly linear, 60 to 90 cm. long, 3 to 6 mm. wide, biconvex, margin with slender white threads, spine flattened 4 to 5 mm. long; flowers unknown to writer.

Agave geminiflora var. **atricha** Trelease in Bailey, Stand. Cylop, Hort. 1: 238, 1914.

A. knightiana Drummond in Curtis' Bot. Mag. 4(5): under pl. 8271, 1909.

Distinguished from the typical species by the stiffer, shorter leaves, 3 to 3.5 dm. long, devoid of marginal threads.

*In the trade sometimes erroneously called *Agave pumila.*

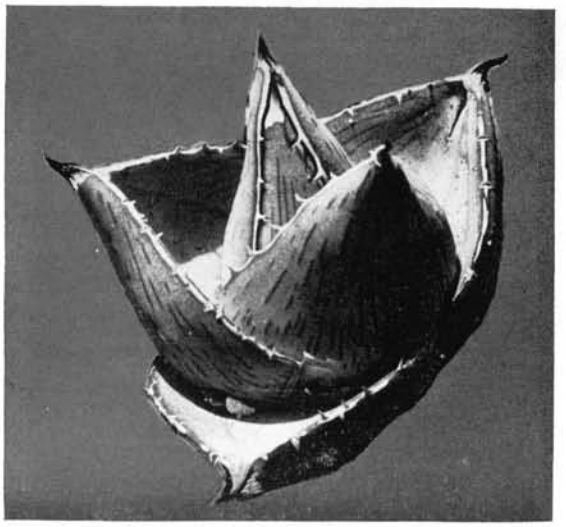

Fig. 59
*Agave pumila** in a private garden in southern California; slightly reduced.

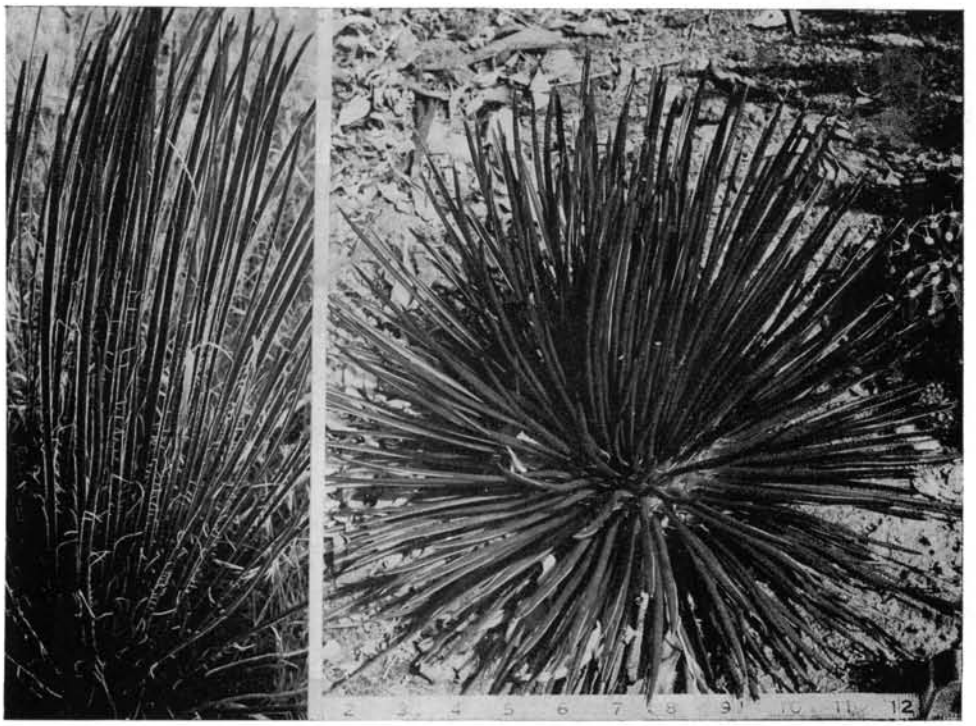

Fig. 60
Left: *Agave geminiflora.* Grown by H. S. Gentry, Murrieta, California, approx. ⅓ natural size.
Right: *A. geminiflora* var. *atricha.* Grown by Hayes Schlundt,
Pasadena, California, approx. 1/4 natural size.

*for description of *Agave pumila* see Cactus & Succ. Journ. 31(3): 91, 1959.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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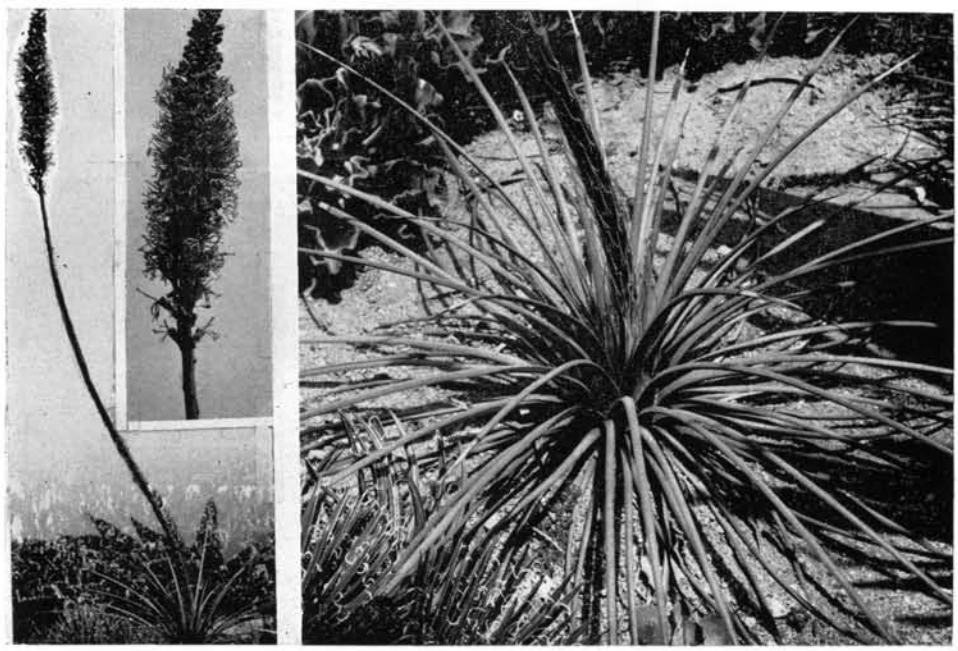

Fig. 82
Agave striata. Grown by the Los Angeles County Arboretum and Botanical Garden, Arcadia, California. Right: rosette approx. 1/4 natural size. Left and inset: inflorescence greatly reduced.

SECTION 4, SCHOENOAGAVE, Berger

Agave striata Zuccarini, Act. Acad. Caes. Leop.-Carol. 16: 678, 1833.

Distribution: Mexico; Hidalgo, cultivated in Europe from Real del Monte.

Rosette 4 to 5 dm. in diameter, short stemmed, branching when old, very leafy; blades gray-green, 3.5 cm. wide at triangular base, abruptly narrowly linear, 40 to 45 cm. long, 4 to 6 mm. wide, rhombically biconvex, slightly scabrid on the margin, the surface with close round parallel ribs separated by narrow whitened grooves, spine very slender, 10 to 18 mm. long, 1 to 2 mm. wide; scape 3 to 4 m. high, beset with narrowly linear bracts, flowers in a short dense spike, perianth 25 to 30 mm. long, green with pale tipped segments. June-July.

Agave echinoides Jacobi, Abh. Schles. Ges. Vaterl. Cult. 1868: 163, 1868.

A striata var. *echinoides* Baker, Gard. Chron. new series, 8: 556, 1877.

Distribution: Mexico; type cultivated in Europe without citation of locality.

Rosette single, 3 to 3.5 dm. in diameter, leaves numerous, stiff, straight or slightly falcate, gray-green, biconvex, 5 mm. wide, 12 to 15 cm. long from a broad base, surface narrowly ribbed, margin slightly scabrid, spine 3 mm. wide, 25 mm. long. Scarce in cultivation. Living plants observed grown by R. H. Diehl, Vista, California.

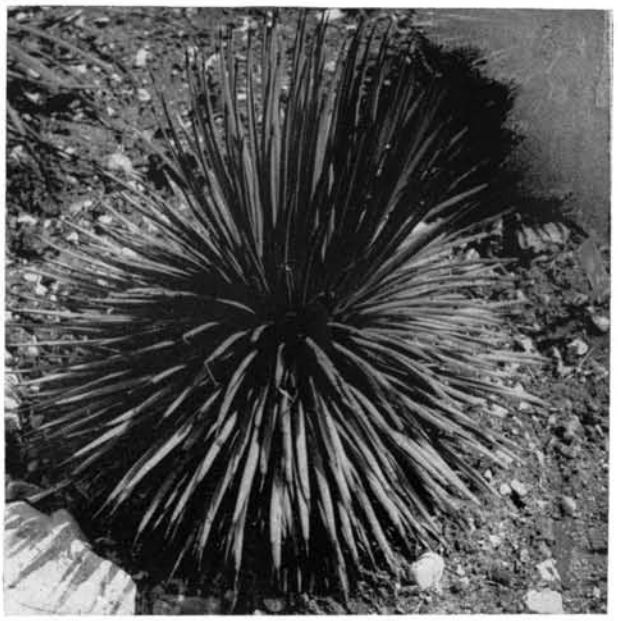

Fig. 83

Agave echinoides. Grown by J. Marnier-Lapostolle. Approx. 1/4 natural size.

introduced from Mexico from Fritz Schwartz. Additional specimens were received from J. Marnier-Lapostolle.*

Agave stricta Salm-Dyck, Bonplandia 7: 94, 1859.
A. hystrix Cels. Cat. 1861: 19, 1861.
A. striata var. *stricta* Baker, Gard. Chron. new series 8: 556, 1877.

Distribution: Mexico: Puebla, common around Tehuacan, type cultivated in Europe.

Rosette 5 to 6 dm. in diameter, often much branched from a short stem; leaves very numerous, 25 to 35 cm. long, 6 to 10 mm. wide, gray-green, biconvex, surface with parallel ribs, margin at most scabrid, spine 20 to 25 mm. long, 3 mm. wide, reddish-brown, becoming gray; 2.30 m. high, flowers in a dense 7 dm. long spike, perianth 12 to 13 mm. long. July-Aug.

Agave falcata Engleman, Trans. Acad. St. Louis 3: 304, 370, 1875.
A. californica Baker, Gard. Chron. new series 8: 556, 1877.

Distribution: Mexico; Coahuila (type locality, Buenevista) Durango, Zazatecas and Nuevo Leon.

Rosette single, in age branched, 6 to 10 dm. in diameter; leaves rather numerous, spreading, often falcate, gray or purplish, evanescently glaucous, 4 to 8 dm. long, 12 to 15 mm. wide, flat above, keeled beneath, finely striate ridged, margin minutely denticulate, spine 22 to 35 mm. long, 3 to 4 mm. wide, triangular, brown; scape 2 to 3 m. high, slender, terminated by a loose flower-spike, bracts numerous, whitish-papery, linear-attenuate, 1 to 2 mm. wide, 10 to 15 cm. long, flowers 35 to 40 mm. long including the ovary, perianth 14 to 17 mm. long. Dec.-Jan.

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*The writer hereby gratefully acknowledges receiving living plants, herbarium specimens and photographs of Agave cultivated in the Jardin Botanique "Les Cedres," St. Jean-Cap-Ferrat, France. Consequently, the following species of Agave appear to be new introductions into the Southwestern United States and are included in this and subsequent articles: *Agave xalapensis, A. dasylirioides* var. *dealbata, A. yuccaefolia, A. ellemeetiana, A. pruinosa* and *A. lurida*. (*Agave xalapensis* was illustrated in the Cactus and Succ. Journ. 31(2): 47, fig. 21, 1959 is correctly *Agave macrantha*.)

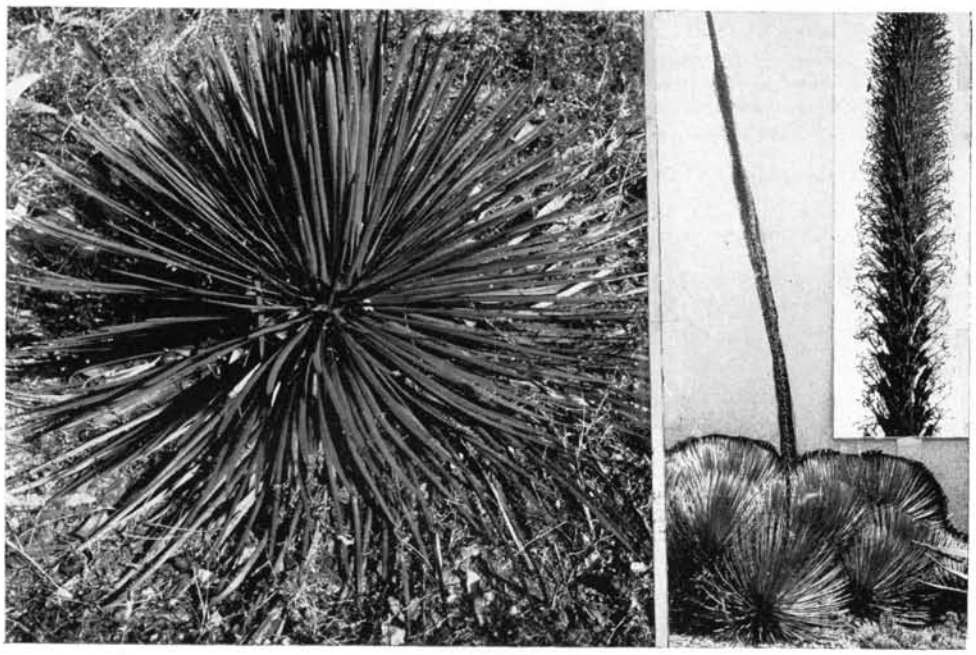

Fig. 84

Agave stricta. Left: rosette grown by Hayes Schlundt, Pasadena, California, approx. 1/6 natural size. Right and inset: habit and close-up of inflorescence grown in the Huntington Botanical Garden, San Marino, California.

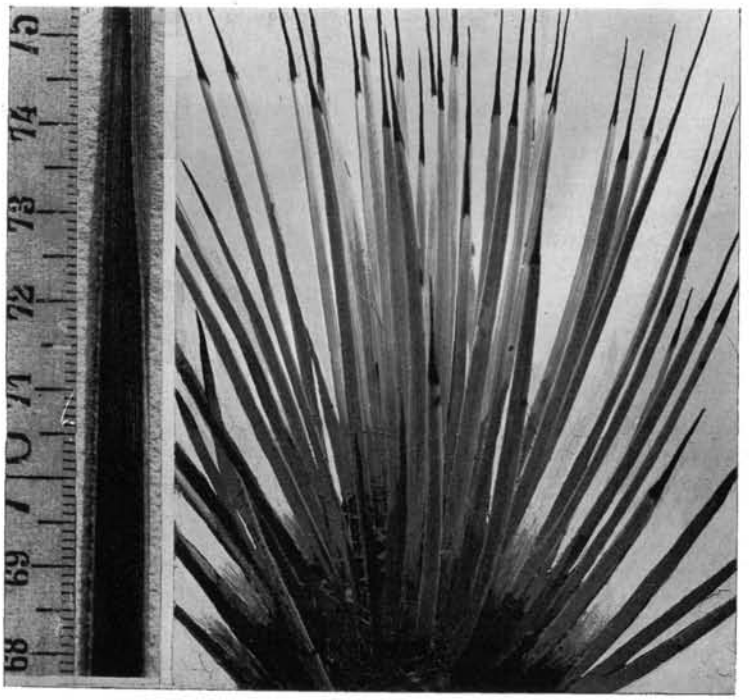

Fig. 85

Agave falcata. Right: rosette grown by Howard S. Gentry, Murrieta, California, approx. ⅓ natural size. Left: enlarged leaf margin, photographed by J. Marnier-Lapostolle.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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Fig. 94
Left: *Agave dasylirioides;* right: *A. dasylirioides* var. *dealbata.* approx. 1/6 natural size.
Photographs by J. Marnier-Lapostolle.

SECTION 5, CHONANTHAGAVE Berger

Agave dasylirioides Jacobi & Bouche, Hamb. Gart. Zeit. 21: 344, 1865.

Distribution: Guatemala, ingenious mountains near Quezaltenango.

Rosette single becoming polycarpic after flowering; leaves 80 to 100 in a dense rosette, linear, flat, very glaucous, 4 to 6 dm. long, 10 to 15 mm. broad from a dilated base, stiffly erect or slightly falcate, flat, finely striated longitudinally, margin entire, spine 1 to 2 mm. broad, 10 mm. long, brown; inflorescence a long dense, commonly recurving spike 1.5 to 2 m. tall; perianth 3.5 to 4.5 cm. long, tube broadly funnelform, 10 mm. long, segments yellow. Nov.-Feb.

Agave dasylirioides var. **dealbata** (Lemaire ex Jacobi) Baker, Gard. Chron. 2: 557, 1877.

A. dealbata Lemaire in Jacobi, Hamb. Gart. Zeit. 21: 346, 1865.
A. intrepida Greenman, Proc. Amer. Acad. 34: 567, 1899.

Distribution: Mexico, Morelos, Tepeoxtlan 20 to 25 miles east of Cuernavaca (type locality of *A. dealbata*); El Parque above Cuernavaca (type locality of *A. intrepida*).

Distinguished from the typical species by longer and broader leaves (.5 to 1 m.) with microscopically denticulate margins. Living specimens contributed by J. Marnier-Lapostolle.

SECTION 6, YUCCAEFOLIAE, Baker

Agave yuccaefolia De Candole in Red. Liliac. 6, pl. 328 to 329, 1812.

Distribution: Mexico: type cultivated in Europe; considered to be from Real del Monte, Hidalgo.

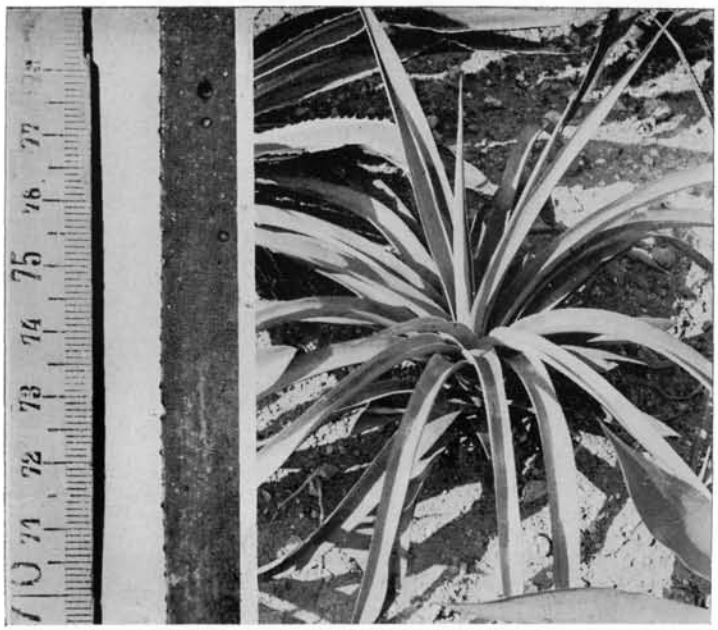

Fig. 95
A. yuccaefolia. Left: leaf margin enlarged, showing minute prickles; right: rosette approx. 1/6 natural size. Photographs by J. Marnier-Lapostolle.

Fig. 96
Agave nizandensis. Left: leaf margin enlarged showing marginal prickles and conspicuous light colored median stripe; right: rosette approx. 1/3 natural size. Photographs by J. Marnier-Lapostolle; center: flowers from type. Photograph by Ladd Cutak.

Rosette short, stemmed or stemless, staloniferous, 12 to 15 leaved, 1.3 m. in diameter; leaves rather soft, recurved 50 to 60 cm. long, 2.5 cm. wide, long-tapering, concave above, convex beneath, the upper surface glaucous-green with a conspicuous pale band down the center and round or oblong brown blotches, undersurface paler and unmarked; margin

minutely denticulate, spine brown, slender 6 to 7 mm. long; peduncle 2 to 3 m. long, including the short lax spike, flowers 35 m. long, the perianth segments linear-oblong, almost distinct. Living plants contributed by J. Marnier-Lapostolle.

Agave nizandensis Cutak, Cactus & Succ. Journ. 23: 143, 1951.

Distribution: Mexico; Nizanda, Oaxaca, the type locality.*

Plant stemless, stoloniferous, rosette 4 to 6 dm. in diameter, loose, with few (10 to 15) leaves which are nearly horizontal, 2 to 3 dm. long, 2 to 3 cm. broad at base, acuminate flat above, convex beneath, dark green with a broad pale median stripe above, margin with irregular minute deltoil teeth, terminal spine weak, reddish-brown; scape slender, 1 m. long, bracts appressed, oblong-lanceolate, 2-3 cm. long, inflorescence a short spike 2 to 3 dm. long; flowers yellowish green, 45 to 50 mm. long. Now fairly common in cultivation.

SECTION 7, ANOPLAGAVE, Berger

Agave bracteosa S. Watson, Gard. Chron. new series 18: 776, 1882.

Distribution: Mexico; Nuevo León, type locality, near Monterrey.

Rosette 6 to 8 dm. in diameter, stoloniferous; leaves numerous, soft, light green, openly ascending with recurved tips, 27 to 30 mm. broad at base, 3.5 to 5 dm. long, caudate, margin minutely denticulate, spine absent; inflorescence 1 to 2 m. high, scape densely covered with outcurved narrow bracts, flowers in a dense spike, perianth cream colored, 2.5 to 3 mm. long including the ovary, persistent. June-July.

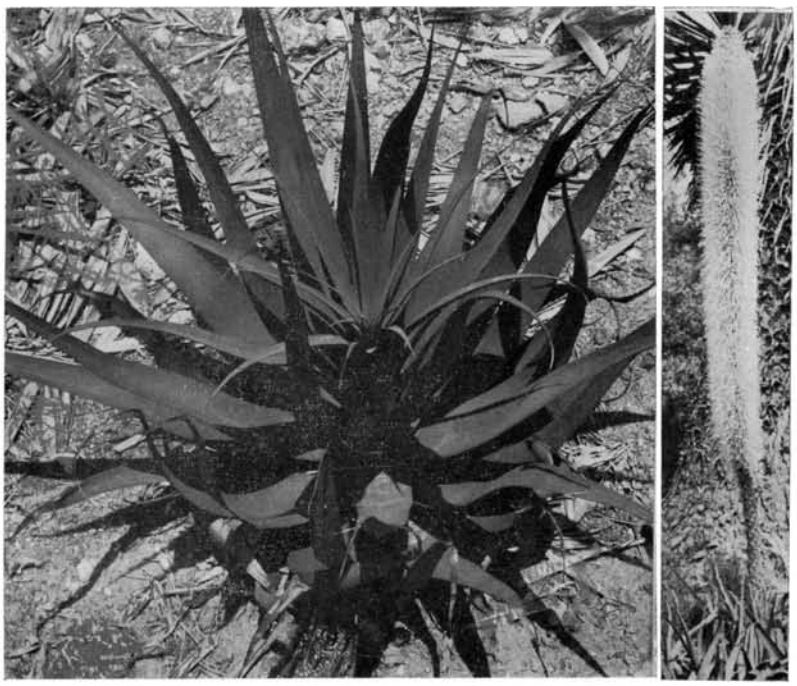

Fig. 97
Agave bracteosa. Left: rosette grown by Hayes Schlundt, Pasadena, California, approx. 1/6 natural size; right: inflorescence in Huntington Botanical Garden, San Marino, California, approx 1/10 natural size.

*Tom MacDougall (personal correspondence, July 1959) gives the following additional information: "In the wild it (*Agave nizandensis*) appears to be of limited distribution and although I have known the plant for more than 20 years, my records show only three native habitat localities, viz.: Sto. Domingo Petapa, San Miquil Chimalapa and Nizanda. All three localities are in the Oaxaca section of the Isthmus of Tehuanatepic and vary from about 30 miles (in direct lines) one from the other. Habitat altitudes are between 170 and 340 m."

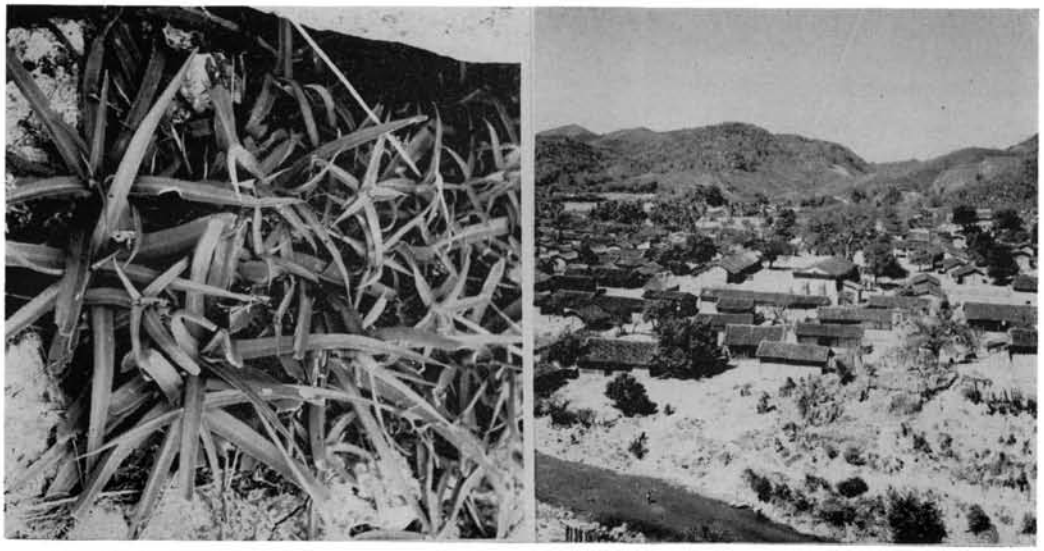

Fig. 98. *Agave nizandensis* growing on a rocky hill at the edge of San Miguel Chimalapa. Note the Chimalapa, Oaxaca, taken from the location of the picture on the left. San Miguel is one of two villages which form a fragment of Soque Indian culture, long since isolated from the parent group in eastern Chiapas. Photos by author Feb., 1941.

Agave nizandensis – A Reintroduction

T. MACDOUGALL

It was in the Nizanda* "Rock Gardens," in Feb. 1947, that Lad Cutak collected this little, aloe-like agave. Later, he described it from a plant flowered in the Missouri Botanical Garden.

The type locality is not the only habitat of A. nizandensis. Indeed there was a description, in manuscript, based on an earlier collection, in which I understand the author proposed the name "aloefolia." Nevertheless, the actual name has much to recommend it, and altho the species is not confined to Nizanda it *is* abundant there.

Nizanda, by the way, is a Zapotec Indian village. The name, in Zapotec of the Isthmus, signifies "hot water." Hot, mineralized springs there are famed locally for the relief of rheumatism, as well as for many other ailments to which the flesh is heir.

For many years, A. nizandensis flowered regularly both at the New York Botanical Garden and at 4000 Boston Road. Nowadays, little if anything is seen or heard of it. All in all, it can hardly be said that it was "introduced to cultivation."

It was to remedy this situation that, in Nov. 1957, the writer collected seed from the wild. About 1 lb. of clean seed was secured and sent to growers in California.

EDITOR'S NOTE: The ISI offered seedlings at $1.25. Plants are still available at 921 Murchison Dr., Millbrae, Calif.

PRESIDENT'S MESSAGE

The Annual meeting of the Cactus and Succulent Society of America, Inc., held last September 11th, at the Franklin Crosby Cactus and Succulent Ranch in Malibu, was very well attended, in spite of its being an extremely hot day. Those who attended this seacoast garden were especially rewarded by cooling breezes and a well shaded meeting place. Don B. Skinner, the speaker of the day very graciously withdrew and instead presented Mr. Harry Butterfield of Berkeley, an outstanding Show Judge, a publisher of many books and pamphlets and an interesting speaker. Door prizes and Raffle plants went to many members and the money raised more than paid for the chair rentals, free cokes and the fine plants.

A special Board Meeting, held the later part of October, will consider the final changes in the Society By-Laws and hear the reports from our wandering members, Pat and "Slim" Moorton and Hazel and Harry Johnson who have just returned from Mexico after conferring with members of the Mexican Cactus and Succulent Society and doing a dry run on the proposed Field Trips for the 9th Bienniel Convention to be held in Mexico during the early part of July, 1961.

Every one planning on attending this Convention should try and obtain the fine free book, "Mexico and Central America" put out by the American Automobile Association (AAA) for the exclusive use of its members. If you are not a member, try and find someone who is, and see if they will obtain a copy for you. The information and suggestions for the tourist contained therein will be a great help to any one visiting Mexico for the first time, or, for the second or third time also.

Our Recording Secretary, Mr. William Bently has moved (for the last time, we hope). The new address is 18317 Farjarno Street, La Puente, California.

EDWARD S. TAYLOR, *President*

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

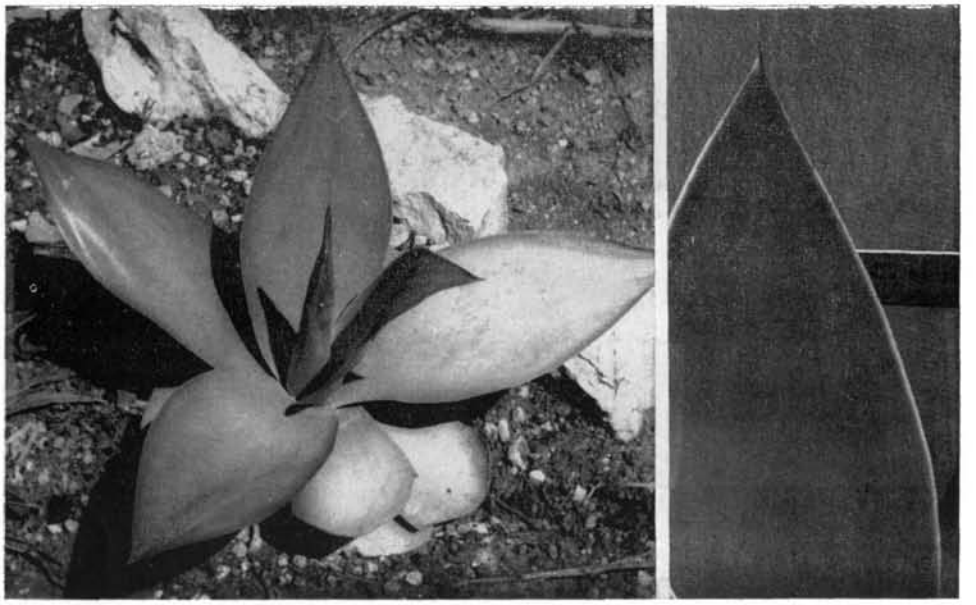

Fig. 6
Agave ellemeetiana. Left: rosette approx. 1/5 natural size; right: leaf detail approx. 1/2 natural size. Grown and photographed by J. Marnier-Lapostolle.

PART 12

Agave ellemeetiana Jacobi, Hamb. Gart. Zeit. 21: 457, 1864.

A. pruinosa Lemaire in Jacobi, Hamb. Gart. Zeit. 21, 449, 186A.

Distribution: Mexico; type cultivated in Europe considered to have come from vicinity of Jalapa, Veracruz.

Rosette 6 to 8 dm. in diameter, nearly stemless; leaves oblanceolate, 4.5 to 6.5 dm. long, 10 to 15 cm. wide, slightly narrowed above the base, apex abruptly ending in a stiff point, margin entire or sometimes microscopically denticulate; flower stalk 4.5 m. high, scape .5 m. long, covered with numerous lance-linear, broad-based bracts; flowers in a dense erect spike, perianth segments pale greenish-yellow, 15 to 16 mm. long; capsules 13 to 15 mm. long and 10 mm. wide. Living plants contributed by J. Marnier-Lapostolle.

Agave guiengola Gentry, Brittonia 12(2): 98-100, 1960.

Mexico: 25 to 27 km NW. of Tehuantepec, Oaxaca on Guiengola limestone.

Rosette single or with few offsets, .7 to 1.3 m. in diam.; leaves 25 to 30, glaucous 30 to 50 cm. long, 15 to 25 cm. wide, ovate-lanceolate, short acuminate, openly ascending, nearly flat above but briefly and narrowly channeled at tip; margin variously serrate with flattened, blunt, single or paired, dark brown teeth 3 to 5 mm. apart, 2 to 3 mm. long; spine dark brown, 3 to 4 mm. wide, 1.5 to 2 cm. long, more or less decurrent; inflorescence spicate, erect, bracts recurved, long attenuate 1 to 2 cm. long, 3 mm. wide at deltoid base, flowers pale yellowish-white 33 to 35 mm. long, including the ovary, capsules 22 to 24 mm. long.

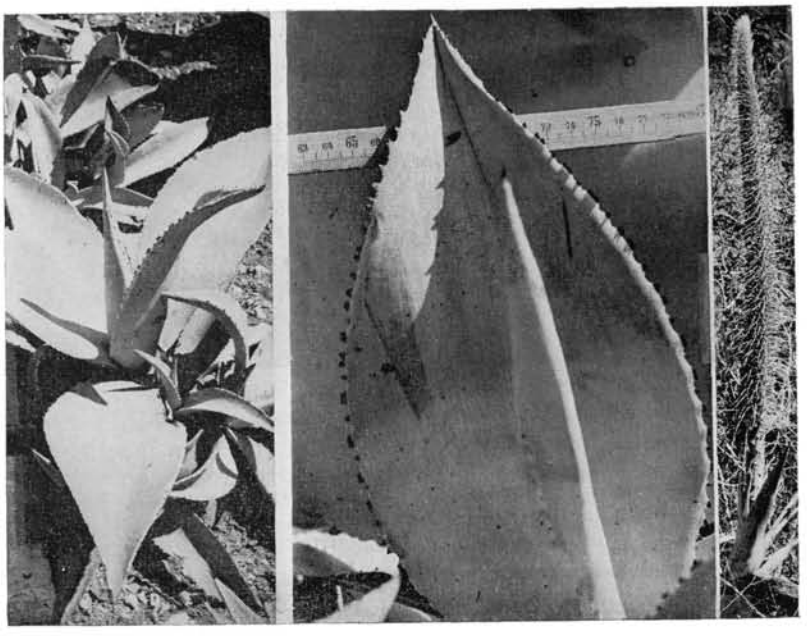

Fig. 7

Agave guiengola. Left: rosette approx. 1/6 natural size; center: close-up of leaf showing armature detail, approx. 1/3 natural size, grown and photographed by J. Marnier-Lapostolle; Right: inflorescence at type locality, photograph by Tom MacDougall, much reduced. Tom MacDougall, personal correspondence dated June 26, 1960, states: "I sent collections (of *A. guiengola*) to Mr. Marnier-Lapostolle during 1954 from vicinity of Tehuanetepec."

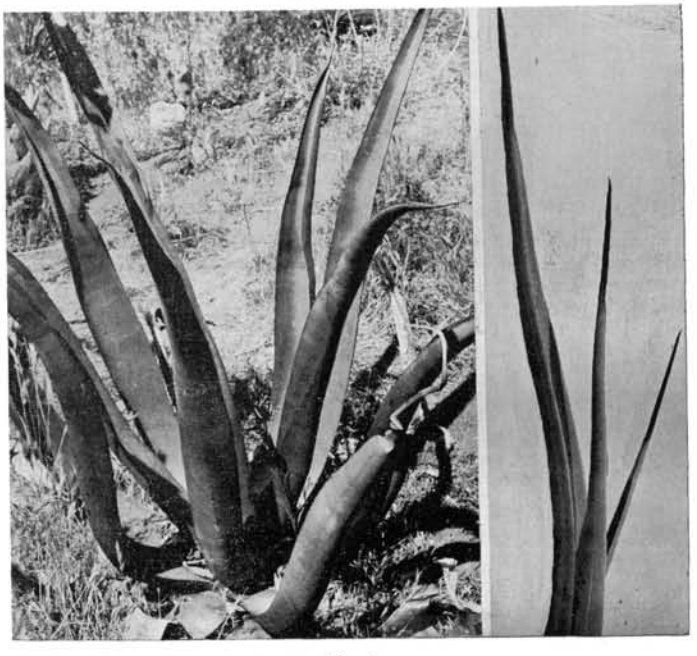

Fig. 8

Agave eduardi. Grown by Howard S. Gentry, Murrieta, California. Introduced from Barranca de Calimilla, near Guadalajara, Jalisco. Left: rosette approx. 1/10 natural size, right: leaf tip showing terminal spine, approx. natural size.

Agave eduardi Trelease in Standley, Trees & Shrubs of Mexico, Cont. U. S. Nat. Herb. 23(1) 134, 1920.

Distribution: Mexico; Durango, type from San Ramón. Specimen grown by H. S. Gentry, Murrieta, California, introduced from Barranca de Colimilla, near Guadalajara, Jalisco.

Rosette single, 1 m. high, approximately 15 leaved, leaves glaucous, 8 to 10 dm. long, long-attenuate erect and outcurved, concave above, convex beneath, terminated by a stiff, slender brown spine 10 mm. long and 1 mm. wide, margin with very narrow, more or less, interrupted brown edge which when present is microscopically denticulate; flowers not seen, here transcribed from Trelease, l.c.: "scape covered by long narrow bracts; pedicels connate into a peduncle some 15 mm. long; flowers yellow, 40 mm. long; ovary flask-shaped, 20 mm. long, the tube narrow, about one third as long as the segments, the filaments inserted in its throat; capsules scarcely glaucous, 8 mm. broad, 20 mm. long." Perhaps not distinct from *A. vilmoriana.*

EUPHORBIA OBESA

Dear Mr. Haselton:

Four years ago, in the November-December 1956 issue of the Journal, you published a photograph of a Euphorbia obesa of mine which had grown quite elongated and had reached a height of 20 inches. Judging from the great number of letters which I received subsequently, it seems that this unusually tall Euphorbia created considerable interest. Every so often someone still writes me, asking how the plant is doing.

From September 1956, date on which I wrote you, until recently the plant continued to grow both in height and in the width of its "head". It gained 5¼ inches in height, which represents a rate of approximately 1⅓ inch per year. The gain in width was quite substantial, but having not taken prior measurements, I have difficulty in estimating it. During these last four years the plant was in excellent health, flowering regularly and abundantly. However, the weight of its "head" seemed to get too heavy and the plant began to nod, bending its head further and further down. I found it necessary to give it support.

In May-June 1960 the plant flowered as heavily as usual. In early September it began to start flowering again, but the flowers never reached full development and dried up. In the last week of September the plant began to lean more heavily in its cradle. On October 1, I discovered that the very top was soft, and removing the plant from its pot I found the roots were nearly all gone. The plant, otherwise, looked all right: its entire body, except for its very top, was firm as a rock. It was evident, however, that it was dead.

Careful examination of the pot and the soil showed no sign of bugs or disease. The soil was in good condition, sweet, loose, only moderately damp. Up to the very last the plant had had exactly the same care as it had always had. It would thus appear that it had died of old age.

This plant was bought in 1932 which was 28 years ago. It was then about 1½ inches high, maybe 2 inches. Perhaps some of our growers could estimate fairly accurately the age of a plant of such size. Personally, I would guess the age at 5 or 6 years, but I might be wrong. If I am right, this would have made by plant 33 to 35 years old when it died. I would be curious to learn if any one has any longevity record of the Euphorbias obesas.

Last measurements of the plant were as follows: Height (measured along outside of curve), 25¼ inches; Circumference at base, 13½ inches, at narrowest of waist, 8¾ inches, and maximum of head, 14½-inches. Weight (unpotted, dead and no root), 8¼ pounds.

The plant was a male.

E. R. LEROY, San Francisco

Note: Your Editor has a plant 18 inches tall and three inches in diameter. It has two tiny offsets about half way up. This plant is a seedling from the R. W. Kelly collection and must be over 15 years old. It is in a 4 inch pot and has never been repotted. Mine is a male plant and will it too, die in another five years—perhaps from lonliness?—S.E.H.

PRESIDENT'S MESSAGE

I wish to thank the many people who returned me to the Presidency of this Society. There were more votes cast in this election than ever before. Many interesting comments were inclosed with the ballots, with the majority commending the activities of the Society. The very few criticisms were regarding the election of Officers from the Los Angeles Area only. It would be nice if members of the Board could be from outside this area, but I doubt very much if they could afford to attend the required Board meetings; which, under the incorporate laws of the State, must be held in the Los Angeles Area only. If you know anyone from othr areas who would promise to attend the majority of Board meetings of the Society, please let us know, we would be very happy to have more good workers made available.

Now that its subscription time again, I hope the members will remember about Associate, Sustaining, and Life Memberships. Check the copy of the revised By-Laws, elsewhere in the Journal for costs. These fees should be sent directly to the Secretary, Mr. William Bently, 18317 Farjardo, La Puente, Calif.

Elsewhere in the Journal you will find details on the forthcoming Convention in Mexico. Hotel commitments made a change in the dates mandatory, so that the Convention will start on Wednesday, July 12th, 1961, and end on Monday, July 17th with a giant Fiesta for the evening. Tentative plans indicate a fine time for all with Field Trips into the heart of the Cactus country. Information Sheets and Registra-Forms will be sent to every member and Affiliate this month. I hope you have made that date with the Doctor for the necessary Smallpox vaccination; get it out of the way so we won't have sore arms during the trip.

See you in Mexico,

EDWARD S. TAYLOR, *President*

ARTICLES AND PHOTOS WANTED

We would like a series of articles with photos of native plants of Texas, New Mexico, Arizona, Colorado, etc. Our membership in the Southwest is growing rapidly and we should have many articles and photos from this section of the country which is so rich in cacti.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 13

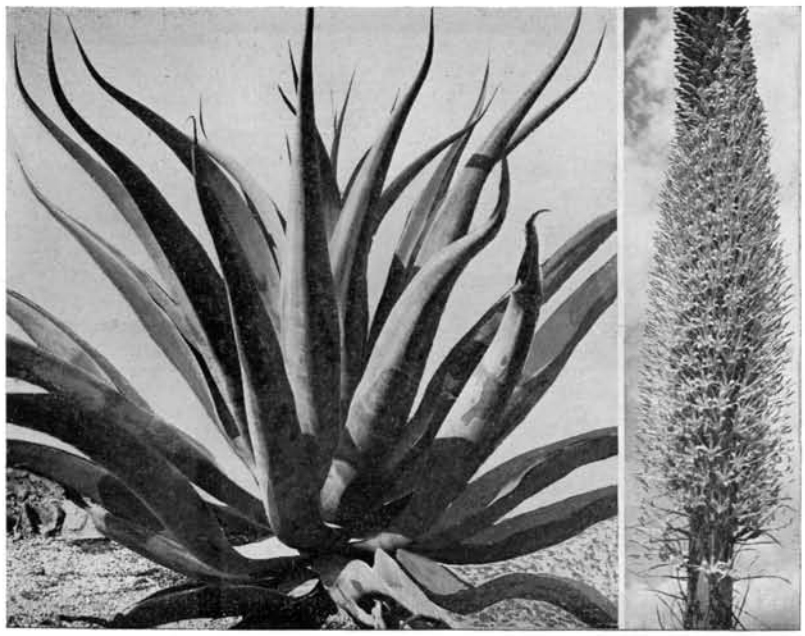

Fig. 13
Agave vilmoriana. Left: Rosette grown by Lida Delap, Covina, California, approx. 1/12 natural size; Right: inflorescence grown by George Glade, Tujunga, California, greatly reduced.

Agave vilmoriana Berger, Repert. Nov. Sp. Fedde 12: 503, 1913.

A. mayoensis Gentry, Carn. Inst. Wash. Publ. 527: 94, plate 6, fig. 1: plate 14, fig. 1, 1942.

Distribution: Type cultivated in Europe, thought to be introduced from Jalisco; Chihuahua to Arroyo Gochico near San Bernardo, Sonora, the type locality of *A. mayoensis.*

Rosette 1.60 m. in diameter, single, leaves narrowly linear-lanceolate, acuminate, 7 to 15 dm. long, 7 to 12 cm. wide, bluish or glaucous, softly fleshy, margin entire, spine slender, subulate, shortly decurrent 3 to 4 mm. long; flower stalk 4 m. high, bracts linear, 1 to 3 dm. long, flowers in a dense spicate racemose cluster 2.5 m. long, perianth yellowish-white, funnelform, 15 mm. long; bulbils numerous. March-May.

Agave chrysoglossa I. M. Johnston, Proc. Calif. Acad. Sci. ser. 4, 12: 998, 1924.

Distribution: Mexico; Sonora, San Pedro Nolasco Island, Gulf of California, the type locality.

Rosette single, 0.2 to 1.5 m. in diameter; leaves 5 to 15 dm. long, 4 to 6 cm. wide, linear-lanceolate, spine pale yellowish brown, becoming gray, decurrent for 2 to 3 dm. and confluent with the narrow, horny, straight, unarmed leaf margin ending 2.5 cm. above the base, remainder is minutely denticulate; inflorescence 2.2 to 3.1 m. high, erect or bent over, the dense elegant spicate cluster 1 to 2 m. long, perianth bright yellow. March-April.

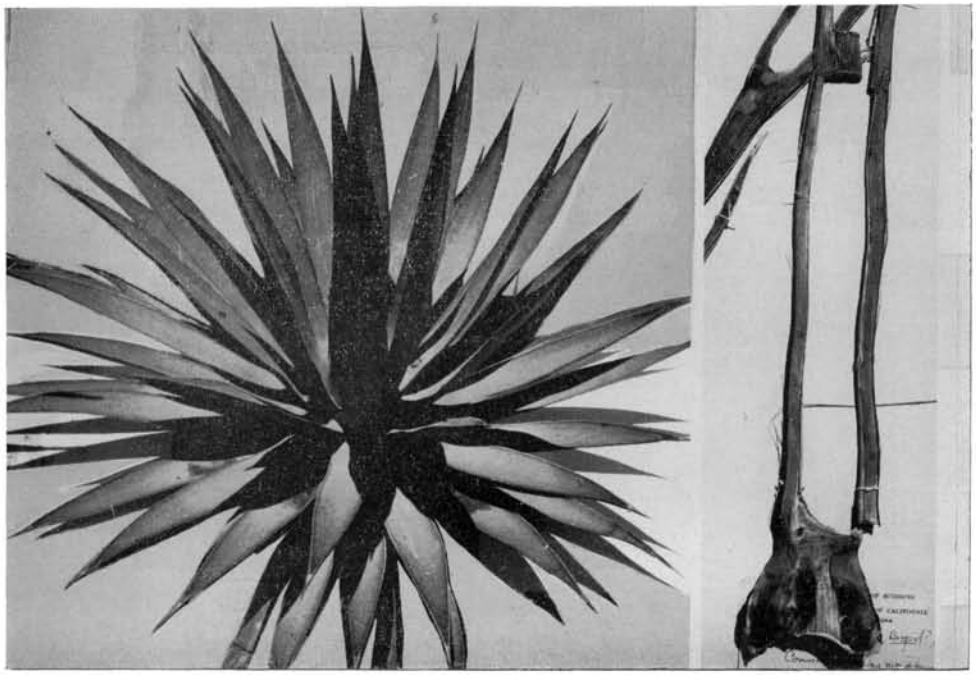

Fig. 14

Agave chrysoglossa. Left: rosette grown by Bob Los Flores, Salinas, California, approx. 1/10 natural size; introduced from San Pedro Nolasco Island, Gulf of California, Sonora.

Right: leaf detail of herbarium sheet, collected at San Pedro Bay, Sonora, by I. M. Johnston, No. 4338, California Academy of Natural Sciences, San Francisco, California.

Agave attenuata Salm-Dyck, Hort. Dyck, 7: 303, 1834.

A. glaucescens Hook. in Curtis' Bot. Mag. 111. 18: pl. 5333, 1862.

A. cernua Berger, Die Agaven, 122, 1915.

Distribution: Mexico; Hidalgo, type cultivated in Europe (from about Real Del Monte?).*

Rosette 1 to 2 m. in diameter, 15 to 35 leaved surmounting a trunk 1 to 1.5 m. long, often branched at the base, leaves 6 to 10 dm. long, 15 to 20 cm. wide, soft, glaucous, unarmed, without spine or prickles; scape short, covered with long attenuate bracts; flowering spike dense, 3 to 4 m. long, elegantly recurved, sometimes very bulbiferous in age, flowers greenish white, 6 cm. long including the ovary, perianth segments 22 to 24 mm. long, 4 to 5 mm. broad, linear lanceolate. Dec.-Jan.

*Cactus Slim Moorten advised the writer that *Agave attenuata* occurs wild in a canyon in Mil Cumbres area. Dr. Howard S. Gentry, personal correspondence, states: "Mil Cumbres is a mountainous area in the state of Michoacan. The highway from Guadalajara to Mexico City winds scenically among the many peaks of the region. At one point along this road I also observed *Agave attenuata* growing spontaneously on a rocky cliff and adjacent rocky slopes. It is the only locality where I have observed *A. attenuata* growing wild."

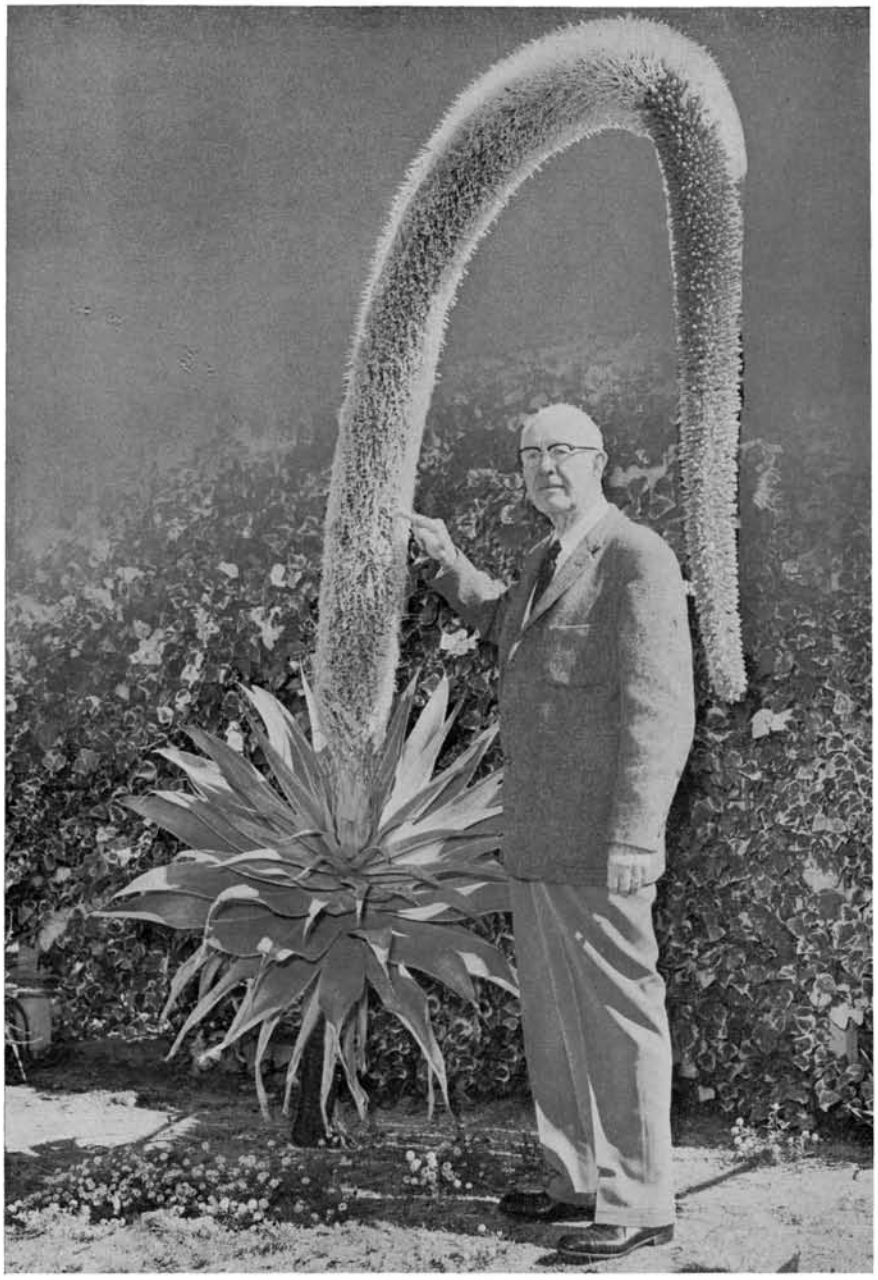

Fig. 15
Agave attenuata. Grown by Peter Kinghorn (Center), Glendale, California. Inflorescence about 4 m. long having over 10,000 flowers. Approx. 1/14 natural size. Courtesy, Glendale Independent Newspress.

Fig. 16

Agave attenuata var. *serrulata*. Grown and photographed by J. Marnier-Lapostolle. Rosette approx. 1/6 natural size; leaf margin with rule enlarged x 1.6; inset enlarged x 14.

Agave attenuata var. serrulata Terracciano, Primo contributo ad una monografia delle Agave, Napoli, 21, 1885.

A. cernua var. *serrulata* (Terracc.) Berger, Die Agaven, 123, 1915.

Distinguished from the typical species by the lower half to two-thirds of leaf margin with close set minute denticles. Living specimens contributed by J. Marnier-Lapostolle.

FROM NEW YORK

Dear Editor:

While studying the latest Cactus & Succulent Book List issued by the Abbey Garden Press I was struck by several omissions. Where for instance is that favorite classic of our childhood, "Black Rebeautya"? Also among the missing is a more recent work, "How Green Was My Aloe". And what about "Lady Chatterley's Lobivia"—this work achieved wide notoriety by being banned by the Post Office because some passages were deemed too succulent for the general reader. And nowhere to be found in the listing are two of the greatest works in English literature—Milton's "Parodias Lost" and DeQuincy's "Confessions of an English Peyote Eater". And not to be forgotten is that epic tale, "Two Years Before the Echinomastus".

No doubt fellow bibliophiles will have some forgotten titles of their own.

JOSEPH EMMA

TED TAYLOR

EDITOR'S NOTE: Your president is a Past President of the Southern California Council of Camera Clubs, composed of about eighty clubs, and is at present District Representative of the Photographic Society of America, the largest photographic hobby group in the world. He is also Chairman of the P.S.A. Roundup Nature division.

CORRECTIONS

Please make the following corrections in the By-Laws printed in the last issue of the Journal:

Article IV, Board of Directors. Section 1, 2nd paragraph "June the thirteenth" should read "June the Thirtieth."

Article VI, Membership Meetings. Section 1, Annual meeting, "September the Thirteenth" should read "September the Thirtieth."

Article IX, Affiliated Societies. Section 2, Remove "for adequate cause" from the end after, "Inc."

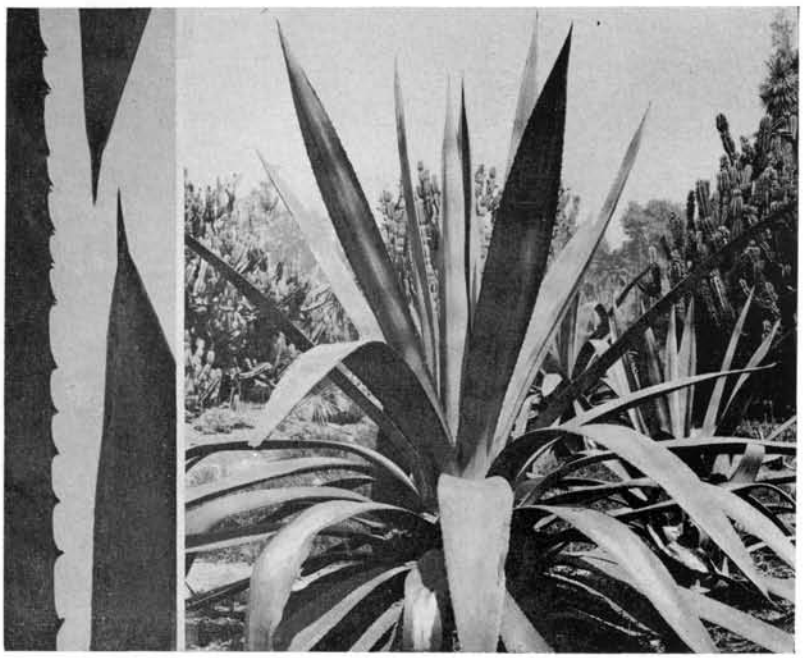

Fig. 44. *Agave cantala*. Right: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/12 natural size. Left: spine and teeth from same plant, slightly reduced.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 14
SUBGENUS 2. EUAGAVE, Baker
SERIES 1. RIGIDAE, Berger
SUBSERIES 1. TEQUILANAE, Trelease

Agave cantala Roxb. Hort. Beng. 25, 1841.

Distribution: Mexico; perhaps Acapulco region.

Rosette 2 to 2.5 m. in diameter, stemless, stoloniferous; leaves 8 to 10 cm. wide, 1 to 1.3 m. long, linear-lanceolate, stiffly erect-spreading, shallowly concave, inrolled at tip, rather thin, leathery, grayish-green, spine small, 2 to 3 or 4 mm. wide, 5 to 7 or 10 mm. long, conical, short-grooved at base; teeth triangular, upcurved, 2 to 3 mm. long, 8 to 12 mm. apart, along a straight margin, inflorescence 4 to 6 m. high; scape with distant, rather small, triangular, appressed bracts; panicle oblong, occupying about one half of the length of scape, lower branches short, the middle ones longest, 6 to 8 dm. long; flowers 6 cm. long, greenish-yellow; capsules 2.5 cm. in diameter, 5 cm. long, short-beaked. July-Aug.

Agave pseudotequilana Trelease in Standley "Trees and Shrubs of Mexico," Cont. U.S. Nat. Herb. 23(1) : 119, 1920.

Distribution: Mexico; Jalisco, type in the herbarium of the Missouri Botanical Garden from Tuxpan.

Rosette 1 to 1.2 m. in diameter; leaves 2 to 3 cm. broad, 6 to 6.5 dm. long, rather thin, flat, green, slightly glaucous and crossbanded; spine conical, 2 mm. wide, 8 mm. long, dark brown; teeth trangular upcurved, 4 to 5 mm. apart, 1 to 2 mm. long, the intervening cartilaginous margin nearly straight; flowers and fruit unknown.

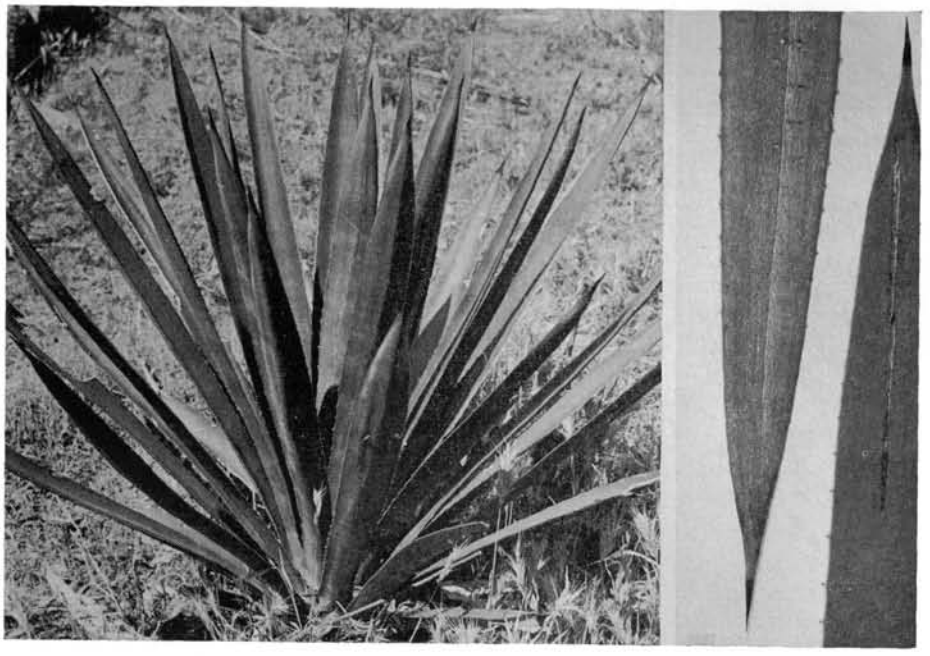

Fig. 45
Agave pseudotequilana. Left: rosette grown by Dr. Howard S. Gentry, Murrieta, Calif., approx. 1/6 natural size. Right: terminal spine and small marginal teeth from same plant, slightly reduced.

Agave rubescens Salm-Dyck, Hortus Dyckianus, 8: 306, 1834.

Agave flaccida Salm-Dyck, Hortus Dyckianus, 8: 306, 1834.
Agave punctata Salm-Dyck, Hortus Dyckianus, 8: 306, 1834.

Distribution: Mexico; Puebla and Oaxaca; type cultivated in Europe without recorded locality.

Rosette 1 to 1.5 m. in diameter, stemless or nearly so, stoloniferous; leaves lanceolate, 7.5 dm. long, 5 cm. wide, rather thin and flexible, gray, tinged with purple; spine stout, 4 mm. wide, 25 mm. long, often broadly, shortly decurrent, dark brown becoming gray; teeth 10 to 20 mm. apart, 3 to 4 mm. long, very slender, upcurved, orange or brown, intervening margin translucent, nearly straight; inflorescence 3 m. high; flowers greenish-yellow; capsules accompanied by numerous bulbils. July-Aug.

Agave elongata Jacobi, Hamb. Gart. Zeit. 20: 501, 1864.

Agave spectabilis Tod. Hort. Panorm. 2: 4, 1879.

Distribution: Mexico; type cultivated in Europe without citation of locality.

Rosette 3 to 4 m. in diameter, stemless, stoloniferous, leaves lance-linear, acuminate, 5 to 8 cm. wide at the middle, 1 to 2.1 m. long, narrowing toward the biconvex base, becoming concave toward tip, glabrous, glaucous, somewhat green-banded across the back; spine 5 to 6 mm. wide, 20 to 30 mm. long, broadly grooved to flat-based, slightly decurrent, red-brown or purplish-brown; teeth 3 to 5 mm. long, 10 to 15 mm. apart, abruptly flexed forward, often parallel with the margin or sometimes s-shaped, the yellowish translucent margin nearly straight between them; inflorescence 3 to 4 m. high; panicle 6 to 8 dm. long, the lower branches about 3 dm. long, perianth greenish-yellow, segments 15 mm. long; capsules 25 to 30 mm. in diameter, 45 to 50 mm. long. June.

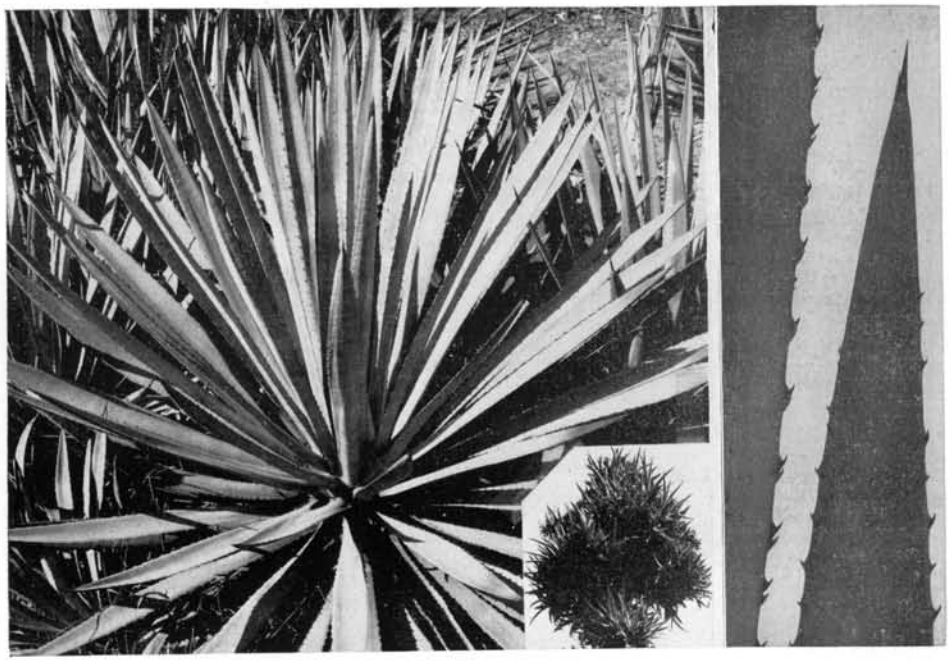

Fig. 46

Agave rubescens. Left: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/8 natural size. Right: showing terminal portion of leaf and spine and portion from middle of leaf, about 1/2 natural size. Inset: terminal portion of inflorescence showing numerous bulbils.

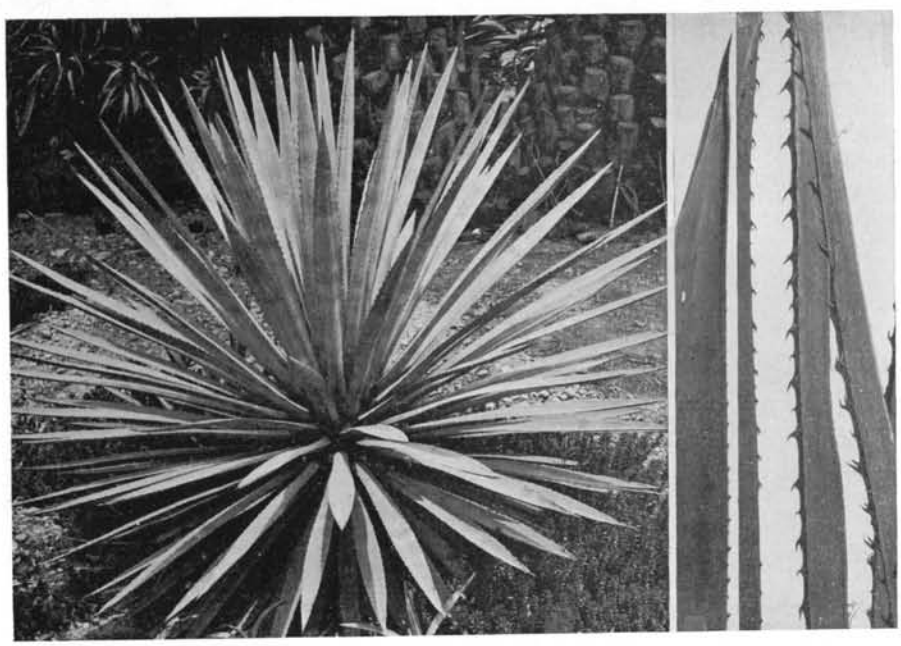

Fig. 47

Agave elongata. Left: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/10 natural size. Right: spine and teeth from same plant, approx. 1/2 natural size.

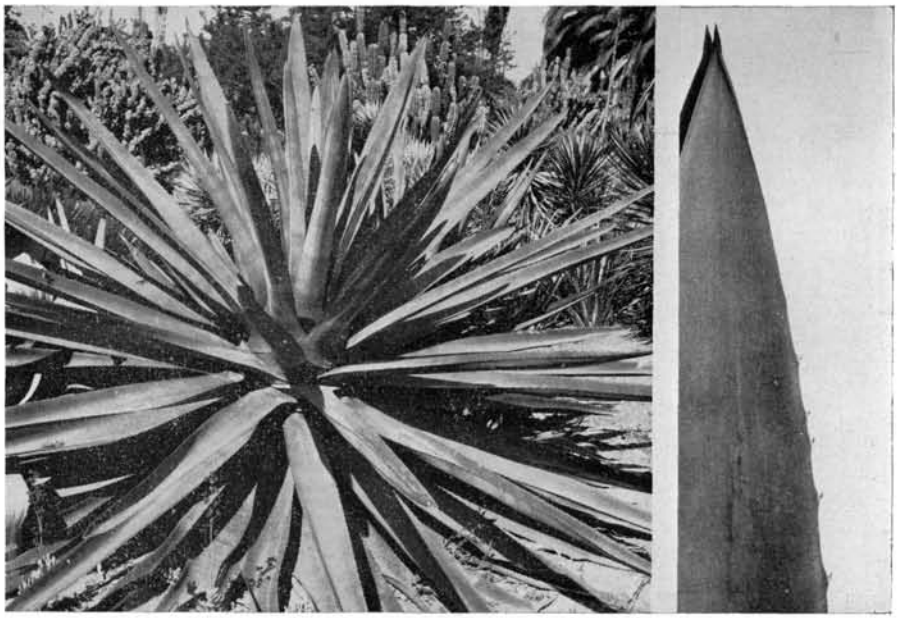

Fig. 75
Agave tequilana. Left: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/12 natural size. Right: leaf tip showing small short terminal spine and small upcurved marginal teeth, from same rosette, slightly reduced.

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Agave tequilana Weber, Bull. Mus. Hist. Nat. 8: 220, 1902.

Distribution: Mexico; type from about Tequila.

Rosette shortly caulescent, stoloniferous; leaves straight, stiff, 1 to 1.5 m. long, 8 to 10 cm. wide, acuminate, flat at base, otherwise shallowly concave, light bluish-green, and persistently glaucous; spine reddish-brown, conical, 10 to 12 mm. long, 3 to 4 mm. wide, teeth triangular, upcurved, 2 to 3 mm. long, 3 to 10 mm. apart, the intervening whitish margin slightly concave; inflorescence 6 m. high, panicle oblong, occupying about one half the length of the scape, the lower branches shorter, the middle longest, 60 to 80 cm. long; flowers 6 cm. long, capsules 5 cm. long, bulbils frequent. July-Aug.

Agave pacifica Trelease in Standley, Trees & Shrubs of Mexico, U.S. Nat. Herb. 23(1): 118, 1920.

A. yaquiana Trelease in Standley, Trees and Shrubs of Mexico, Cont. U. S. Nat. Herb. 23(1): 120, 1920.

A. oweni I. M. Johnston, Calif. Acad. Sci. series 4, 12; 999, 1924.

Distribution: Mexico; Sonora, Sinaloa and Tepic, type from Creston Island, Mazatlan, Sinaloa.

Rosette 1 to 1.5 m. in diameter, stemless, stoloniferous; leaves 3.5 to 5 cm. wide, 7.5 dm. long, stiff, yellow-green, lightly glaucous and zoned; spine conical, round-grooved at base, red-brown, 5 mm. wide, 15 to 25 mm. long, often abruptly contracted and slender above the decurrent base; teeth 15 to 25 mm. apart, 3 to 6 mm. long, upcurved, triangular, intervening cartilaginous margin straight or very slightly hollowed, inflorescence 3 m. high, flowers greenish-yellow, 50 mm. long, perianth tube openly conical, half as long as the segments; capsules 25 mm. wide, 45 mm. long, stipitate, beaked. June.

Fig. 76
Agave pacifica. Left: a group of flowering specimens in the Huntington Botanical Garden, San Marino, Calif., greatly reduced. Right: leaf detail from type of A. oweni, approx. ¼ natural size.

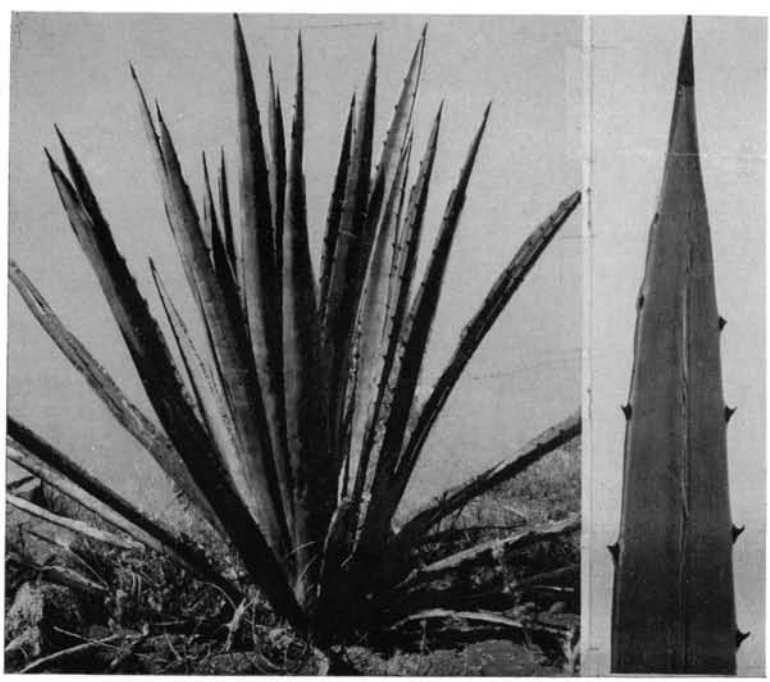

Fig. 77
Agave deweyana. Grown by Dr. Howard S. Gentry, Murrieta, Calif., approx. 1/10 natural size. Right: leaf detail from same rosette, approx. ⅓ natural size.

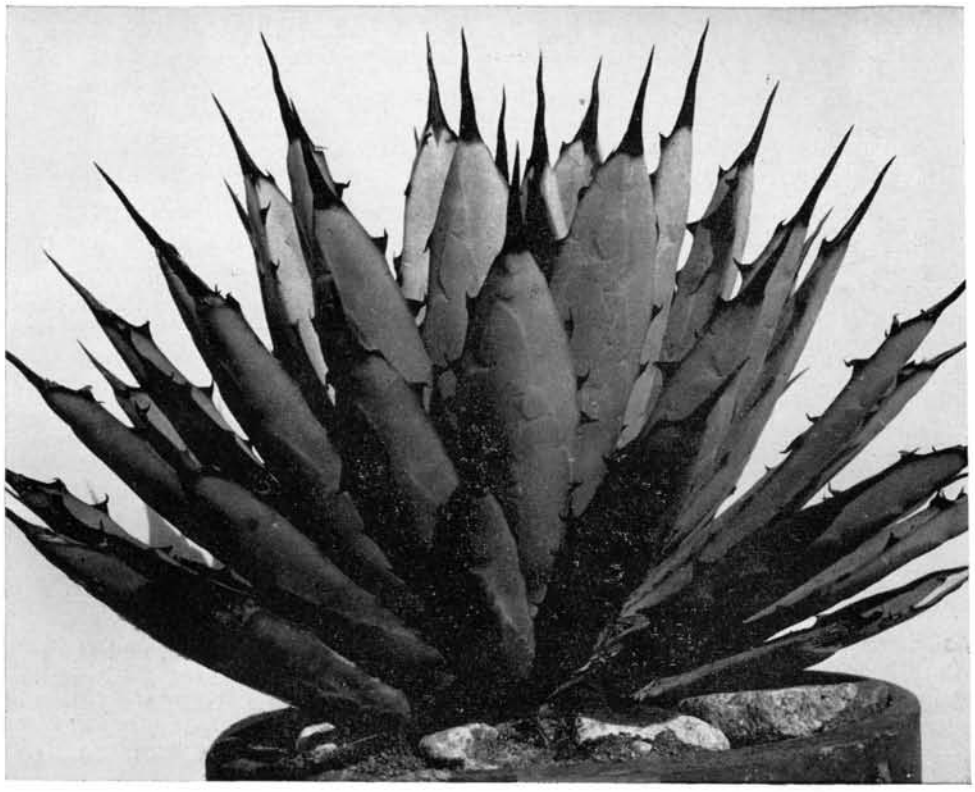

Fig. 78

Agave macroacantha. Characteristic rosette showing comparatively large, black armature, the terminal spine intruded in the green tissue; grown by Dr. Shelley A. Swift, Salt Lake City, Utah.

Agave deweyana Trelease, Trans. Acad. St. Louis 18: 35, 1909.

Distribution: Mexico: Tamaulipas and Veracruz, type from Victoria, Tamaulipas.

Rosette 2 to 2.5 m. in diameter, stemless, stoloniferous, leaves numerous, 3 to 5 cm. wide, 1 to 1.5 m. long, lance-linear, acuminate, yellow-green, transiently glaucous and sometimes transversely banded on the back, fibrous striate in drying; spine 3 to 4 mm. wide, 15 to 40 mm. long, brown, nearly straight and conical, broadly round-grooved in the lower third, shortly decurrent; teeth similarly colored, 15 to 40 mm. apart in the middle, reduced or absent toward the tip, 2 to 3 mm. long, slender, upcurved or inflexed, their bases somewhat lenticular, the intervening translucent margin nearly straight; inflorescence 3 to 6 m. high, the upper half densely oblong-paniculate; flowers unknown; capsules 25 mm. wide, 35 mm. long.

Agave macroacantha Zuccarini, Act. Acad. Caes. Leop. Carol. 16: 676, 1833.*

Distribution: Mexico; Puebla, type cultivated in Europe, probably from Tehuácan.

Rosette 4 to 6 or rarely 8 dm. in diameter, stemless or shortstemmed, stoloniferous; leaves numerous linear-lanceolate, stiff and rigid, glaucous, 2 to 4 cm. broad; 1.7 to 2 (or 3) dm. long; spine 4 to 6 mm. wide, 15 to 25 mm. long or more, dark brown or blackish, almost triangular, broadly grooved above, slightly decurrent, not always reaching the first pair of teeth, intruded ventrally into the tissue; teeth 2 to 5 mm. long, 15 to 20 mm. apart, heavy-based, mostly upcurved; inflorescence 2.5 to 3 m. high, slender; panicle open with 10 to 15 branches; flowers about 5 cm. long, greenish-yellow; capsules 4 to 4.5 cm. long. June-July.

*For complete synonymy see Trelease in Rep. Mo. Bot. Gard. 18: 247-251, 1907.

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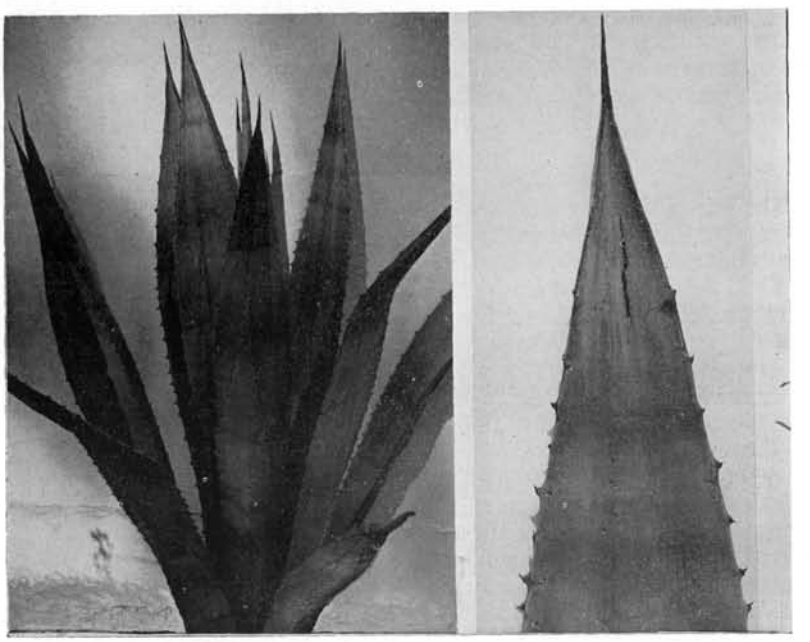

Fig. 97
Agave aboriginum. Left: grown by Dr. Howard S. Gentry, Murrieta, Calif., approx. 1/10 natural size. Right: leaf detail of same rosette showing marginal teeth and terminal spine, approx. 1/3 natural size.

Agave aboriginum Trelease, Trans. Acad. Sci. St. Louis, 18(3) : 34, 1909.

Distribution: Mexico; Veracruz, type from plantations around Tuxpam.

Rosette 1.8 to 2:5 m. in diameter, stemless or nearly so, stoloniferous; leaves 5to 11 cm. wide, 7 to 15 dm. long, persistently gray, scarcely striate, rather fleshy, acuminately pointed; spine 4 mm. wide, 35 to 50 mm. long, conical, round-grooved to the middle, often decurrent on the margin for its own length; teeth similarly colored, 5 to 8 mm. long, 20 to 35 mm. apart in the middle, continuing nearly to the tip, sometimes with intercalated smaller ones, heavy, upcurved or the tip recurved, their deltoid bases 5 to 8 mm. wide and sometimes concave below, the intervening thick usually green margin nearly straight. Flowers and fruit not seen.

Agave endlichiana Trelease, Trans. Acad. St. Louis, 18(3) : 34, 1909.

Distribution: Mexico; Veracruz, type from Huatusco.

Rosette 1.5 to 2 m. in diameter, stemless, stoloniferous; leaves 5 to 9 cm. wide, 0.8 to 1.5 m. long, narrowly lanceolate, light to dark green, spine 4 to 5 mm. wide, 15 to 30 mm. long, garnet-colored to chestnut, becoming grayish, smooth and glossy, somewhat flexuous, almost half-round below, obliquely round-grooved or concavely flattened, sometimes with a low median keel to beyond the middle, usually intruded ventrally and dorsally into the green tissue; teeth bright garnet or chestnut, pointed, 1 0to 20 or 30 mm. aport, about 3 mm. long, heavy, upcurved, gradually tapering, intervening margin thin, translucent, straight or low-repand; inflorescence and flowers unknown to writer, capsules abovoid, 30 mm. wide, 60 mm. long.

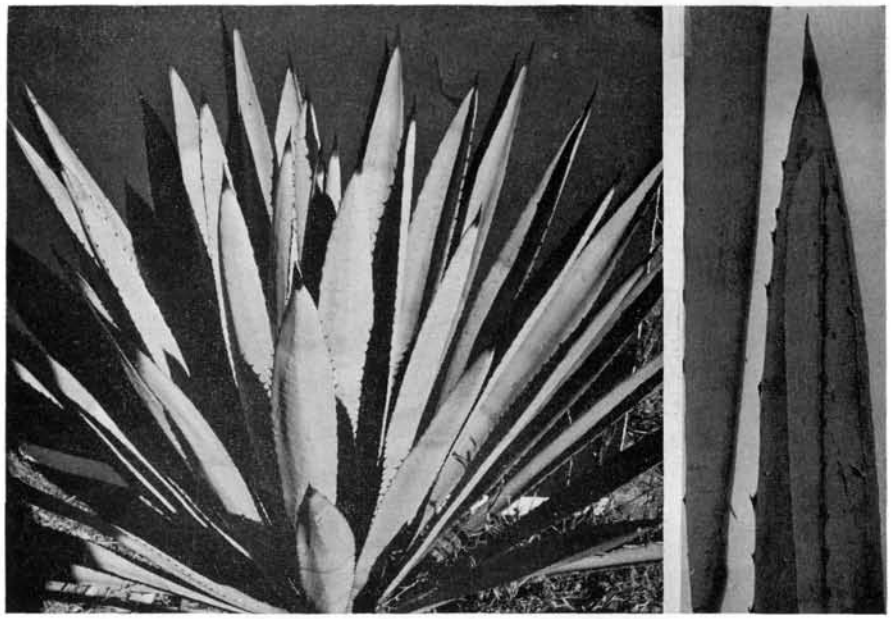

Fig. 98
Agave endlichiana. Left: grown by Dr. Howard S. Gentry, Murrieta, Calif. approx. 1/6 natural size. Right: leaf detail from same plant showing characteristic armature, approx. 1/3 natural size.

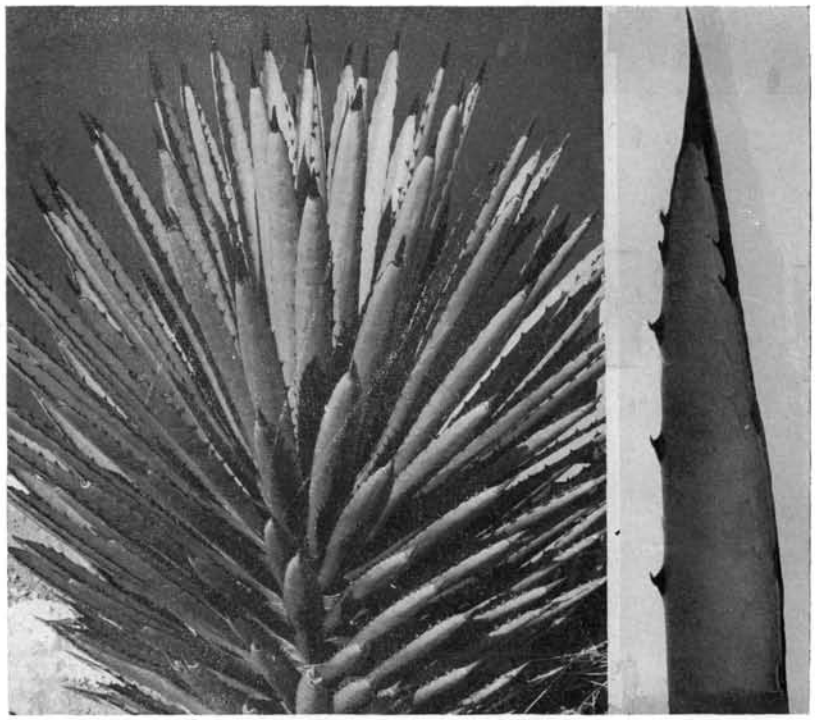

Fig. 99
Agave karwinskii. Left: grown by the University of California Botanical Garden, Los Angeles, Calif., approx. 1/12 natural size. Right: upper portion of leaf from same rosette showing heavy spine and teeth.

Agave karwinskii Zuccarini, Act. Acad. Caes. Leop. Carol. 16: 677, 1833.

A. corderoyi Baker, Gard. Chron. new series, 8: 398, 1877.

A. bakeri Ross in Boll. Soc. Sci. Nat. ed econom. Palermo, 1894.

Distribution: Mexico; Puebla and Oaxaca; type cultivated in Europe, probably from Tehuacan.

Rosette 0.8 to 1 m. diameter terminating in a trunk 2 to 3 m. high, stoloniferous; leaves 2 to 4 cm. wide, 3.5 to 7 dm. long, narrowly lanceolate, stiff and rigid, green or transiently glaucous, concave; spine 3 to 6 mm. wide, 25 to 50 mm. long, dark brown, conical or triangular, grooved above, decurrent for 5 to 7 cm.; teeth strong, upcurved, dark brown, 3 to 5 mm. long, 2.5 to 4.5 cm. apart, the intervening margin nearly straight between them; inflorescence 4 to 6 m. high, the oblong-ovoid panicle occupying the upper half; flowers greenish-brown or reddish 36 to 40 mm. long; capsules 3.5 to 5 cm. long.

Agave murpheyi Gibson, Cont. Boyce-Thompson Inst. 7(1): 83, 1935.

Distribution: Arizona, localized to central Arizona, Queen Creek, near Superior; Roosevelt Dam; Tonto Basin; Paradise Valley; type locality, near Boyce Thompson Southwestern Arboretum, Superior.

Rosette 1.3 m. in diameter, acaulescent, stoloniferous, leaves 5 to 8 cm. wide, 6 to 6.5 dm. long, narrowly lanceolate, widest above middle, flat above from base to middle becoming strongly concave near tip, smooth and pale glaucous-green on both surfaces, crossbanded; spine 4 mm. wide, 15 mm. long, glabrous, reddish-black becoming gray, grooved only near the base, shortly decurrent; teeth similarly colored, 1 to 3 mm. long, curved upward or downward, on fleshy prominences; inflorescence 3.5 m. high, panicle ovate about 8 dm. long; flowers 6 cm. long, pale greenish-yellow tinged with red, capsules 2.5 wide, 6 cm. long, flowers followed by bulbils. May-June.

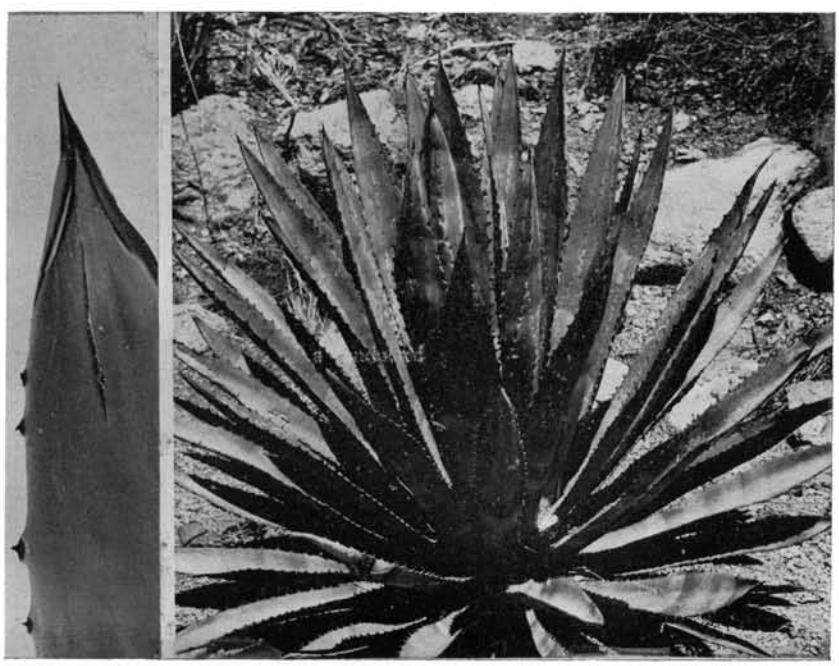

Fig. 100

Agave murpheyi. Right: rosette grown by the Boyce-Thompson Southwestern Arboretum, Superior, Arizona, approx. 1/8 natural sifie. Left: terminal portion of blade showing short-conical spine and teeth on low prominences, approx. 1/2 natural size.

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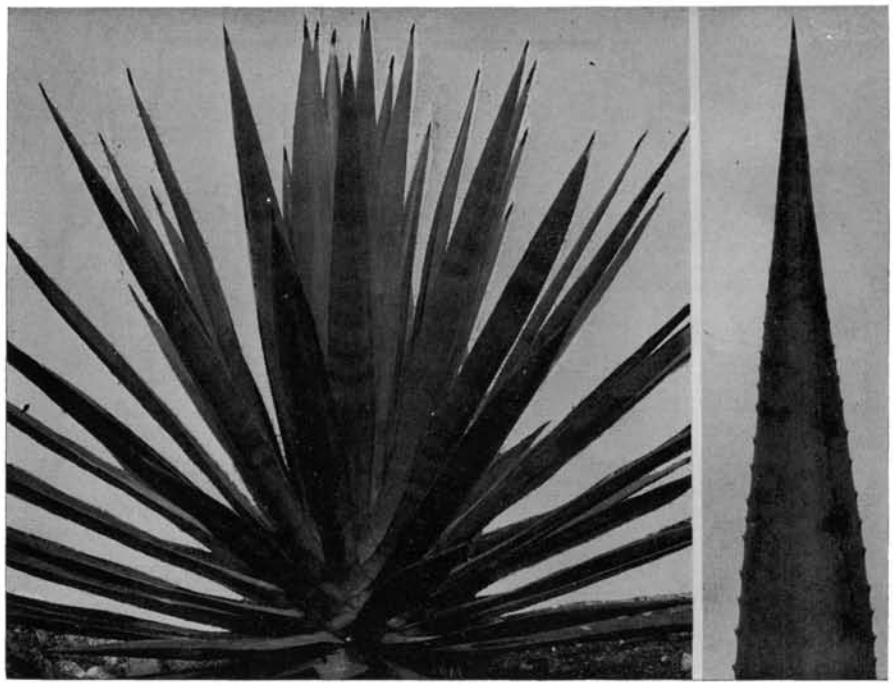

Fig. 109
Agave sisalana. Left: grown by Chester Summers, San Fernando, California, approx. 1/12 natural size. Right: leaf tip of *Agave sisalana* forma *armata,* grown by Lee Ellenwood, San Fernando, California.

SUBSERIES 2. SISALANAE, Trelease

Agave sisalana Perrine, U. S. Sen. 25th Gongr. Sess. 2 Doc. 300, 1838.

Distribution: Yucatan; type cultivated in Florida from introduced plants; widely planted in the tropics as a source of fibre.

Rosette 2 to 3 m. in diameter, stemless or stem to 1 m. high; leaves sword-shaped, slightly glaucous becoming bright green, numerous, nearly flat, stiff and rigid, 7 to 10 cm. wide, 1.10 to 1.80 long, spine 4 to 5 mm. wide, 20 to 25 mm. long, short-conical, chestnut, shallowly round-grooved toward the base, not decurrent, margin typically unarmed; inflorescence 6 to 7 m. high; panicle oblong, about 3.80 m. long; flowers about 65 mm. long, glaucous-green; bulbils abundant. July-Aug.

Agave sisalana forma **armata** Trelease, Mem. Nat. Acad. Sci. 11: 49, 1913.

Distinguished from the typical species by having the margin armed with small teeth.

Agave fourcroydes Lemaire, Ill. Hort. 11: Misc. 65, 1864.

A. sullivani Trelease in Standley, Cont. U.S. Nat. Herb. 23(1): 119, 1920.

Distribution: Yucatan; type cultivated in Europe from an unrecorded locality; widely cultivated as a source of fibre.

Rosette 2 to 3 m. in diameter terminating in a trunk becoming 2 m. high, stoloniferous; leaves narrowly lanceolate, stiff, rigid, 8 to 12 cm. wide, 1.25 to 1.75 m. long, flat, gray; spine 4 to 6 mm. wide, 10 to 30 mm. long, conical, chestnut to blackish-brown, round-

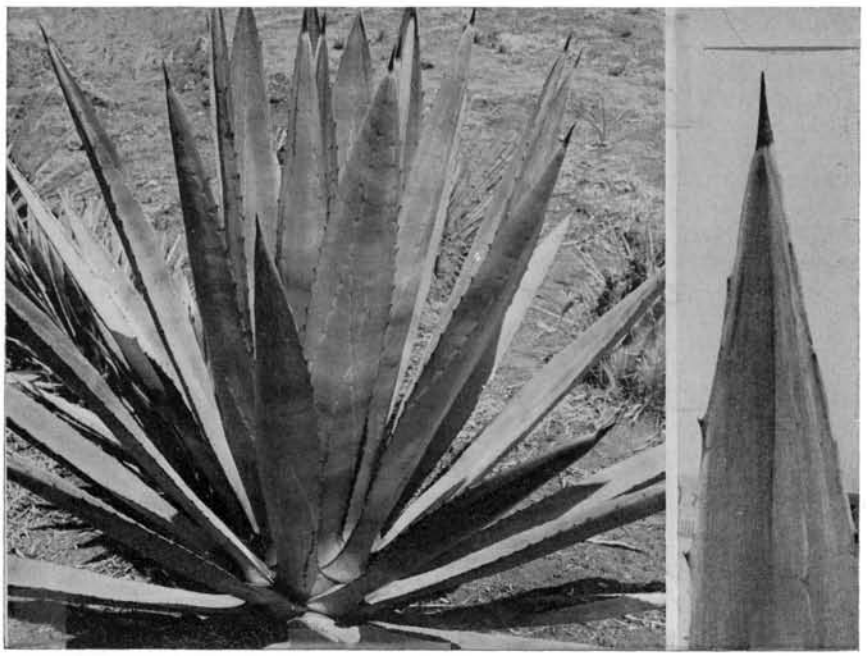

Fig. 110
Agave fourcroydes. Left: grown by Howard S. Gentry, Murrieta, California, approx. 1/10 natural size. Right: leaf tip showing spine and marginal teeth, approx. 1/2 natural size.

Fig. 111
Agave desmettiana. Left: rosette grown in the Huntington Botanical Garden, San Marino, California, approx. 1/10 natural size. Right: inflorescence terminating slender scape, greatly reduced.

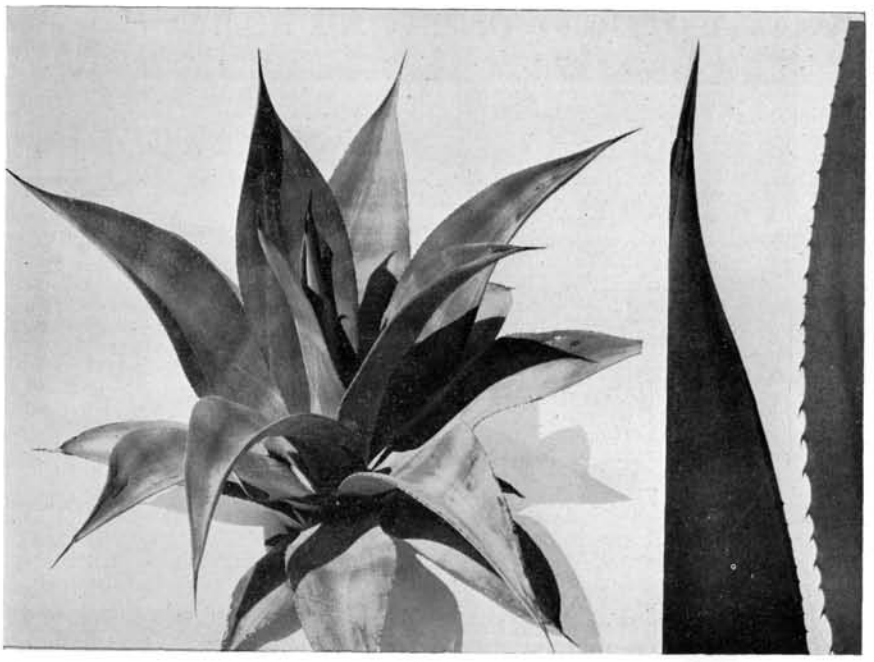

Fig. 112
Agave neglecta. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/8 natural size. Right: leaf tip and margin showing upper portion entire.

grooved at base; teeth 3 to 6 mm. long, 20 to 30 mm. apart, triangular, upcurved, blackish; inflorescence 6 to 7 m. high; panicle oblong-pyramidal; flowers 6 to 7 cm. long; capsules 5.5 cm. long; bulbils abundant. June-July.

Agave desmettiana Jacobi, Hamb. Gart. Zeit. 22: 217, 1866.

A. regeliana Jacobi, Hamb. Gart. Zeit. 22: 112, 1866.
A. miradorensis Jacobi, Abh., Schles. Ges. Vater. Cult. 1868; 156, 1868.
A. franceschiana Trelease, ex. Berger, Hortus Mortolensis 12: 358, 1912.
A. elizae Berger, Die Agaven, 232, 1915.
A. paupera Berger, Die Agaven, 235, 1915.

Distribution: Mexico; Veracruz, type cultivated in Europe, presumably from El Mirador, Huatusco, though said to be from Brazil.

Rosette 1.5 to 1.8 m. in diameter, stemless or short-stemmed, stoloniferous; leaves 3 to7 (or up to 11) cm. wide, .5 to 1.5 m. long, lanceolate, glaucous with conspicuous green cross-banding, nearly straight, rather soft and pliable, slightly concave; spine 4 to 5 mm. wide, 20 to 25 mm. long, reddish-brown to dark-brown, conical, shallowly grooved or flattened below the middle, scarcely if at all decurrent; upper half of leaf margin entire, lower part with minute, nearly colorless teeth, 3 to 5 mm. apart or wholly entire; inflorescence 3 to 5 m. high including the short-pyramidal panicle; flowers 5 cm. long, green, tipped with brown; bulbils numerous. July-Aug.

Agave neglecta Small, Flora of the Southeastern United States, 289, 1903.

Distribution: Florida, the type locality where it occurs is on sandy soil.

Rosette stemless, 3 to 4 m. in diameter, stoloniferous; leaves 1 to 1.5 dm. wide, 1.5 to 2.5 m. long, gray, ascending and recurved, thick at the base, concave; spine conical, short and narrowly grooved, 4 to 5 mm. wide; 2 to 3 cm. long, dorsally intruded in the green tissue, decurrent for about its own length, lower half to two thirds of leaf margin armed with numerous close set very small recurved prickles, 1 to 2 mm. long, about 5 mm. apart, upper third of leaf margin entire; inflorescence 13 m. high; panicle 3 m. long; flowers yellowish-green, 55 mm. long. Aug.-Sept.

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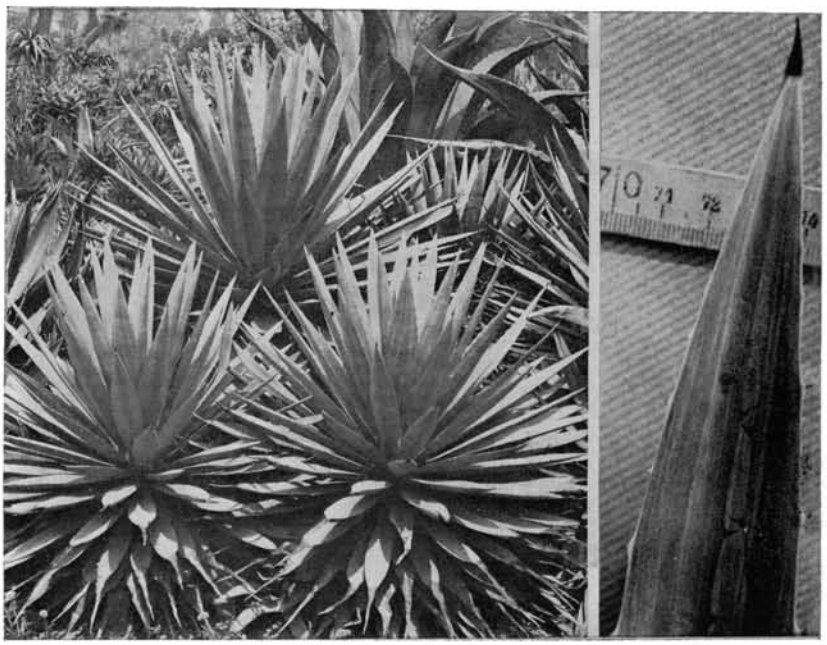


Fig. 18
Agave angustifolia. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/12 natural size. Right: leaf tip showing characteristic armature, slightly reduced.

Agave angustifolia Haworth, Syn. Pl. Succ. 72, 1812*

Distribution: Yucatan or Honduras?; type cultivated in Europe from the island of St. Helena, where, as everywhere in warm climate, it is planted.

Rosette 1 m. in diameter, stem 1 to 4 dm. high, stoloniferous; leaves numerous, stiff, 5 to 6 dm. long, linear-lanceolate 7 to 8 cm. wide at the middle narrowing to 4 cm. just above base, gray-green, flat above or slightly concave, convex beneath; spine 4 mm. wide, 18 to 25 mm. long, dark brown or black, biconvex, slightly flattened above at base; teeth similarly colored, 3 to 5 mm. long, 2 to 2.5 cm. apart, variously bent, very slender from deltoid horny bases; inflorescence 2.5 to 3 m. high; panicle narrowly pyramidal; flowers about 5 cm. long, capsules obovoid, 3.5 cm. long, 2.5 cm. in diam.; bulbils abundant. Aug.-Sept.

Agave angustifolia var. **marginata** Trelese, Rep. Mo. Bot. Gard. 19: 287, 1908.

Distinguished from the typical form by the white marginal variegation of leaves; common in cultivation, sometimes erroneously called *A. picta.*

Aagave angustifolia var. **marginata** forma **woodrowi** (Watson) Trelease, Rep. Mo. Bot. Gard. 19: 287, 1908, having the white marginal variegation of the original variety in addition, the remaining leaf surface is silvery gray or milky—the chlorenchyma being everywhere overlaid by several layers of etiolated cells. This form is not know to the writer.

*For complete synonymy see Trelease in Rep. Mo. Bot. Gard. 19: 284, 1908.

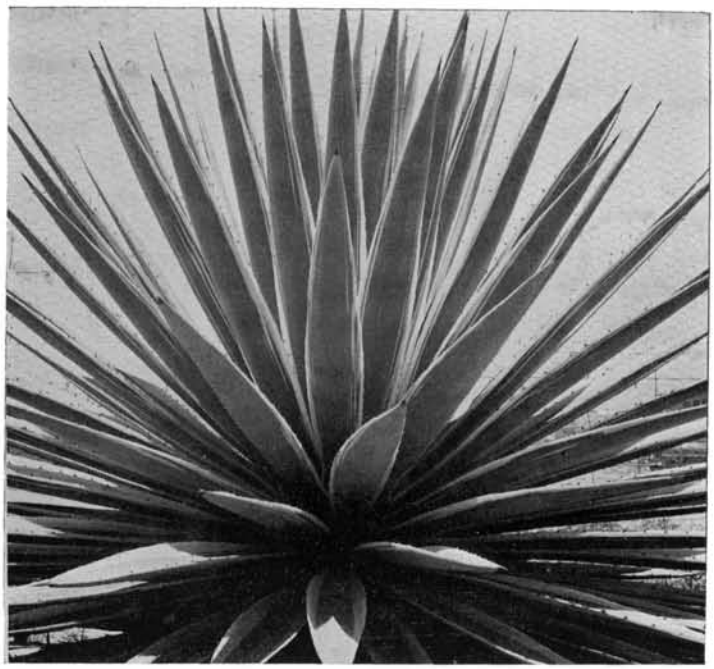


Fig. 19

Agave angustifolia var. *marginata*. Grown by Chester Summers, San Fernando, California, approx. 1/10 natural size.

Agave zapupe Trelease, Trans. Acad. St. Louis 18: 32, 1909.

Distribution: Mexico, Veracruz, type from Tuxpan.

Rosette 2 to 3 m. in diameter, stemless or nearly so, stoloniferous; leaves rather numerous, 8 to 10 cm. wide, 1.5 to 2 m. long, dark green, persistently glaucous, striate, thin, gradually acute; spine 4 mm. wide, 1 5to 25 mm. long, bright red-brown becoming nearly black, smooth and glossy, acuminately tapering, triquetrously subterete, from a broad convex flattened or slightly concave base, somewhat intruded ventrally into the green tissue, not decurrent; teeth 15 to 30 mm. apart in middle, reduced or wanting near tip, 2 to 3 mm. long, rather slender, straight or mostly upcurved, gradually tapering or with abruptly widened or lenticular bases; the intervening thin translucent margin nearly straight; inflorescence 3 to 6 m. high, the upper third or half laxly ovoid-paniculate with outcurved or ascending branches; flowers greenish, 5.3 cm. long, infrequent, bulbils abundant, maroon-dotted.

Agave candelabrum Tod. Gort. Panorm. 1: 66, 1876.

Distribution: Mexico; type cultivated in Europe without citation of locality.

Rosette large, 2 to 3 m. in diameter, stemless or short-stemed, stoloniferous; leaves rather few, 8 to 9 cm. broad, 1 to 1.5 m. long, linear-lanceolate, light to dark green, slightly lined longitudinally, glabrous, thin and pliable, frequently overhanging; spine 3 to 4 mm. wide, 15 to 20 mm. wide, conical, round-grooved at base, dark brown; teeth 4 to 6 mm. long, 20 to 25 or 30 mm. apart, sharply upcurved, the intervening translucent margin straight; inflorescence 4 to 6 m. high, panicle oblong; flowers 6 to 6.5 long; bulbils abundant. July-Aug.

Agave vera-cruz Mill. Gard. Dict. ed. 8, Agave no. 7, 1768.

A. lurida Aiton, Hort. Kew. 1: 472, 1789.

A. vernae Berger, Die Agaven 245, 1915.

A. prainiana Berger, Die Agaven 246, 1915.

Distribution: Mexico: type cultivated in Europe.

Rosette about 2 m. in diameter, stem 4 to 5 dm. high, stoloniferous; leaves linear-

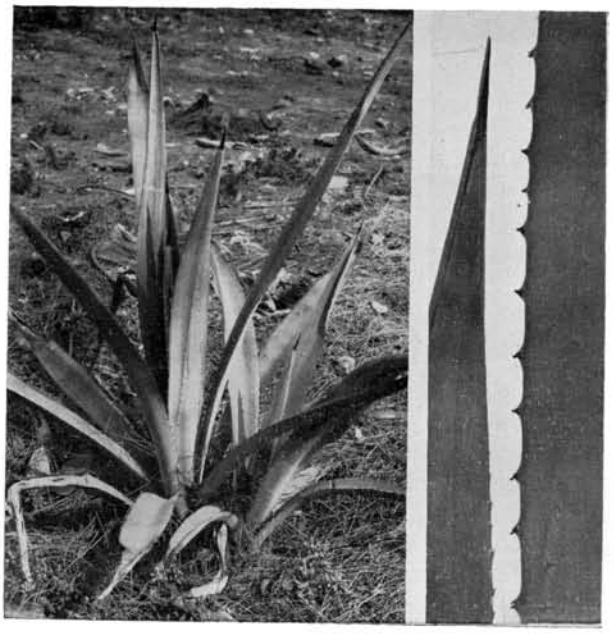


Fig. 20
Agave zapupe. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/8 natural size. Right: leaf tip and margin from same rosette, approx. 1/2 natural size.

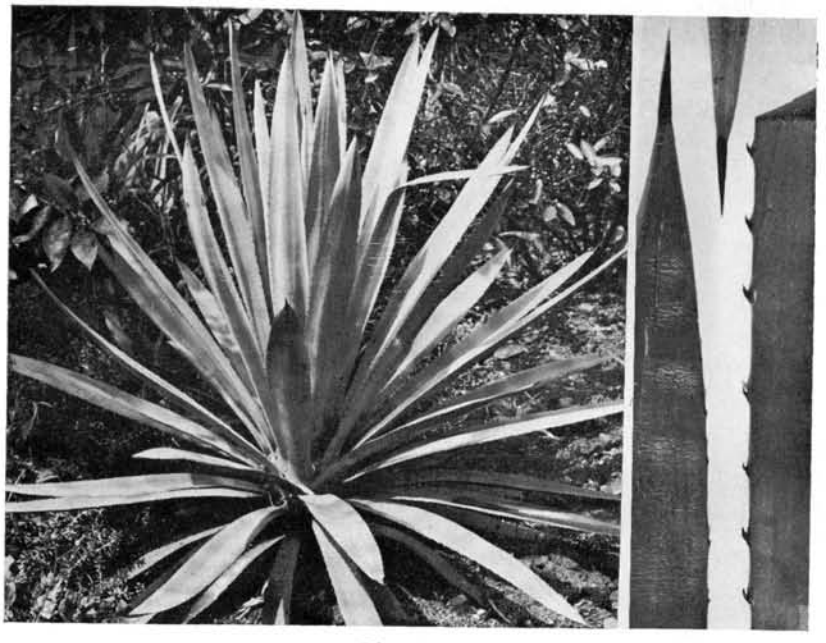


Fig. 21
Agave candelabrum. Left: grown by Hayes Schlundt, Pasadena, California, approx. 1/12 natural size. Right: leaf tip and margin showing armature, approx. 1/2 natural size.

lanceolate, acuminate, 1 m. long, 15 to 16 cm. wide at middle narrowing to 11 cm. near base, erect-spreading, concave or flat, inrolled near tip, more or less glaucous or transversely gray and green zoned, glabrous; spine conical, 3 to 4 mm. wide, 15 to 30 mm. long, shallowly grooved at base only, sessile or very little decurrent, at first yellow or red-brown, later graying, rough; teeth 2 to 3 mm. long, 10 mm. apart, deltoid, straight or the tips curved forward or backward, brown, soon graying; inflorescence 4 to 6 m. high, panicle oblong pyramidal about 2 to 2.5 m. long; flowers 7.5 to 8.5 cm. long, yellow-green; capsules 5.5 to 6 cm. long, 2 to 2.5 cm. in diameter. August.

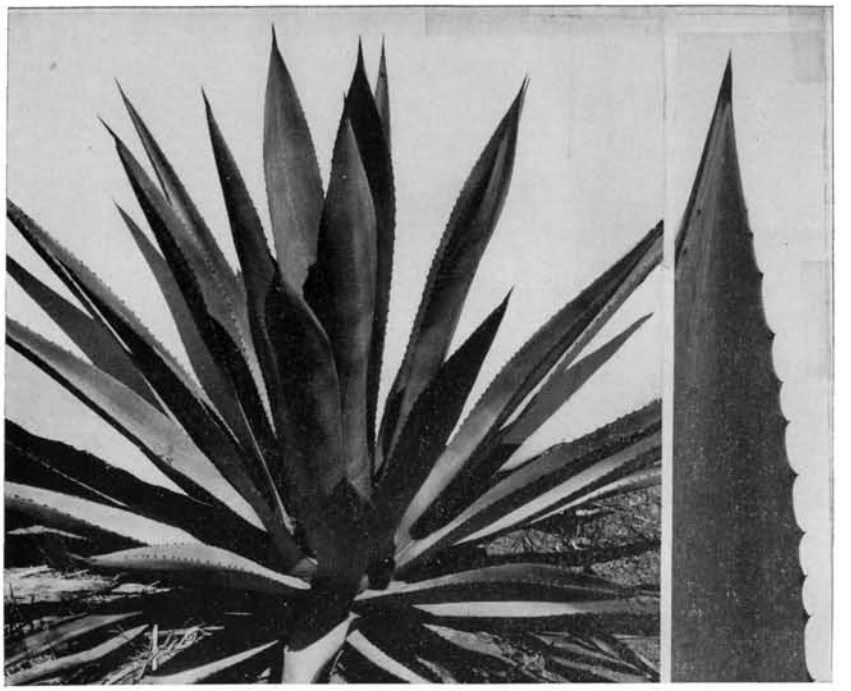


Fig. 22

Agave vera-cruz. Left: grown by Cactus Slim Moorten, Palm Springs, California. Right: blade showing characteristic armature, approx. ½ natural size.

CACTUS & SUCCULENT SOCIETY OF CALIFORNIA

The November 12 meeting was held in the Oakland Garden Center. Mr. Tressler headed a discussion on reasons for grafting cactus plants. He showed many plants to illustrate the points brough out in the discussion. Those plants with weak root systems are of course helped most by grafting. All of the crests and the small varieties make much more attractive pot plants when grafted. Mr. Tressler promises to demonstrate the methods he uses this coming spring. In the meantime, many of us are growing understock which we were given at the meeting.

Mr. Hillery, Mr. Butterfield and Dr. Dodson brought in some very attractive plants too. Dr. Dodson had a small bright red cactus (lacking in chlorophyll) grafted on a small understock. This was developed in Japan and will be offered on I.S.I. sometime in the near future.

The Society decided, after much discussion and a Board of Directors meeting, to buy a complete set of "Flowering Plants of Africa", a quarterly publication, for the years 1920-1956 inclusive. The set contains some 1240 hand tinted plates as well as descriptions of the plants. We were very fortunate to obtain these books through Mr. Scott Haselton.

The Society's Christmas party took place Sunday, December 10th. There was an exchange of gift plants and a very festive desert lunch. Before the party, a short business meeting was held. Old members and former presidents of the Society were introduced. Mrs. Green showed pictures that Mrs. Margaret Williams and she took in Mexico while at the American Society's convention.

MARAFRED GREEN

MORE TRIPS?

So much fun was had on the visit to Madam Ganna Walska's that many requests have been made for a 'repeat'. Plans are being made for such a trip, preferrably by bus, to San Diego's famous Natural History Museum, followed by a run around Balboa Zoo. As now discussed, this will be done in March, in order to have Drs. George Lindsay and Reid Moran on hand to host the group. Trip to be made by Charter buses—reservations to be made to appointed clerk. Be alert and ready. Detailed information will be sent your Affiliate Director through the Affiliate Secretary, Murray Skinner.

Another trip is planned for somewhere near the middle of May. This time to Palm Springs and the Slim Moortens. Details later.

The get-together at the Annual Meeting was so well received, how many desire another such? Contact your Chairman, let him know. PL. 8-3729 or 8627 Denver Ave., Los Angeles 44.

DON B. SKINNER, *Chairman*
Special Events

there may have been cause for worry. If you have read this column you will remember I always stress the need of fresh air and sunlight. Even a little direct sunlight is very beneficial. Light through a pane of glass loses a good part of the short-waved blue side of the spectrum but allows longer waved red rays to come through. Thus your plants are partially deprived of a part of the total spectrum they need. In Southern California I have always considered a greenhouse a crutch on which it is unwise to lean too heavily. In it one may create a micro-climate quite suitable for many purposes as seed sowing, rooting cuttings, etc., and of course protecting from heavy frosts. Keep your plants out of doors, if and when you can, for their easiest and simplest care.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 19

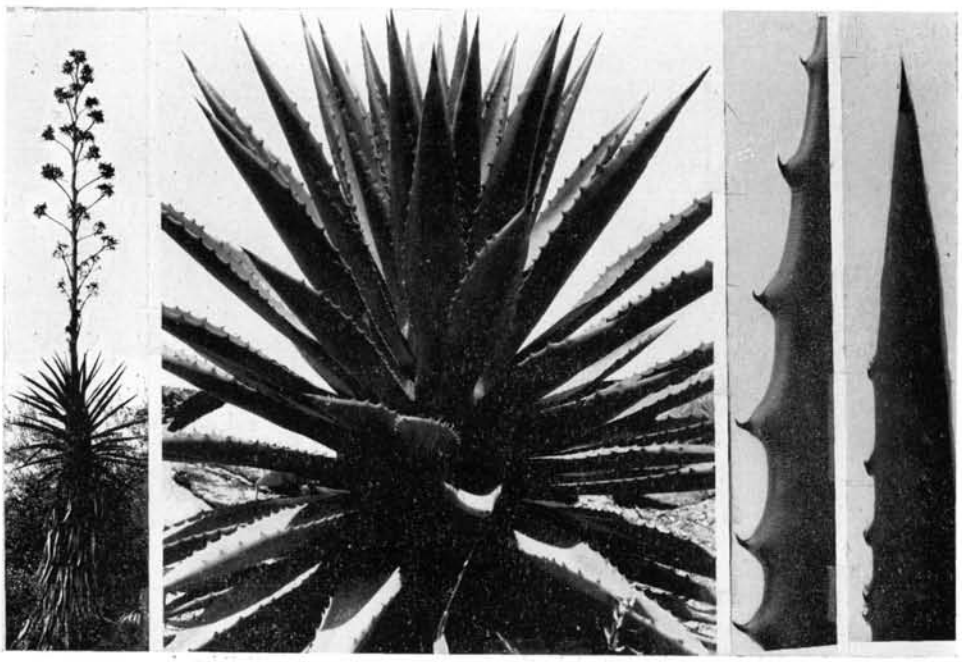


Fig. 31
Agave decipiens. Left: flowering plant grown in Glendale, California, greatly reduced. Center: rosette grown by Chester Summers, San Fernando, California, approx. 1/8 natural size. Right: leaf tip and margin showing armature, approx. 1/2 natural size.

Agave decipiens Baker, Kew Bull. Misc. Inf. 1892: 183, 1892.

A. laxifolia Baker in Curtis' Bot. Mag. 122: 1896.

Distribution: naturalized in southern Florida; type cultivated in Europe without recorded locality; presumably from Yucatán.

Rosette 1 to 1.5 m. in diameter, terminating a trunk 2 to 3 m. high, stoloniferous; leaves 4 to 10 cm. wide, 3 to 7 dm. long, linear-lanceolate, green, outcurved, rather fleshy, concave; spine 3 to 5 mm. wide, 10 to 25 mm. long, conical, dark chestnut; teeth 3 to 4 mm. long, 1.5 to 3 cm. apart, slender, upcurved, on fleshy prominences between which the margin is concave; inflorescence 5 to 6 m. high; panicle open occupying half or more of the scape; flowers greenish-yellow about 7.5 cm. long. July.

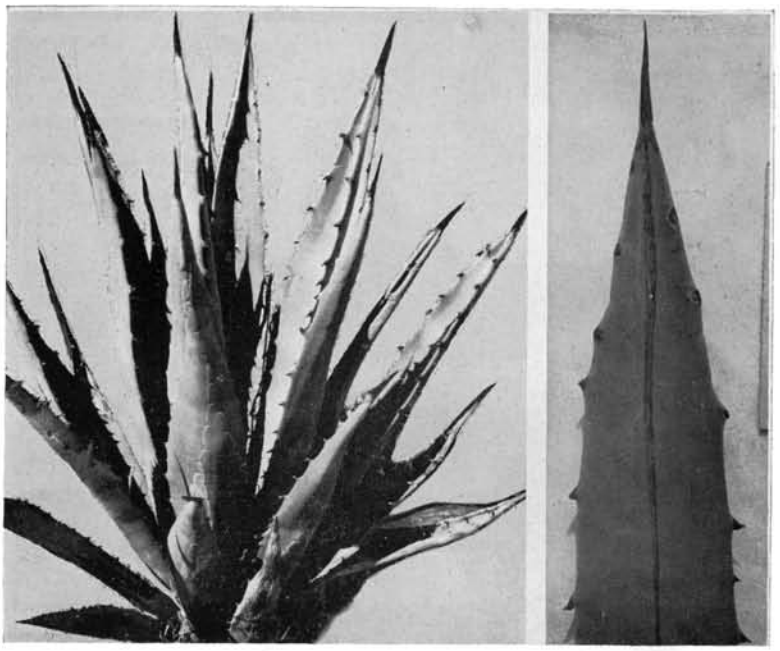


Fig. 32
Agave datylio. Grown by Howard S. Gentry, Murrieta, California, approx. 1/5 natural size. Left: leaf blade showing armature, approx. 1/2 natural size.

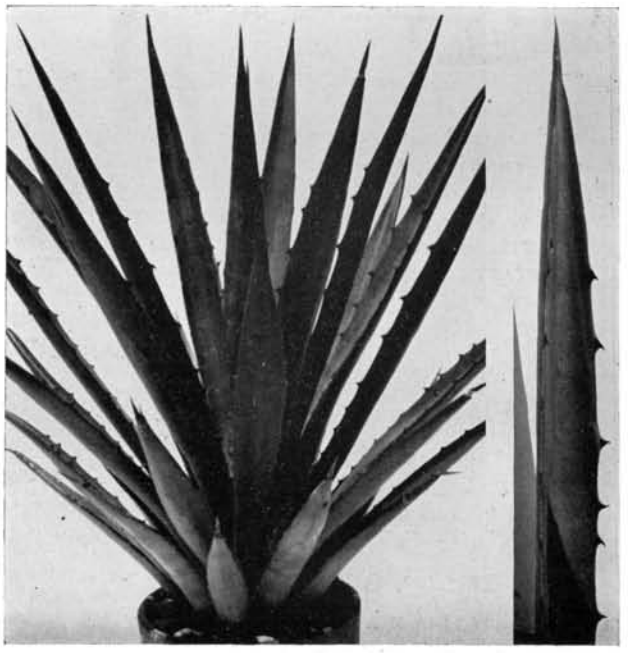


Fig. 33
Agave datylio var. *vexans*. Left: grown by Hayes Schlundt, Pasadena, California. Left: leaf blade showing armature, approx. 1/2 natural size.

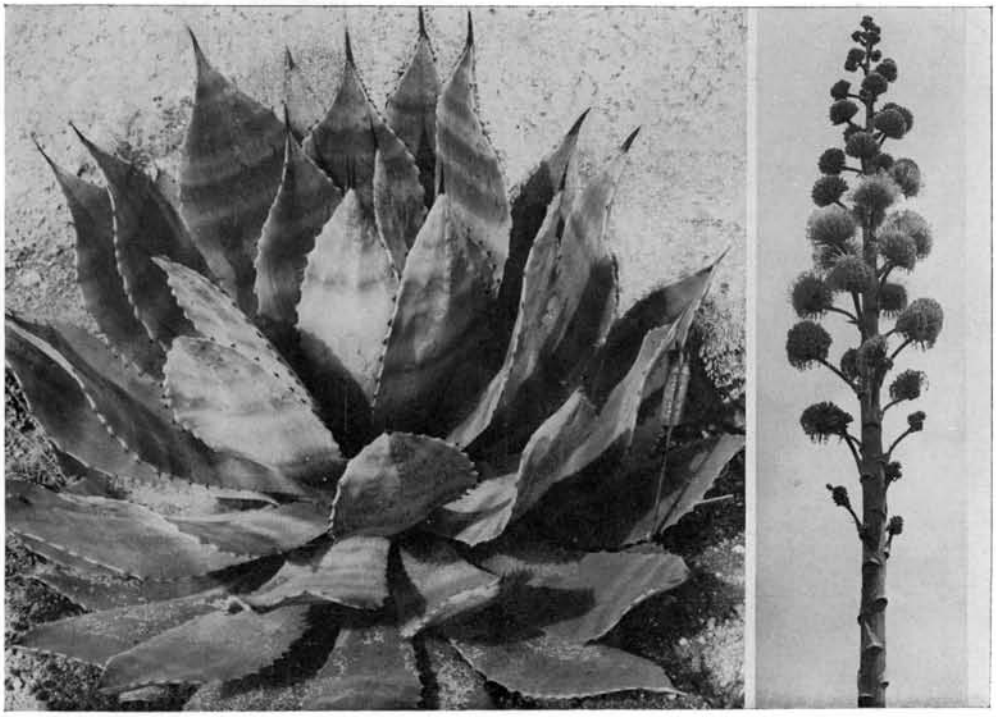


Fig. 34
Agave pachycentra. Left: rosette grown in the Huntington Botanical Garden, San Marino, California, approx. 1/8 natural size. Right: inflorescence showing short branches and dense clusters of flowers, much reduced.

SERIES 2. DATYLIONES, Trelease

Agave datylio Weber, Bull. Mus. Hist. Nat. 8: 223, 1902.

Distribuiton: Mexico, Southern Lower California, La Paz, the type locality and San Pedro.

Rosette .8 to 1.2 m. in diameter, few-leaved, stemless, stoloniferous; leaves 3 to 4 cm. wide, 3 to 7.5 rm. long, yellowish gray-green, glabrous, oblong-lanceolate, concave, fleshy, rigid; spine 4 to 6 mm. wide, 20 to 30 mm. long, nearly straight, triquestrously conical, grooved only at the base, chestnut, glossy; teeth 3 to 5 mm. long, 20 to 30 or 50 mm. apart, triangular and mostly recurved from heavy or lenticular bases or the narrowed cusps absent, the intervening margin nearly straight; inflorescence 4 to 5 m. high, lightly glaucous, the slender scape branches moderately short branched at end; flowers 45 to 55 mm. long, greenish, filaments 35 to 45 mm. long; capsules 20 mm. broad, 35 to 40 mm. long. July-Aug.

Agave datylio var. **vexans** (Trelease) I. M. Johnston, Calif. Acad. Sci. series 4, 12: 1003, 1924.

A. vexans Trelease. Rep. Mo. Bot. Gard. 22: 62, 1911.

Distribution: East central Lower California, type from Mulegé.

Distinguished from the typical species by the shorter flowers which are 40 mm. long, with filaments scarcely 25 mm. long, a spine which is grooved to the middle, shorter leaves 20 to 45 cm. long and 2 cm. wide. Foliar differences may be only ecological.

SUBSERIES 2. GUATEMALENSIS, Berger

Agave pachycentra Trel. Trans. Acad. St. Louis 23: 135. 1915.

Distribution: Guatemala: type from Cruz.

Rosette 2.5 to 3.5 dm. in diameter, single, stemless, leaves 1.5 to 2 dm. wide, 3.5 to 6 dm. long, blue-glaucious on a deep ground, ascending in a close rosette, broadly oblong-lanceo-

late, acute, concave, minutely granular beneath; spine 8 mm. wide, 40 to 60 mm. long, drab or graying, dull or slightly glossy, more or less granular, stoutly half-conical or triquetrous, somewhat wavy, very openly grooved from near the end with acute edges, usually ventrally and dorsally keeled, decurrent for about its own length, more or less intruded into the green tissues on both faces; teeth similarly colored 25 to 40 or 50 mm. apart, 5 to 10 mm. long, more or less curved, specially downward, heavily triangular, abrutly dilated into fleshy prominences or frequently shouldered at base, the intervening margin somewhat concave; inflorescence 5 m. high, scape stout, panicle narrow, flowers in a dense cluster at the ends of short branches, bulbils abundant. April-May.

Agave seemanniana Jacobi, Abh, Schles. Ges. Vaterl. Cult. 1868: 154, 1868.

Distribuiton: Nicaragua (type from Segovia) and Guatemala.

Rosette .8 to 1 m. in diameter, stemless, single; leaves 8 to 10 cm. wide, 2.3 to 3.5 dm. long, glaucous somewhat green banded, openly spreading, oblanceolate-oblong or obovate, acute or subacuminate, minutely roughened toward the apex particularly o nthe under surface; spine 2 to 4 mm. wide, 20 to 30 mm. long, purplish-brown, somewhat glossy above, minutely granular below, slenderly conical or acicular, more or less flexous, involutely grooved from above the middle with acute edges, decurrent for its own length or less, scarcely intruded into the green tissue; teeth brown or turning gray 2 to 3 mm. long, 10 to 20 mm. apart, brown or turning gray, rather straight but the lower point downwards, the slenderly triangular cusps abruptly dilated on to the tops of fleshy prominences between which the somewhat concave margin sometimes bears slender dark denticles; inflorescence 3 to 4 m. high, slender, flowers in dense clusters at the ends of short branches.

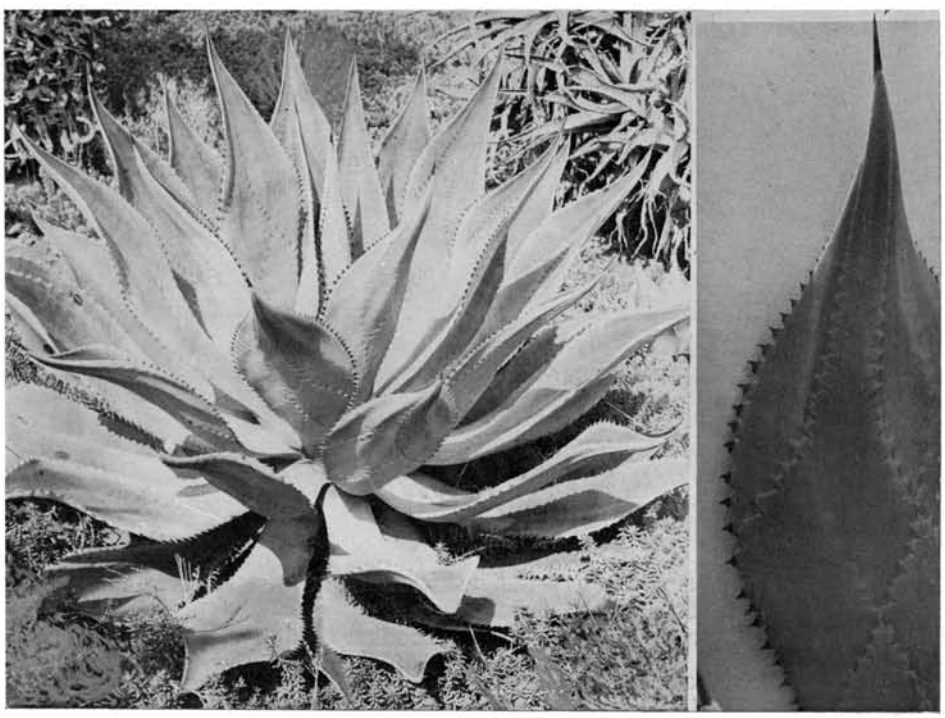


Fig. 35

Agave seemanniana. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/10 natural size. Right: leaf showing armature.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 20

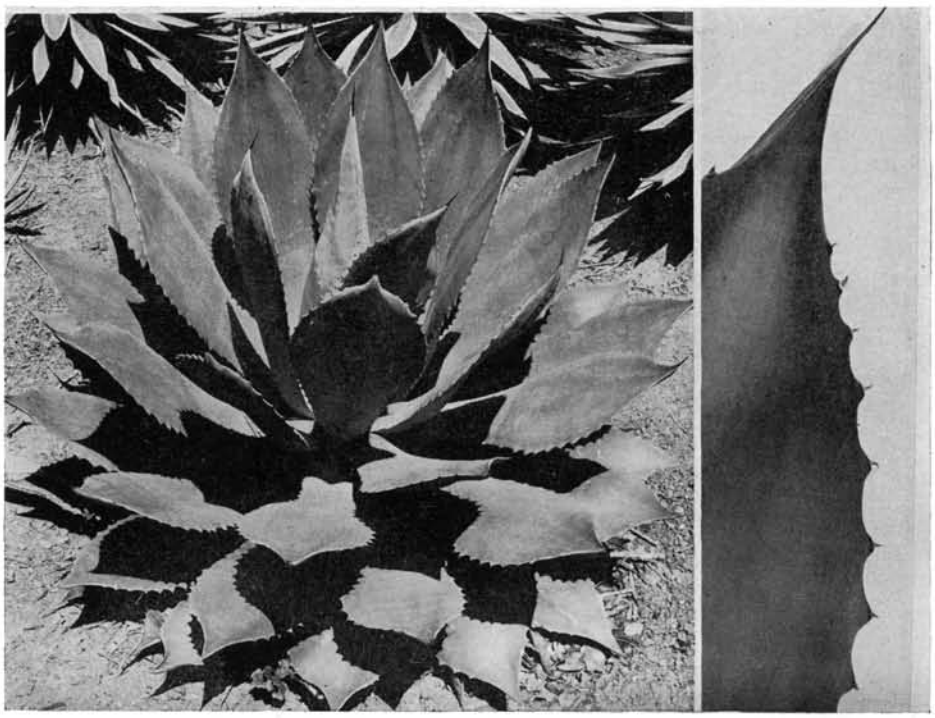


Fig. 48
Agave samalana. Left: grown by Madame Ganna Walska, Santa Barbara, California, approx. 1/8 natural size. Right: leaf portion from same rosette showing armature, approx. 1/2 natural size.

Agave samalana Trelease, Trans. Acad. St. Louis 23: 142, 1915.

A. weingartii Berger, Die Agaven, 200, 1915.

Distribution: Guatemala; type from mountainsides along the Samala River around Esperanza.

Rosette 1 to 1.8 m. in diameter, stemless, scarcely caespitose; leaves rather numerous 1.5 dm wide, 6 dm. long, glaucous, especially beneath, oblanceolate, sub-acuminate, somewhat concave, minutely roughened beneath and sometimes above; spine 3 to 4 mm. wide, 30 mm. long, reddish or chestnut, becoming gray, somewhat granular below, slenderly conical or acicular, nearly straight, round-grooved from above the middl,e with acute edges, decurrent for about its own length, upper one quarter to one fifth of leaf margin sometimes entire; teeth variable on same leaf margin, 1 to 3 or 5 mm. long, 8 to 15 or 20 mm. apart, brown becoming dull gray, flat, narrowly triangular, lenticularly widened into the nearly straight margin above the middle, becoming broadly triangular on broad shouldered fleshy prominences between which the margin is concave or which are separated by acute sinuses; inflorescence 3 to 4 m. high, panicle open with short branches, bulbils abundant. June.

Agave tenuispina Trelease, Trans. Acad. St. Louis 23: 139, 1915.

Distribution: Guatemala; type from mountainsides at Cruz.

Rosette 1.3 to 1.5 m. in diameter, stemless, scarcely caespitose; leaves not numerous, 8 to 12 cm. wide, 5 to 7.5 dm. long, oblanceolate, acute, ascending at the base, then recurved,

Fig. 49
Agave tenuispina. Grown in the Huntington Botanical Garden, San Marino, Califorina, approx. 1/8 natural size.

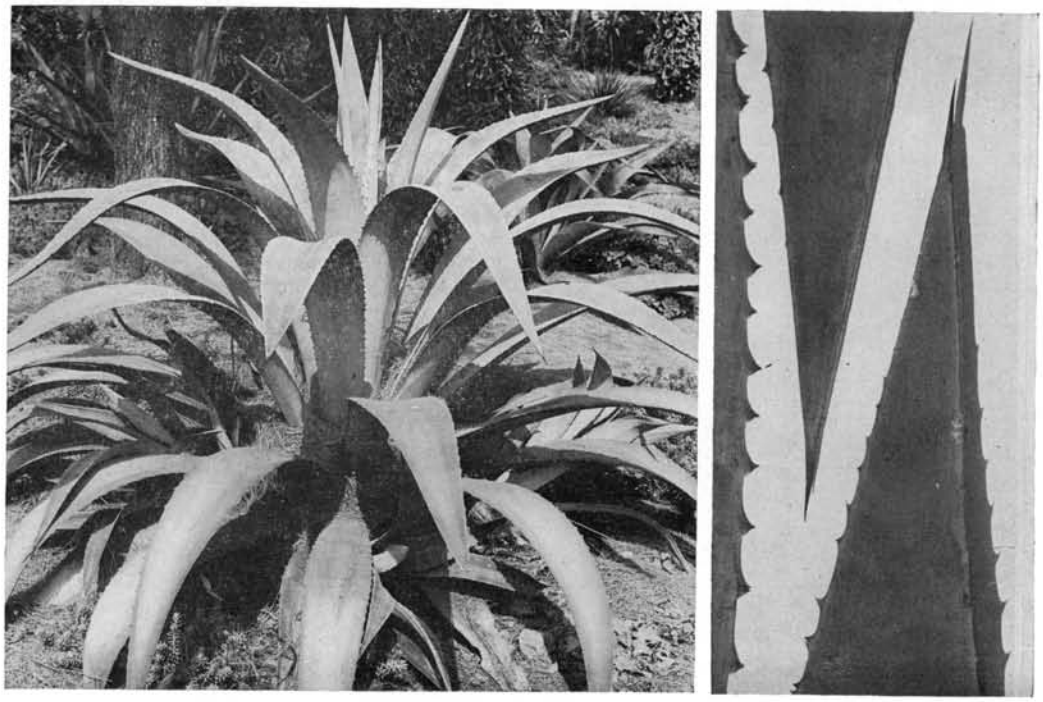


Fig. 50
Agave kellermaniana. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/12 natural size. Right: leaf tips and leaf margin showing armature, approx. 1/2 natural size.

deeply concave, somewhat plicate, rather thin and pliable, green above with glaucous cross banding, glaucous and rough beneath; spine 2 to 4 mm. wide, 30 to 40 mm. long ,dull brown or yellowish, acicular, smooth or somewhat roughened at base, slightly undulate, involutely grooved from above the middle with rather blunt edges, decurrent for less than half its length, little or not intruded into the green tissue; teeth brown, glossy, 2 to 3 mm. long, 20 to 40 mm. apart, curved up or down, narrowly triangular, deltoidally enlarged into fleshy prominences between which the margin is nearly straight or slightly concave.

The above description is drawn from living plants in the Huntington Botanical Garden, San Marino, California, introduced from Puerto del Diablo, El Salvador. *A. tenuispina* was described originally as having glabrous leaves and *A. opacidens,* l.c. also from the same locality, Cruz, as roughened on back and margin, but with stoutly triquestrous spine. Both may be forms of the same species. Also allied, if not identical is *A. parvidentata* Trelease, Journ. Acad. Sci. 15: 395, 1925, described from San Salvador.

Agave kellermaniana Trelease, Trans. Acad. St. Louis 23: 142, 1915.

Distribution: Guatemala, type from Fiscal.

Rosette 2 to 2.3 m. in diameter, stemless, little suckering; leaves very glaucous, 8 to 10 cm. wide, 10 dm. long or more, elongated-lanceolate ,slightly acuminate, rather concave, glabrous or slightly granular on undersurface below spine only; spine 4 to 5 mm. wide, 30 to 35 mm. long, purplish chestnut, somewhat glossy, slenderly conical, round-grooved from above the middle with blunt edges, somewhat dorsally intruded in the green tissue; teeth 3 to 5 mm. long, 10 to 25 mm. apart, triangular, the widened bases occupying the larger part of fleshy prominences between which the margin is nearly straight.

CEREUSLY SPEAKING

From the good results I have had with flowers and fruits in the last five years, I think I have proved my contention that it is not dryness alone, nor sunshine, nor regular amounts of water—but it is a combination of these plus irregular temperatures. Irregular temperatures of 42 to 58 degrees here in Ohio do not seem to hinder the flowering of my regular flowering types.

I contend that the most vigorous races of men live in the variable temperate zones or in the higher areas in the mountainous districts of the hotter regions. If this is so, and I'm sure it is proven in men, I'm also sure it is true of plants and a variable temperature keeps them from too much poor growth and limits the vigorous growth, the setting of buds, and flowering and seed production to carry on this vigor into new plants grown from seed.

I've observed the poor results in over-hybridizing of various strains. These frequently have poor germination and an early loss of seedlings which lack chlorophyll. Over-vigorous hybrids have a tendency to proliferate to excess and be shy of flowers as in Echinopsis.

I've consulted various growers of seedlings which do need a more steady temperature and a tropical treatment. Eugene Ziegler has his best results with a steady temperature and high humidity in the 90 degree range. He continued this treatment for several weeks doring and after germination. His results were high in the percentage of germination and survival. He used waterings of copper solutions to keep down the algae and damping-off fungus. After his seedlings were hardened, he maintained a lower but regular temperature. Frequently he had low temperatures with low readings of northern New York state. His collection always wintered well and responded to spring warmth.

I'm sure I do not disagree with the care of seedlings under these conditions. However, I do not pamper them in my growing conditions. I let them go bone dry from late October to mid-February and even into mid-March. Usually they respond with limited waterings and coolness. I examine them to see if any show the loss of roots because of such treatment. I find the roots are slightly shriveled but not dead and frequently have already begun to grow at the tips and finer root hairs.

I turned off the heat on March 21 of this year. There has been frost on the roof glass and the temperatures near 38. The buds on the Epiphyllums have shown no aborting, in fact I've had more flowers on my 50 to 70 types than when I kept the temperatures up in the 60's. My Rhipsalis are finished flowering and outside of a few shy bloomers, I'm satisfied with the results.

My Mammillarias have had a long flowering period. My collection of S.W. cacti, near the glass, have bloomed in profusion—Echinocactus, Echinocereus, Toumeya, Pediocactus, Mammillarias and Ferocacti. Since these were near the glass you may say that temperatures were high. This is not necessarily so, as we have had only 55 days of sunshine from September 30 through April 8. Most growers say the S.W. cacti bloom because of winter sunshine and cold or coolness. I've tried them in coolness in storage with plenty of light, and other years with limited light. I've gotten my best results this year with excellent light, dryness and whatever variations in heat they got near the glass. There is a down draft from cold glass where I have them. I kept the duplicates and a few others in coolness, limited light, etc. There is no response as yet in flowering, growth or loss of vigor. If as in past years the results are true, then these plants seldom flower or have passed their flowering period and are ready to put on vegetative growth before the right conditions are given by the grower.

Every year I try a few new plants, of which I have duplicates, in new situations in my greenhouse. These are in all sorts of containers and in every possible position. My notes show that in some instances the drastic treatment brings results but in others the results are spotty. Some do not care what treatment is given them and they bloom and go on normally as before.

If I want a long-day plant to flower, I hang it up under the light or where it gets the extra electric light, usually 2 hours before dawn and 2 hours after sunset. The intensity can vary, I've found, but artificial light does help. Pelecyphora is usually a shy bloomer for me but I flowered it this year with three nice flowers where it was exposed to the artificial light. It seems that the length of day and the direction of the light did the trick. It flowered between February 15 to March 1.

I've found that collected plants from the Southwest frequently refuse to bloom the second year but may

Concluded on page 94

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 21

Fig. 75
Agave marmorata. Rosette grown by Madame Ganna Walska, Santa Barbara, California. Insets: close-up of spine and marginal teeth. Right: inflorescence in the Huntington Botanical Garden San Marino, Calif.

SERIES 3. MARMORATAE, Berger

Agave marmorata Roezl, Belg. Hort. 33: 238, 1833.

A. todaroi Baker, Amaryll. 195, 1888.

A. troubetskoyana Hort. ex Baker, Kew Bull. 1892: 5, 1892.

Distribution: Mexico: Puebla, type locality, Cerro Colorado near Tehuacan.

Rosette 2 to 3 m. in diameter, stemless, single or little caespitose; leaves 2.5 to 4 dm. wide, 1 to 1.8 m. long, ascending-spreading and eventually recurved, lanceolate or oblong-lanceolate, acute, leathery, concave and plicate, somewhat inrolled near tip, narrowed below the middle to a thick base, gray, green-zoned, very rough; spine comparatively small, 3 to 5 mm. wide, 10 to 15 or 20 mm. long, conical, narrowly grooved to middle, sessile, rough, dull red eventually graying; teeth large, 15 to 20 mm. long, including the abrutly dilated horny bases, rusty-brown, rough, along middle of leaf margin teeth are 2 to 3 cm. apart, clasping high fleshy prominences with narrowly acute sinuses or their edges even plaited; teeth becoming farther spaced (3 to 5 cm.) toward the tip, between which the margin is concave to nearly straight; inflorescence 3 to 5 m. high; panicle oblong-cylindrical, 1.8 m. long, 5.5 dm. in diameter; flowers yellow, about 4 cm. long, including the ovary. May-June.

SERIES 4. SCOLYMOIDES, Berger

SUBSERIES 1. EUSCOLYMOIDES, Berger

Agave verschaffeltii Lemaire, in Verschaffelt, Cat. 1866-7.

A. potatorum var. *verschaffeltii* (Lemaire) Berger, Die Agaven, 186, 1915.

A. tehuancanensis Karwinski in Otto in Allgem. Gart. Zeit. 51, 1842.

Distribution: Mexico; Puebla, type cultivated in Europe quite certainly from around Tehuacan.

Rosette 2 to 5 dm. in diameter, stemless, single or sometimes with a circle of offsets surrounding the parent plant; leaves 7 to 10 cm. wide, 15 to 20 cm. long, obovate, oblong, acuminate, mostly glaucous, glabrous on both surfaces or slightly rough beneath, fleshy; spine 3 to 5 mm. wide, 12 to 60 mm. long, light brown, straight to somewhat twisted, broadly grooved from near the tip with sharp edges, decurrent for 2½ cm. or less; teeth 3 to 14 mm. long, 5 to 30 mm. apart, rust-brown, on low or very high fleshy prominences between which the margin is slightly to deeply concave or separated by acute sinuses; inflorescence 2.4 to 5 m. high, slender; panicle cylindrical, 8 to 9 dm. long, about 3 dm. wide, the lowest branches approximately 1 dm. long; flowers 55 mm. long, greenish-yellow; capsules 4 cm. long, 15 to 16 mm. in diameter.

A beautiful polymorphic small species, the numerous forms of which have been described as distinct species.

Fig. 76

Agave verschaffeltii. Grown by Howard S. Gentry, Murrieta, California. approx. ¼ natural size.

Agave megalacantha Hemsley, Diag, Pl. Mex. 55, 1880.

Agave guadalajara Trelease, Cont. U. S. Nat. Herb. 23(1): 123,1920.

Distribution: Mexico; type from Pedregat, near the City of Mexico.

Rosette 2.5 to 4 dm. in diameter, stemless, single; leaves 1 dm. wide, 1.5 to 2 dm. long, short-obovate, acuminate, dull gray-green, minutely scabrous above, scabrous beneath; spine 5 mm. wide, 15 to 17 mm. long, slightly twisted, broadly grooved above, brown or gray; teeth 5 mm. long, 15 to 20 mm. apart, deltoid-cuspidate; mostly upcurved from very high fleshy prominences; flowers 4.5 to 6 cm. long, yellow.

Agave potatorum Zuccarini, Act. Acad. Caes. Leop. Carol. 16: 675, 1833.

A. scolymus Karwinski, Salm-Dyck, Hortus Dyckianus, 307, 1834.

Distribution: Mexico; Puebla, type cultivated in Europe probably from around Tehuacan.

Rosette 1.3 to 1.6 m. in diameter, stemless, single or with few stolons; leaves 1.5 to 2 dm. wide at the middle, narrowed to 1 dm. at base, 5 to 9 dm. long, oblong spatulate to oblanceolate, acute, thick, stiff and rigid, slightly concave on upper surface above middle, dull glaucous green; spine 3 to 4 mm. wide, 25 to 40 mm. long, straight or somewhat tortuose, broadly grooved from near the tip with acute edges, brown to nearly black; teeth 5 to 8 mm. long, 1.5 to 3 cm. apart, usually on low fleshy prominences; inflorescence 4 to

5 m. high, scape stout, panicle thrysoid, 12 to 15 dm. long; flowers greenish-yellow, 6 to 7.5 cm. long. June-July.

Fig. 77
Agave megalacantha. Left: rosette grown by Hayles Schlundt, Pasadena, California, approx. 1/5 natural size. Upper right: type in Herbarium, Museum of Natural History, Paris. Lower right: type of *A. guadalajara* in the Pringle Herbarium, University of Vermont, probably not distinct from *A. megalacantha*.

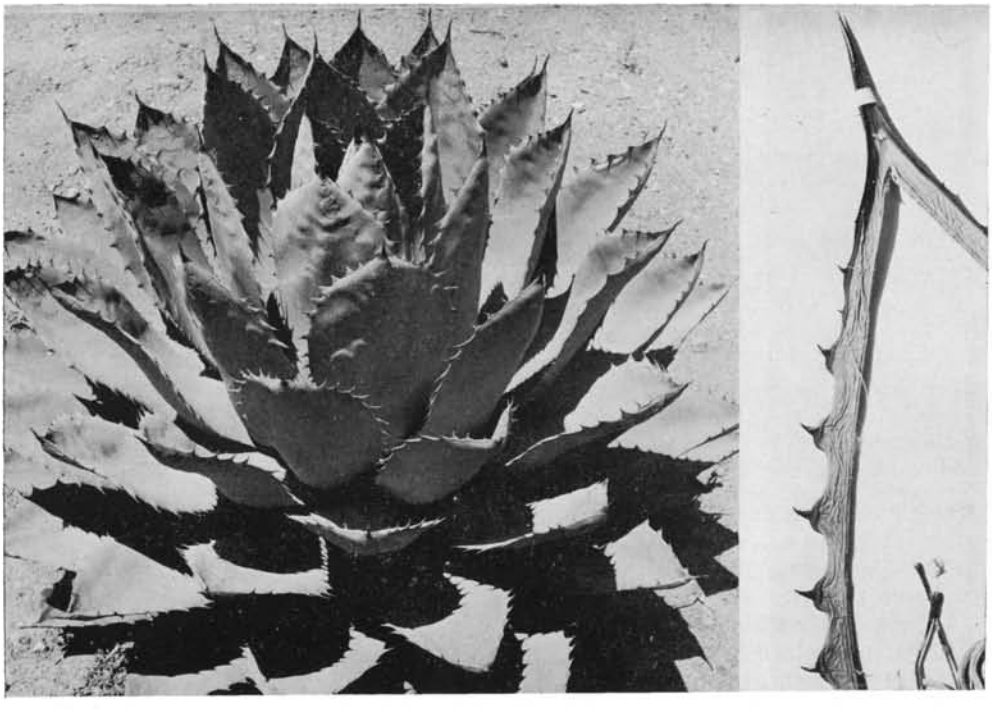


FIG. 78
Agave potatorum. Right: rosette grown by Chester Summers, San Fernando, California, approx. 1/8 natural size. Right: Herbarium specimen collected by C. G. Pringle, no. 6677 in 1897, vicinity of Mexico City, now in Pringle Herbarium, University of Vermont.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 22

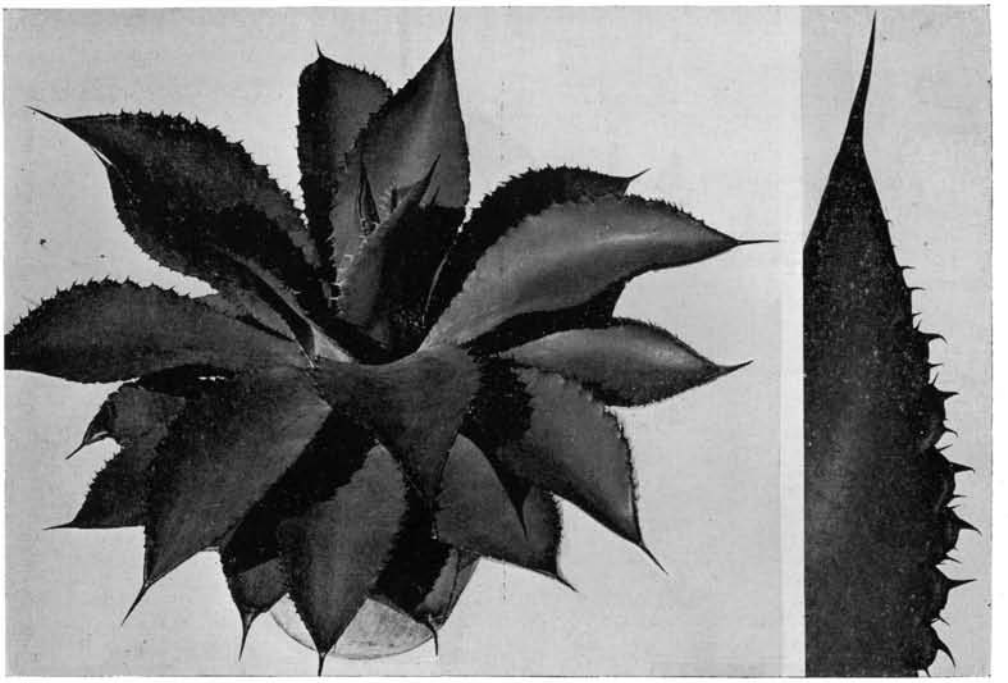


Fig. 94
Agave mescal. Left: grown by Madame Ganna Walska, Santa Barbara, California, approx. 1/8 natural size. Right: upper portion of leaf showing characteristic armature.

SUBSERIES 2. CRENATAE, Berger

Agave mescal K. Koch, Wochenschr. Ver. Beförd Gartenb. 8: 94, 1865.

A. inaequidens C. Koch, Wochenschr. Ver. Beförd Gartenb. 3: 28, 1860.
A. hookeri Jacobi. Hamb. Gart. Zeit. 22: 168, 1866.
A. katherinae Berger, Die Agaven, 197, 1915.
A. bovicornuta Gentry, Carnegie Inst. Wash. Publ. 527: 92, 1942.

Distribution: Mexico; Michoacán (type locality around Tejulpico on the Balsas River?), Sinaloa and Sonora.

Rosette 2 to 3 cm. in diameter, stemless, single; leaves 2 to 3 dm. wide at middle, narrowed to 1 to 1.5 dm. wide near base, 10 to 15 dm. long, oblong-obovate, acute, escending after first spreading, deep green, glabrous; spine 5 mm. wide, 4 to 5 cm. long, chestnut-brown, slender, broadly grooved to within 1 cm. from tip, the sharp edges decurrent; teeth red-brown, very irregular in size and shape, the largest 10 to 18 mm. long clasping high fleshy prominences 2 to 3 cm. apart, between which occur 1 to 4 smaller teeth on the hollowed margin; variously curved and bent, all broad based forming a continuous horny margin; inflorescence 3 to 4 m. high; panicle narrowly pyramidal; flowers yellow about 6 cm. long including the ovary; capsules 15 to 18 mm. in diameter, 40 to 50 mm. long. March-April.

Agave fenzliana Jacobi, Hamb. Gart. Zeit. 22: 170, 1866.

A. flaccida Jacobi, Hamb. Gart. Zeit. 22: 174, 1866

A. maximiliana Baker, Gard. Chron. 201, 1877.

A. calodonta Berger, Hortus Mortolensis, 364, 1912.

Distribution: Mexico; likely Michoacan, type cultivated in Europe without citation of locality.

Rosette medium to large 1 to 2 m. in diameter, higher than broad, single; leaves 1.5 to 2 dm. wide 9 to 15 dm. long, lanceolate, thick and fleshy near base from there on rapidly becoming thin and leathery, eventually tending to overhang above the middle; spine about 5 mm. wide, 16 to 55 mm. long, grooved from above the middle, decurrent for 10 to 15 cm., slender, dark-brown; teeth flat, brown, tips curved forward, some backward, dilated into broad horny basis 6 to 12 mm. wide on rather distant more or less raised prominences; inflorescence 6 to 8 m. high; panicle 1.5 to 1.8 m. long, rhombic; flowers about 8 cm. long, yellow; capsules 15 to 18 mm. in diameter, 40 to 45 mm. long. July.

Agave cupreata Trelease & Berger, Die Agaven, 197, 1915.

Distribution: Mexico; Michoacan and Guerro, type from the Sierra Madre.

Rosette 1.5 to 1.8 m. in diameter, single; 2 dm. wide, 7.5 dm. long, oblanceolate, acute, light green; spine 5 mm. wide, 45 mm. long, somewhat twisted, broadly grooved, decurrent, copper-colored; teeth 10 to 15 mm. long, 30 to 60 mm. apart, flat, reddish-brown, variously curved, unequal, clasping the tops of large fleshy prominences 20 to 25 mm. wide; inflorescence 10 mm. high; perianth yellow, 30 to 35 mm. long, the ovary 30 mm., tube 8 to 9 mm. and segments about 22 mm. long.

Agave wocomahi Gentry, Carnegie Inst. Wash. Publ. 527: 96, 1942.

Distribution: Mexico; Chihuahua, type locality, Guicorichi. Type (H. S. Gentry No. 1989) in Dudley Herbarium, Stanford University.

Rosette large 1.5 to 2 m. in diameter, single or seldom with 1 to 3 offsets; leaves 1.5 to 2 dm. wide, 7.5 to 15 dm. long,narrowly-lanceolate, at first horizontal then ascending; light green; spine chestnut-brown, straight, stout, 8 to 12 mm. wide, 50 mm. long, openly grooved to within 10 mm. of the tip, the sharp horny edges decurrent, reaching the first pair of teeth or nearly so, conspicuously intruded in the green tissue on the dorsal side; teeth similarly colored, 6 to 10 mm. long, 1 to 3 cm. apart, straight or curved upward or downward, abruptly dilated into broad horny bases which are separated by green tissue, sometimes a smaller tooth is interlocked between two larger ones; margin shallowly concave or nearly straight; inflorescence 4 to 5 m. high, panicle cylindrical; perianth yellow, 42 to 45 mm. long, when fresh, capsules 15 mm. in diameter 50 to 60 mm. long. July.

Agave latissima Jacobi, Hamb. Gart. Zeit. 20: 499, 1864.

A. coccinea Roezl ex Jacobi, Hamb. Gart. Zeit. 22: 114, 1865.

Distribution: Michoacan; type cultivated in Europe without citation of locality.

Rosette 2 to 3 m. in diameter, stemless, single; leaves about 50, gracefully ascending, outcurved and again incurved, 20 to 30 cm. wide, 10 to 15 dm. long, lanceolate, flat or somewhat convex at the thick fleshy base, becoming concave near the tip, bright green or slightly glaucous, sometimes transversely banded; spine 6 to 10 mm. wide, 20 to 25 mm. long, conical, shallowly grooved to the middle above, back round or slightly keeled, somewhat intruded into the green tissue, reddish-brown eventually graying, decurrent for 15 to 16 cm. as a thick horny border sometimes reaching the 5th pair of teeth; teeth similarly colored, largest along middle of blade, 5 to 10 mm. long, 10 to 15 or 20 mm. apart, heavy, triangular, straight or a little curved forward or backward, abruptly dilated into rhombic bases 10 mm. long, between which the green margin is concave or acute, teeth along upper margin smaller, eventually disappearing about 10 cm. below the spine, teeth toward base becoming very small and close-set, their bases confluent into a horny margin; inflorescence 4 to 5 m. high; panicle narrow; flowers yellow, 10 to 10.5 cm. long; capsules 6 to 7 cm. long; few bulbils. June.

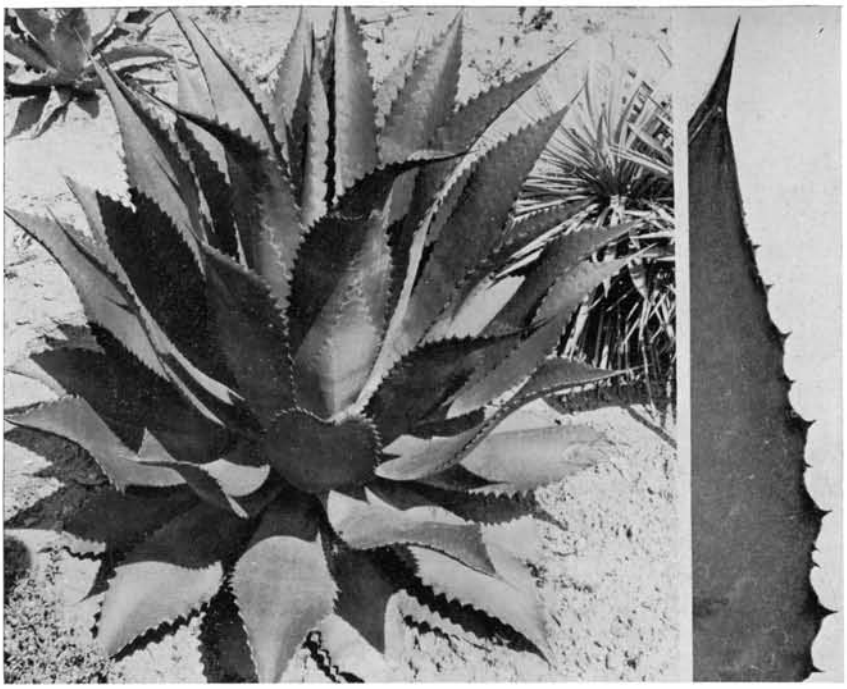


Fig. 95
Agave fenzliana. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/10 natural size. Right: leaf detail from same rosette showing terminal spine and marginal teeth, approx. ½ natural size.

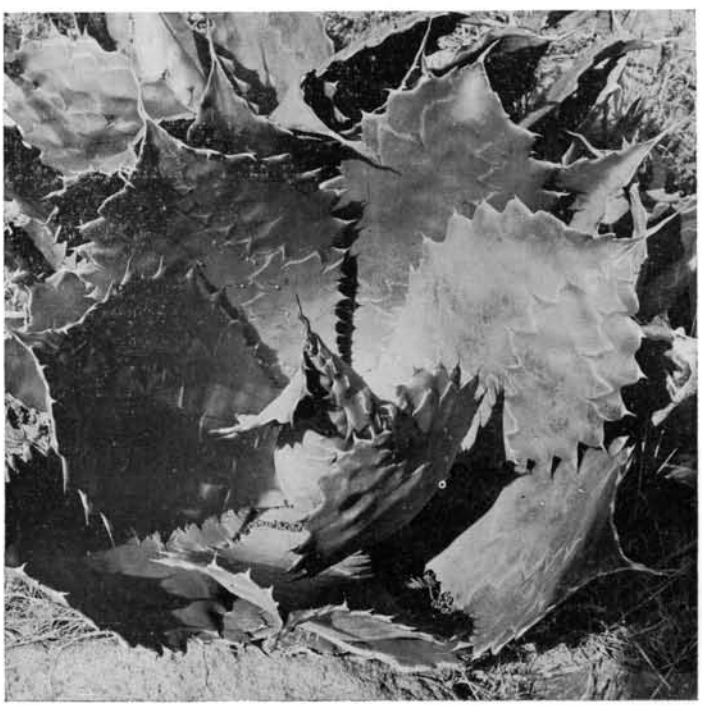


Fig. 96
Agave cupreata. Grown by Howard S. Gentry, Murrieta, California, approx. ⅕ natural size.

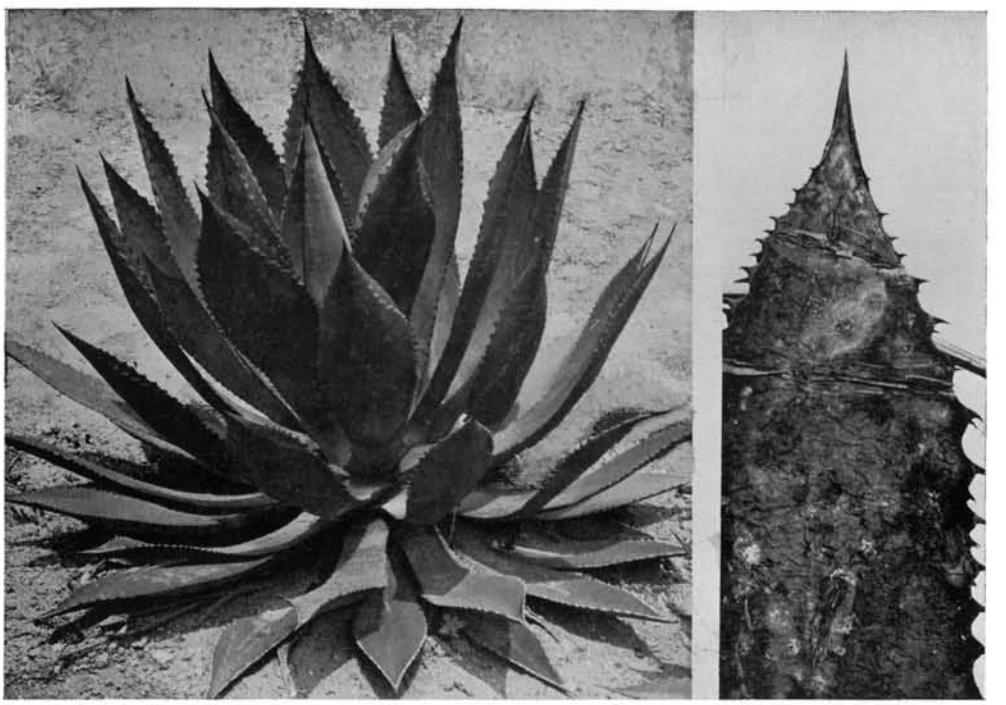


Fig. 97
Agave wocomahi. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. 1/8 natural size. Right: leaf portion of type showing stout terminal spine, approx. 1/10 natural size.

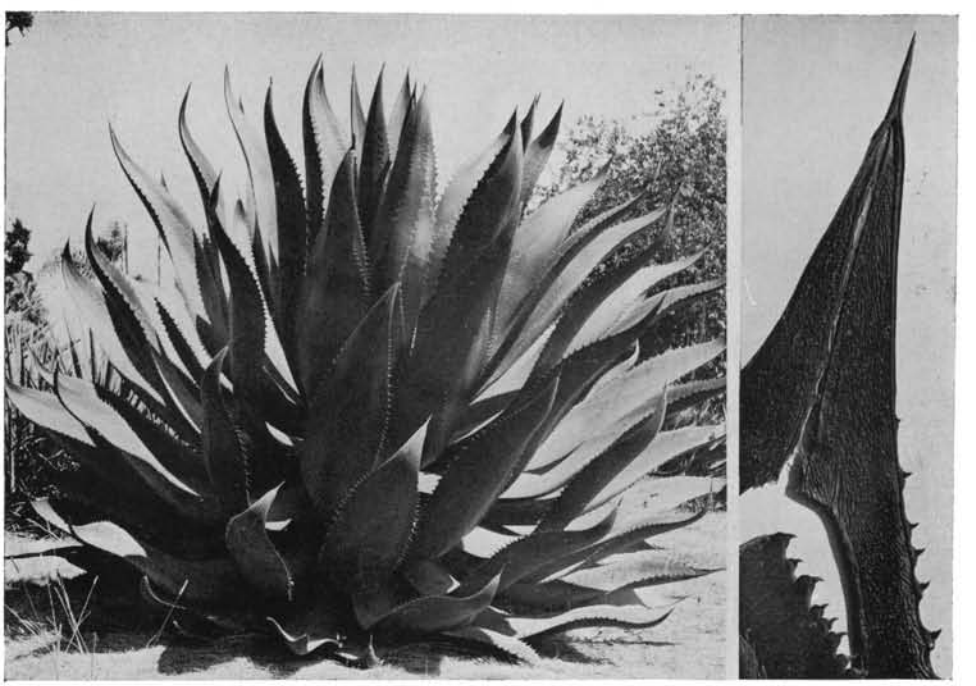


Fig. 98
Agave latissima. Left: grown in the Huntington Botanical Garden, San Marino, California, approx. *Agave cupreata.* Grown by Howard S. Gentry, Murietta, California, approx. 1/5 natural size.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 23

Agave longisepala Todaro, Hort. Panorm. 2: 34, 1891.

Distribution: Mexico; probably Jalisco, type cultivated in Europe; cultivated for mescal at Tequila.

Rosette 2 m. in diam., stemless, stoloniferous, leaves 1.5 to 2 m. long, 10 to 15 cm. wide, spine dark brown, conical or acuminate, often 10 mm. wide and 25 mm. long; teeth deltoid, 5 to 10 mm. long, 30 to 50 mm. apart, cusps prevailingly upcurved often suppressed; flowers 7 cm. long, tube short, perianth segments 30 mm. long.

Agave colorata Gentry, Carnegie Inst. Wash. Publ. 527, 93, 1942.

Distribution: Mexico; Sonora, type locality, Aquibiquichi.

Rosette 5 to 8 dm. in diameter, single or with few offsets; leaves 1 to 1.5 dm. wide, 3 to 4 dm. long, ovate, abruptly acuminate, ascending to horizontal, conclave to flat, leathery, 1 to 2 cm. thick, scabrous on both surfaces, ashy gray, or with transverse pinkish crossbanding if soil is strongly calcarious; spine stout, 6 to 8 mm. wide, 25 mm. long, straight or slightly tortuose, purplish-brown, narrowly grooved at base, little decurrent, somewhat intruded dorsally into the leaf tissue, rough on back and sides; teeth 5 to 10 mm. long, on high fleshy prominences with mostly acute sinuses, becoming smaller on a nearly straight margin along the narrowed leaf base; inflorescence about 3 m. high, panicle open, weak, slightly overhanging, branches 8 to 12 cm. long, flowers in close bunches, perianth creamy-yellow, about 35 mm. long; capsules 15 mm. in diameter, 40 to 45 mm. long, seeds black, hemispherical, 4 to 5 mm. wide, 5 to 6 mm. long. April-May.

Probably closely related to *A. megalacantha.*

Fig. 16
Agave longisepala. Grown by Lee Ellenwood, San Fernando, California.

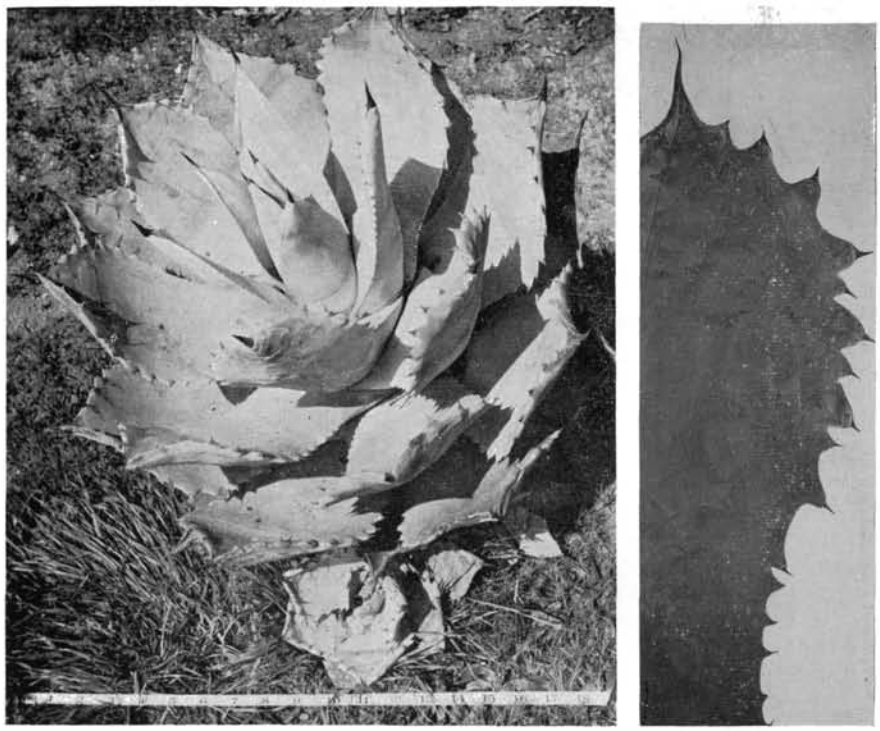


Fig. 17
Agave colorata. Left: grown by Howard S. Gentry, Murrieta, California, approx. 1/5 natural size. Right: portion of leaf showing characteristic amature, approx. 1/2 natural size.

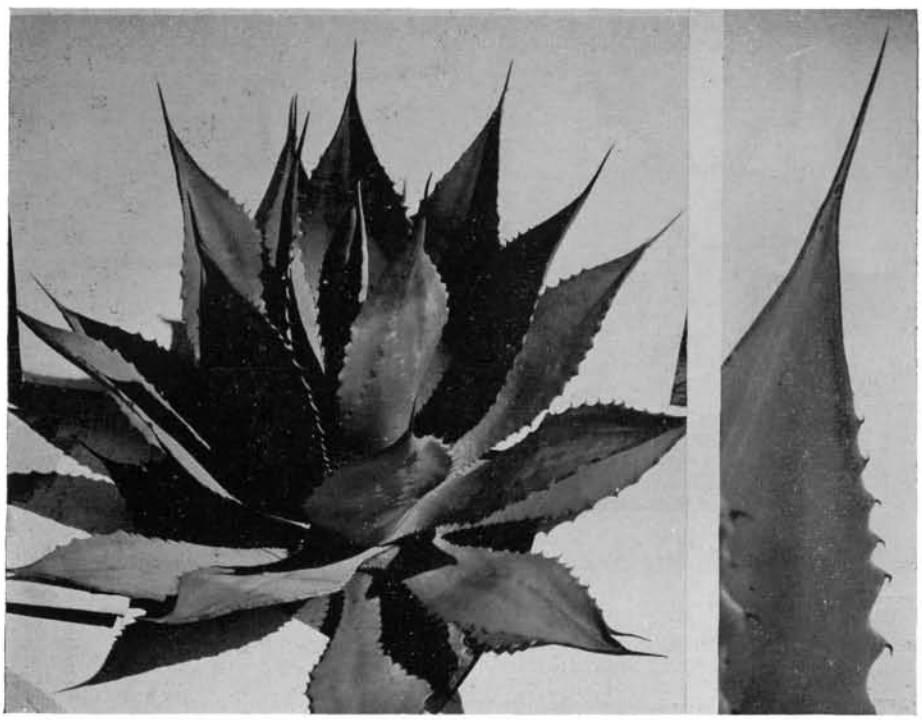


Fig. 18
Agave shrevei. Left: grown by Bob Los Flores, Salinas, California, approx. 1/6 natural size. Right: upper portion of leaf from same rosette showing slender terminal spine and teeth with curved tips.

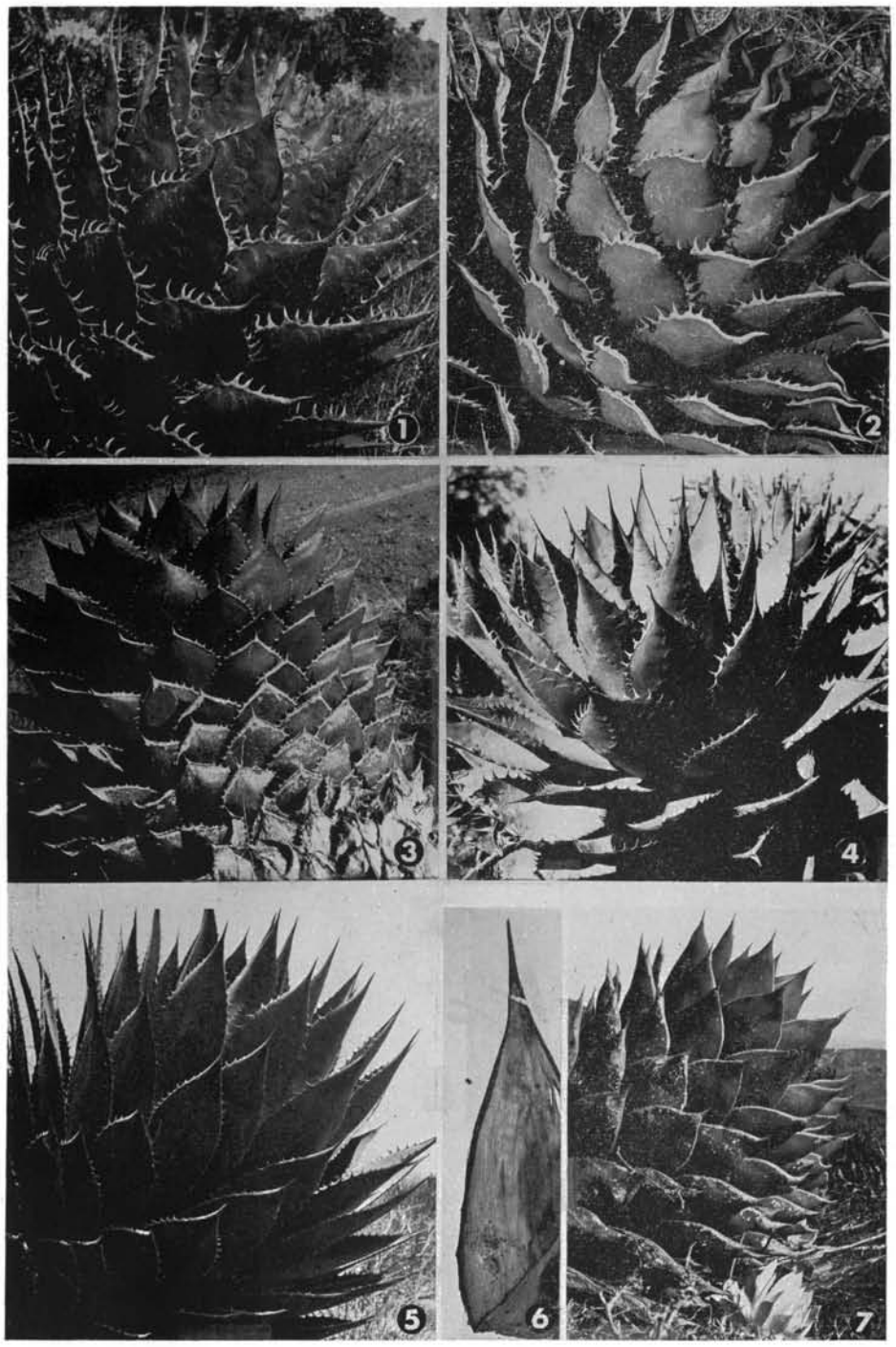


Fig. 19
Variations in *Agave shawii:* (1) *Agave shawii* (typical); (2) syn. *A. orcuttiana;* (3 & 4) syn. *A. pachyacantha;* (5) small toother rather narrow-leafed form of *A. shawii;* (6 & 7 form of *A. shawii* having upper half of leaf margin entire, all approx. 1/5 natural size.

Agave shrevei Gentry, Carnegie Inst. Wash. Publ. 527; 95, 1942.

Distribution: Mexico; Barancas and San Pedro Bay, Sonora; Chihuahua, type locality, Sierra Canelo, Chihuahua. Plants from Navajoa, Sonora also seem to belong to this species.

Rosette .75 to 1 m. in diameter, stoloniferous; leaves ashy-white, glabrous, 1 to 1.5 dm.

wide, 3 to 4 dm. long, 1 to 2 cm. thick, spatulate-lanceolate, acute, flat or slightly concave above the middle, spine slender, 4 mm. wide, 4 to 5 cm. long, shallowly grooved to within 2 cm. of the tip, decurrent for 3 to 4 cm. shiny chestnut-brown; teeth similarly colored, 5 to 10 mm. long, rather regularly spaced 1.5 to 2 cm. apart, the slender tips mostly flexed downward, bases lenticularly widened on low fleshy prominences between which the margin is round or sometimes acute; inflorescence 2 to 3 m. high; panicle cylindrical with numerous flowers on ends of few short (10 cm.) branches and stiff armed cauline bracts; perianth yellowish, about 40 mm. long; capsules 40 to 45 mm. long; seeds hemispherical, 3.5 mm. wide, 5 mm. long.

Perhaps closely related if not identical to *Agave saundersii* as is also indicated by I. M. Johnson, Calif. Acad. Sci. 22, series 4: 1004, 1924. The illustration, fig. 62 accompanying the description of *A. pampaniniana* Berger, Die Agaven, 193, 1915, is no doubt same as *A. saundersii* and apears to simulate *A. shrevei* including offsets. However, since the type locality of *A. saundersii* was not recorded and Trelease in Standley, Cont. U.S. Nat. Herb. 23(1): 123, 1920, places *A. saunderii* in synonymy under *A. verschaffeltii,* I am inclined to use the name *A. shrevei.*

SERIES 5. UMBELLIFLORAE, Trelease

Agave shawii Engelmann, Trans. Acad. Sci. St. Louis 3: 314, 1875.

A. orcuttiana Trelease, Rep. Mo. Bot. Gard. 22: 47, 1941 (type from San Quintin.).

A. pachyacantha Trelease, Rep. Mo. Bot. Gard. 22: 48, 1912 (type from Todos Santos Bay).

Distribution: northwestern Baja California, bluffs along the coast. Southern California; type from Point Loma where apparently now extinct.

Caespitose, trunk sometimes reaching a height of 3 meters, eventually reclining, the many trunks from one base forming extensive clones; leaves 6 to 12 cm. wide, 2 to 5 dm. long, ovate to lance-ovate, openly concave, stiff, green, glossy; spine 4 to 9 mm. wide, 20 to 40 mm. long, straight or twisted; chestnut, becoming gray, shallowly grooved to the middle, long decurrent, forming a broad horny border; teeth garnet, 10 to 15 mm. long, 10 to 25 mm. apart, variously curved, connected by a horny border, or almost suppressed; inflorescence 3 to 3.5 m. high, panicle congested, bracts and buds purplish-brown; flowers greenish-yellow, 7 to 10 cm. long; perianth tube 14 to 18 mm. long, segments 1.5 to 2 cm. long, capsules 20 to 25 mm. wide, 40 to 60 m. long, oblong. Dec.-May.

CACTUS CRIMES

It is almost, or is it, incredible that brave lawmen would leave their dangerous crime enforcements to travel some hundred miles to Needles, California, to arrest three harmless Navajo Indians who were chewing on the California forbidden "Peyote," as part of their religious beliefs. Arrested April 28, they were tried in San Bernardino Nov. 26 and sentenced to 2-10 years suspended prison term. It was testified during the trial that 92 of the "buttons" had reportedly been consumed experimentally without noticeable effect! Perhaps by an exaggeration, the law could say that if a person consumes too many of the Peyote, he might have some black-out and become a hazard while driving on the highway. Any one of us has more poison or black-out material in our liquor cabinet which is condoned by the very ones who put laws on the books and then try defenseless, illiterate Indians who were doing far less harm to themselves and society than those of us who frequent cocktail bars.

The Los Angeles Times sums up the case in a recent Editorial:

"Some clarification of state laws governing the use of peyote by Indians in religious rites seems in order, on the basis of evidence in the trial at San Bernardino.

"Possession or use of peyote is prohibited under state narcotics laws. However, the state charter of the Native American Church, to which the three San Bernardino defendants belong, specifically mentions that peyote is used as a sacrament in the church ritual.

"Testimony of pharmacologists and anthropologists at the trial tells that peyote is a bitter, often nauseating, 'button' from an indigenous plant. It induces hallucinations and euphoria.

"It is non-narcotic, non-habit forming and leaves no after-effects. It has long been used by Southwest Indians in religious ceremonies. The federal government permits its shipment in the mails, and does not classify peyote as harmful.

"There is no evidence that peyote has ever moved in illicit, underworld channels, or that it has become a social or crime problem. It does contain mescaline, a poison, in minute qualities. No deaths from peyote use have been recorded.

"San Bernardino authorities cannot be criticized for prosecuting the three Indians for possession of peyote. The law banning possession is on the statute books, and they did their duty in enforcing it.

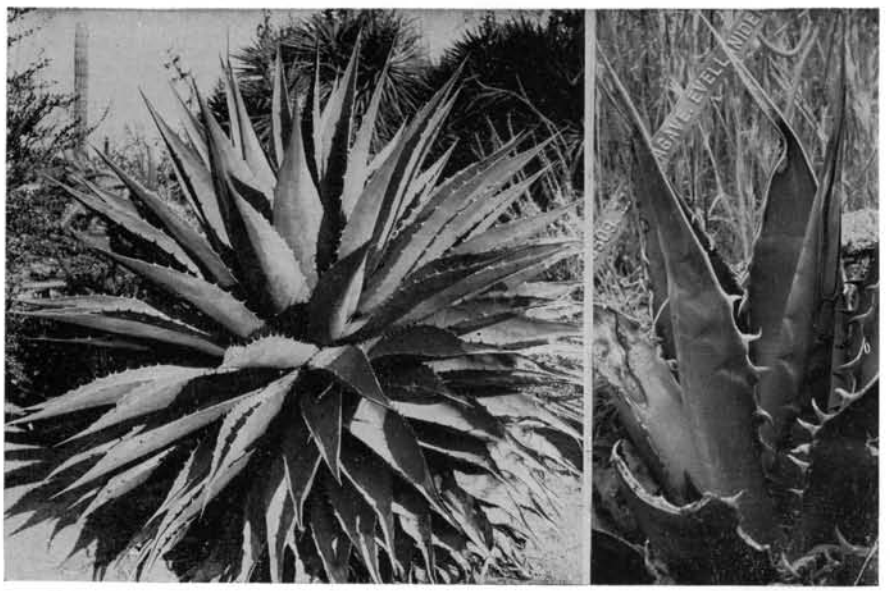
"However, there is an inferential state sanction for the use of peyote in the state charter granted the Native American Church. This apparent legal conflict should be resolved by the legislature, in simple justice.

"During the prohibition era, sacramental wine was exempt from the law against intoxicants. Sacramental peyote, on the basis of the San Bernardino evidence, would seem to have a similar claim to special regulatory status."

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 24



Agave goldmaniana. Left: grown by the Howard Gates Nursery, Corona, California, approx. 1/9 natural size. Right: young plant showing armature detail, grown by Howard S. Gentry, Murrieta, California, approx. 1/5 natural size.

Agave sebastiana. Left: leaf portion showing spine and teeth, approx. 1/2 natural size. Center: rosette grown by Howard S. Gentry, Murrieta, California, approx. 1/6 natural size. Right. same rosettes, later in bloom showing short inflorescence, greatly reduced.

Agave goldmaniana Rep. Mo. Bot. Gard. 22: 49, 1911.

Distribution: Mexico; inland desert of central Baja, California, type from Yubai. Specimens seen from Calmalli appear to belong here.

Rosette shortstemmed, the more or less reclinate trunk leafy throughout, 1.3 to 2 m. in diameter, single or seldom with 1 to 2 offsets; leaves green or slightly glaucous, 1 to 1.5 dm. wide, 5 to 6 dm. long, lance-ovate or lanceolate, ecuminate, openly concave, stiffly erect-spreading; spine 7 mm. wide, 40 mm. long, nearly straight, half conical, very openly grooved almost to the end, long-decurrent, dull dark-brown soon gray; teeth similarly colored, 6 to 10 mm. long 15 to 30 mm. apart, rather gently curved, heavily triangular, lunately widened into the little repand margin or confluent; inflorescence 5 to 7 m. high, the upper third broadly ovoid paniculate; flowers yellow; capsules narrowly oblong-pyriform, 20 mm. wide, 50 mm. long. April-May.

I. M. Johnston in Calif. Acad. Sci. 12 series 4; 1003, 1924 has included *A. goldmaniana* in synonymy under *A. shawii*. However, the pyriform capsules, much larger rosette with more ample inflorescence, few or no offsets and its more southern and inland distribution, the present writer is inclined to maintain *A. goldmaniana* as a distinct species.

Agave sebastiana Green, Bull. Calif. Acad. 1: 214, 1885.

A. avellanidens Trelease Rep. Mo. Bot. Gard. 23: 60, 1911. (type from Paraiso, collected by Brandegee as *A. huachucensis*).

A. shawii var. *sebastiana* (Greene) Gentry, Allan Hanc. Pacific Exped. 13(2): 49, 1949.

Distribution: Mexico; western coast region and islands of middle Baja, California; type from Cedros Island.

Rosette 0.8 to 1 m. in diameter, short stemmed, somewhat caespitose; leaves 6 to 12 cm. wide, 15 to 60 cm. long, stiffly erect-spreading, ovate to lanceolate, acute to acuminate, openly concave, glaucous or crossbanded with green, glabrous or granular roughened; spine variously conical, nearly straight, 5 to 6 mm. wide, 2 to 7 cm. long, red-brown to dark-brown, graying, openly grooved to beyond the middle, long decurrent; prickles similarly colored, at first glossy, 3 to 5 or even 10 to 15 mm. long, 10 to 20 or 50 mm. apart, rather straight or gently recurved, narrowly to broadly triangular, abruptly dilated into lunate or lenticular bases connected by a straight or deeply notched horny margin; inflorescence 2 to 3 m. high, panicle almost corymbose; flowers yellow, 60 to 85 mm. long; capsules, 30 mm. in diameter, 60 to 80 mm. long. April-May.

Foliar characteristics very variable, perhaps evolved from a mixture of *A. shawii* and members of the Deserticolae, certain forms closely simulate *A. asperrima* and *A. palmeri* of the Americanae.

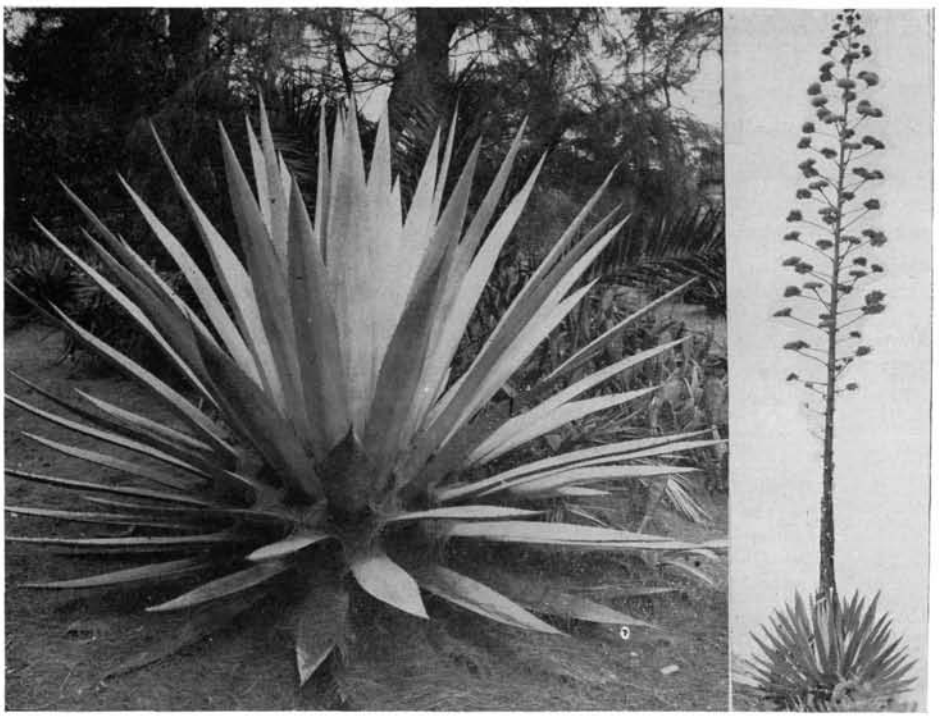
SERIES 6. APPLANATAE, Trelease

Agave applanata K. Koch, Wochenschr. Ver. Beförd. Gartenb. 1862: 83, 1862.

Distribution: Mexico; Veracruz, lava fields about Limon, type cultivated in Europe without recorded locality; Queretaro, Caderyta; Hidalgo, Tulanunga.

Rosette large 2 to 3 m. in diameter, stemless, single or little caespitose; leaves 1 to 1.5 dm. wide, 10 to 15 dm. long, stiffly erect-spreading, oblong-lanceolate, gradually acute, very openly concave, nearly smooth, glaucous; spine 6 to 7 mm. wide, 35 to 45 mm. long, straight or somewhat flexuous, gradually tapered, purplish slate-colored becoming dull gray, broadly grooved nearly to the tip, very long-decurrent or continuous to base of leaf margin; teeth similarly colored, 5 to 8 mm. long, 25 to 35 mm. apart, straight or gently recurved or somewhat hooked, elongated-triangular, abruptly lenticularly widened to 20 to 30 mm. at base or confluent throughout in a slightly concaved horny margin about 1 mm. wide, which like the spine, is granular; inflorescence 8 to 10 mm. high, panicle narrowly oblong-paniculate; bracts triangular, close, somewhat spreading; branches horizontal, slightly ascending; flowers greenish-yellow, fetid, 60 to 70 mm. long. July.

Very variable between juvenile, moderately developed and mature plants.



Agave applanata. Grown in the Huntington Botanical Garden, San Marino, California. Left: rosette approx. 1/12 natural size. Right: inflorescence greatly reduced.

Agave scabra. Grown in the Huntington Botanical Garden, San Marino, California. Left: rosette approx. 1/7 natural size. Right: inflorescence greatly reduced.

Agave scabra Salm-Dyck, Bonplandia 7: 86, 1859.
A. wislizeni Engelmann, Trans. Acad. St. Louis 3: 320, 1875.
A. chihuahuana Trelease, Rep. Mo. Bot. Gard. 22: 90, 1911.
A. havardiana Trelease, Rep. Mo. Bot. Gard. 22: 91, 1911.

Distribution: Mexico; Coahuila, Chihuahua and Texas; type now believed to be from Cusihuiriachic, Coahuila.*

Rosette 0.8 to 1 m. in diameter, stemless, little caespitose; leaves light gray-green, glabrous or slightly scabrous when young, 8 to 15 cm. wide, 20 to 40 cm. long, broadly ovate to lance-oblong acuminate, concave, dorsally somewhat valleculate, stiffly erect-spreading, spine 6 to 7 mm. wide, 15 to 45 mm. long, nearly straight to slightly flexuose, from red to purplish-chestnut, becoming gray, round or flat-grooved nearly to the end, decurrent for about its own length; teeth 3 to 8 mm. long, 15 to 25 or 30 mm. apart, narrow to heavily triangular from dull ashen bases on a straight repand margin; inflorescence 4 to 5 m. high, panicle ovoid; flowers yellow, 65 to 70 mm. long; capsules narrowly pyriform-oblong, 15 to 20 mm. wide, 55 to 65 mm. long. June-July.

*See I. M. Johnston, Journ. Arn. Arb. 25: 78, 1944.

QUESTIONS and ANSWERS

Conducted by
HARRY JOHNSON
Paramount, Calif.

Question: What would be the culture of a three foot Saguaro in New York?

Olive R. Nelson
New York

Answer: Saguaros are no problem to root in their native state but in coastal regions or where temperatures are moderate and humidity high they do present a problem. Your plant had the large roots stubbed back and will have to form a new root system. They should have a very open rooting medium or they will almost certainly rot. Acorn sized, or larger, fir-bark or large pebbles should be suitable. Sphagnum moss if kept dry could also be used. Give them as much light as possible and keep dry — no watering — until spring becomes warm which may be June. Then only the barest minimum for the first year. Just enough to encourage root growth. There will not be many of these for two or three years.

Plants, in general, that have become adapted to peculiar climatic or edaphic conditions often present cultural problems. *Carnegeia gigantea* (Saguaro) is fairly widely spread over southern Arizona and Sonora and comes as far west as the Colorado River but right there it stops although a few hundred specimens are on the California side. To you and me it would be hard to find much difference in climate a few miles to the west of the river but to the Saguaro the difference is so great that the plant is not established to the west. The fan palm, *Washingtonia filifera,* finds the same barrier to the east though again a colony is found in Arizona. Plant and animal adaption to environment is an absorbing study of which science knows only the barest outlines as yet.

Question: Is fluorescent lighting applicable to growing cacti and succulents?

Lilian J. Ross
New Jersey

Answer: So far as I know there is no real experimental data on this. However, since it is very useful in growing many kinds of other plants I see no reason why it should not be useful in our hobby. Plants seem to get almost as much benefit from such light as from actual sunlight. Much of the original experimental and fanciers work was done with plants which grow naturally where light is reflected or obscured by fog or clouds—as begonias or African violets. As you note in the article from Flower and Garden for January by Elvin McDonald that he says in the opening paragraph "with the possible exception of some orchids, geraniums, cacti and other succulents, all house plants bloom under fluorescent lights". These plants are heliophytes so he is not sure how they would react.

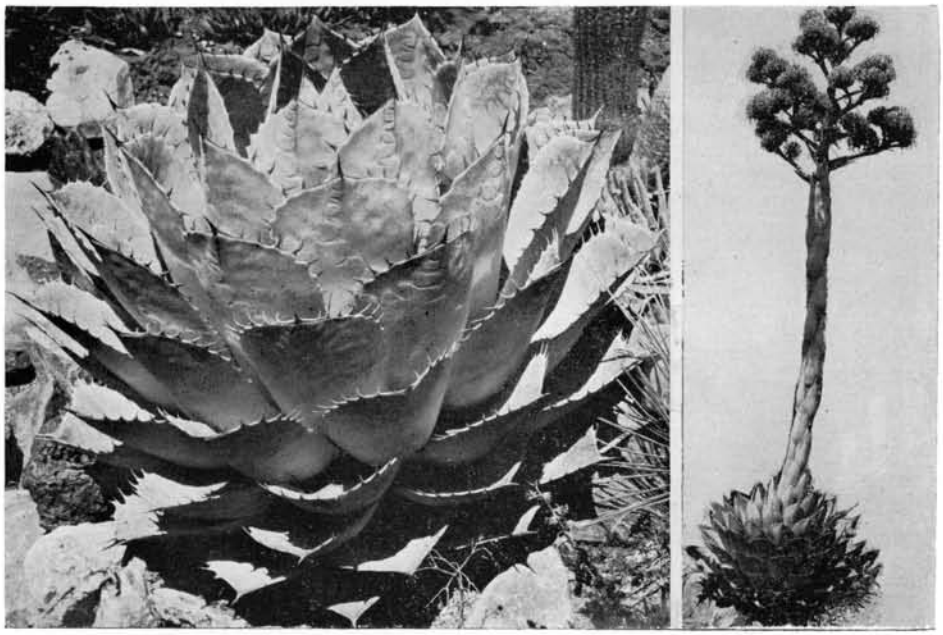
My personal belief is that good normal growth could be expected if circulation of air is provided. This I think is the crucial thing in successful indoor growing of cacti. It is easily provided by a small, cheap, electric fan. Just circulating the air within the room would be very helpful. Cacti and succulents have developed wonderful ways of conserving moisture for where they grow wild, wind, sun and drought conspire continuously to steal it from them. Growing in a room they find it next to impossible to get rid of surplus moisture and probably also to get sufficient air interchange through their stomata.

Please send your questions to Harry Johnson, Johnson Cactus Gardens, Paramount, California.

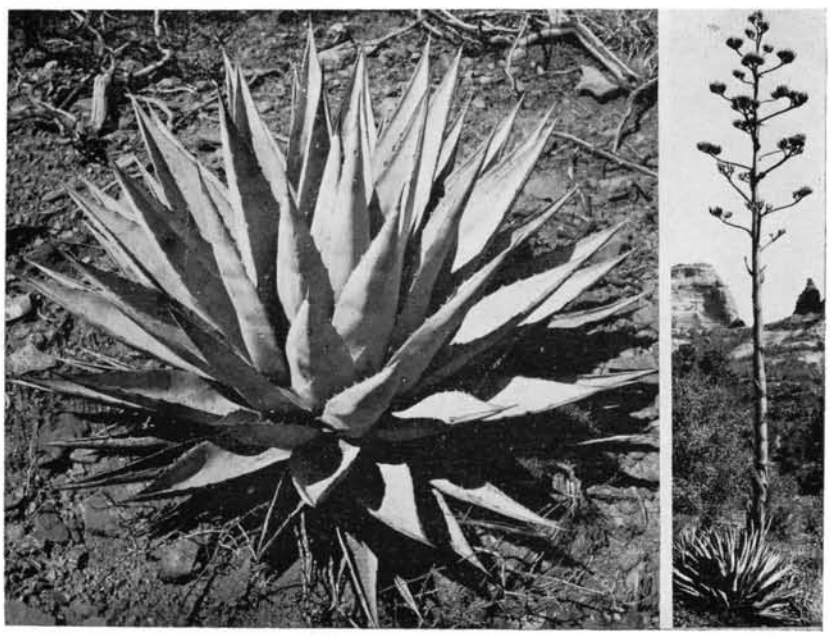
CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 25



Agave parrasana. Left: rosette approx. 1/10 natural size. Right: short inflorescence and numerous large bracts covering scape, greatly reduced. Grown by R. H. Diehl, Vista, California.



Agave parryi. Left: rosette in natural habitat, Oak Creek Canyon, Arizona, approx. 1/8 natural size. Right: flowering plant 10 miles s. w. of Prescott, Arizona, greatly reduced.

Agave parrasana Berger, Notizbl. Bot. Gard. Berlin 4: 250, 1906.

Distribution: Mexico; Coahuila, type from Sierra de Paras.

Rosette 0.8 to 1 m. in diameter, leafy, setmless, single or little caespitose; leaves 10 to 20 cm. wide, 30 to 40 cm. long, obovate, short acute to acuminate, usually concave above middle, thick and fleshy especially at base, glabrous, green, lightly glaucous; spine 3 to 4 mm. wide, 25 to 50 mm. long, straight or slightly twisted, grooved nearly to the tip, decurrent nearly to the upper pair of teeth, smooth brown; lower half of leaf margin straight, entire or with few small teeth, upper half armed with stout, variously bent or mostly recurved teeth 5 to 20 mm. long, 10 to 15 mm. apart on fleshy prominences; inflorescence 2 to 3 m. high, scape stout, covered with large imbricated bracts; panicle short pyramidal, open with few horizontal or slightly ascending branches; flowers yellow. June-July.

Agave parryi Engelmann, Trans., Acad. St. Louis, 3: 311, 1875.

A. americana var. *latifolia* Torrey, Rep. U. S. & Mex. Bound. Surv. (Bot.) 213, 1859,—as to Emory.

A. applanata var. *parryi* (Engelm.) Mulford. Rep. Mo. Bot. Gard. 7: 83, 1896.

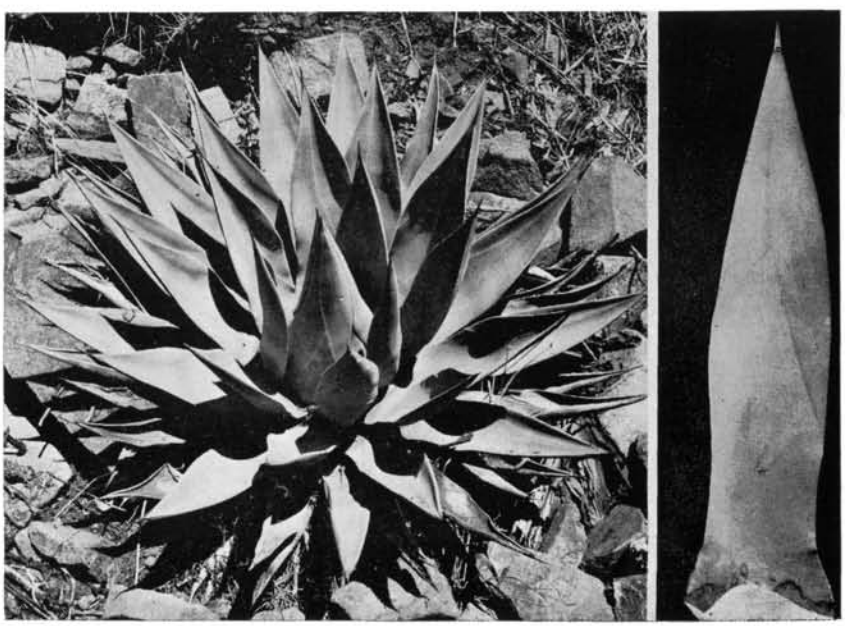
A. cousii Engelmann in Trelease, Rept. Mo. Bot. Gard. 7: 83, 1896.

A. neomexicana Wooton & Standley, Contrib. U. S. Nat. Herb. 16(4): 115, 1913.

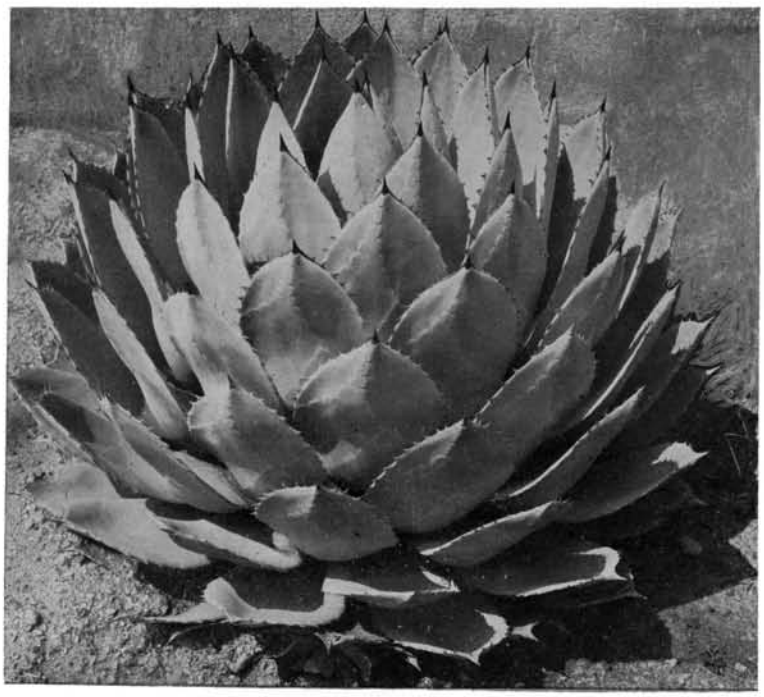
A. parryi var. *cousii* (Engelmann ex Trelease) Kearney & Peebles. Journ. Wash. Acad. Sci. 29: 474, 1939.

Distribution: Mountains of northern Arizona to New Mexico and northern Chihuahua (near Colonia Garcia); type from Santa Rita, near Silver City, New Mexico.

Solitary to densely caespitose, stemless; leaves numerous, crowded together and forming a compact, almost globose rosette 0.4 to 1 m. in diameter; blades 10 to 15 cm. wide, 25 to 40 cm. long, oblong to ovate-lanceolate, acute, or somewhat acuminate, openly concave, very rigid, smooth, gray; spine nearly straight, gradually tapered, brown becoming gray, 5 to 6 mm. wide, 20 to 25 mm. long, very openly grooved becoming flattened nearly to the end, rather long decurrent; teeth similarly colored 3 to 5 mm. long, 15 to 20 mm. apart, mostly gently curved in either direction or straight, narrowly triangular, abruptly lenticularly widened to 5 or 10 mm. at base or the upper ones confluent on the slightly concaved margin; inflorescence 3 to 5 m. high; panicle oblong; flowers yellow to orange, 25 to 60 mm. long; capsules 20 mm. wide, 25 to 40 mm. long. June-July.



Agave parryi forma *integrifolia*. Left: rosette in natural habitat 10 miles s. w. of Prescott, Arizona, approx. 1/8 natural size. Right: leaf from same rosette showing entire margins, approx. 1/3 natural size.



Agave parryi var. *huachucensis*. Characteristic, robust broad-leaved rosette grown in the Huntington Botanical Garden, San Marino, California, approx. 1/12 natural size.

Agave parryi forma **integrifolia** Breitung, forma nova.

A. f. parryi differt: foliis rosulatic integris, margine sine dentibus.

Distinguished from the typical species by the entire leaf margins. So far the only toothless form observed. Type in Herbarium California Academy of Sciences.

Agave patoni. Left: rosette grown by Dr. Howard S. Gentry, Murrieta, California, approx. 1/7 natural size. Right: leaf and 2 flowers of type in Herbarium of Univ. of California, Berkeley, from Tobar, Durango, E. Palmer, No. 228.

Type locality: 10 miles southwest of Prescott, Arizona, Hwy. 89, associated with typical *A. parryi*.

Agave parryi var. **huachucensis** (Baker) Little in Benson, Amer. Journ. Bot. 235, 1943.
A. huachucensis Baker, Handbook Amaryllid. 172, 1883.
A. applanata var. *huachucensis* (Baker) Mulford, Rept. Mo. Bot. Gard. 7: 85, 1896.

Distinguished from the typical species by the very broadly oblong leaves up to 35 cm. wide and up to 65 cm. long, stouter (5 to 6 mm.) spine and longer (up to 75 mm.) flowers.

Known only from the Huachuca Mts., southern Arizona, the type locality, and perhaps adjacent Mexico.

Agave patoni Trelease, Rept. Mo. Bot. Gard. 22: 92, 1911.

Distribution: North-central Mexico: Durango; Chinacates, the type locality and Tobar.

Rosette 6 to 7 dm. in diameter, single or with few offsets; leaves 10 to 20 cm. wide, 25 to 35 cm. long, broadly oblong, acute to acuminate, very openly concave or flat above middle, stiffly erect-spreading, sometimes a little recurved; spine nearly straight, 6 mm. wide, 30 to 35 mm. long, purple-chestnut becoming gray-brown, openly grooved nearly to the end, decurrent for 2 to 4 cm.; teeth similarly colored, 6 to 7 mm. long, 20 to 25 mm. apart, retrorse or recurved, triangular from low ashen bases, the intervening margin shallowly concave; inflorescence 3 to 3.5 m. high, slender; panicle few-branched; flowers creamy-yellow, about 65 mm. long; capsules 20 mm. wide, 55 to 60 mm. long. Aug.-Sept.

Editor's Note: We are receiving many requests for a complete reprint of the Agave series. We have saved all of the type and hope this reprint will be available at the completion of the series.

"Hey, you! Get out of there!" From The *New Yorker*

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 26

Agave flexispina Trelease, Cont. U. S. Nat. Herb. 23(1): 133, 1920.

Distribution: Durango; Tepehuanes, the type locality.

Rosette small, about 3 dm. in diameter, when mature, depressed subglobose, single or with few offsets; leaves 6 to 10 cm. wide, 12 to 20 cm. long, broadly obovate, abruptly acute, regularly spreading, deeply concave, glaucous-green, glabrous; spine 5 mm. wide, 30 mm. long, flexuose, openly flat-grooved, with acute margin at base, decurrent almost to first pair of teeth, shining chestnut to dark brown; teeth similarly colored, 6 to 9 mm. long, 7 to 15 mm. apart, slender, lenticularly widened at the base, the margin between them shallowly concave to sharply incised; flowers 45 to 50 mm. long.

Agave gracilipes Trelease, Rep. Mo. Bot. Gard. 22: 95, 1911.

A. americana var. *latifolia* Torrey, Rep. U.S. & Mex. Bound. Surv. (Bot.) 213, 1859 — as to Bigelow.

A. applanata Trelease, Rep. Mo. Bot. Gard. 4: 191; 13: 117 — Mulford, Rep. Mo. Bot. Gard. 7: 83, 1896.

Distribution: Extreme western Texas; Sierra Blanca, the type locality; Rock Creek and Van Horn.

Rosette 6 to 8 dm. in diameter, single or little caespitose; leaves 7 to 12 cm. wide, 20 to 30 cm. long, lance-oblong, gradually acuminate, openly concave, rather openly spreading; spine 4 to 5 mm. wide, 20 to 45 or rarely 100 mm. long, straight or flexuose, brown to dark purplish-black, eventually becoming gray, openly grooved nearly to the end, rather long decurrent; prickles similarly colored, 4 to 10 mm. long, 15 to 20 mm. apart, straight or more commonly recurved, narrowly triangular, abruptly lenticular and often confluent at base, the intervening margin slightly concave; inflorescence 2.5 to 5 m. high; panicle oblong with short, ascending branches; flowers yellow, 35 mm. long; capsules 15 mm. in diameter, 30 mm. long. July-Aug.

Mature plants of *A. gracilipes* closely simulate moderately developed specimens of *A. applanata.*

SERIES 7. CAMPANIFLORAE, Trelease

Agave aurea Brangegeei, Proc. Calif. Acad. Sci. 11, 2: 207, 1889.

Distribution: Mexico; Eastern Baja California, Purisima, the type locality; Commondu.

Rosette 6 to 9 dm. in diameter, single or caespitose, stemless or short-stemmed, sometimes with axillary branches and eventually mound-forming; leaves smooth, grayish-green, lance oblong, acuminate, openly concave, 6 to 8 cm. wide, 50 to 60 cm. long; outcurved-ascending; spine conical or somewhat awl-shaped, slightly curved, at first glossy chestnut becoming dull gray 3 to 5 mm. wide, 20 to 30 mm. long, narrowly grooved below the middle, decurrent for about its own length; teeth similarly colored, 10 to 20 mm. apart, very unequal, 4 to 8 mm. long, triangular lunately enlarged clasping the tops of fleshy prominences between which the margin is usually concave, mostly curved or somewhat hooked, especially upwardly; inflorescence 2 to 4 m. high, the upper half paniculate; flowers golden-yellow, bell-shaped; 45 to 50 mm. long; perianth segments about 40 mm. long, twice as long as the tube; capsules 20 mm. wide, 55 m. long. Feb.-May.

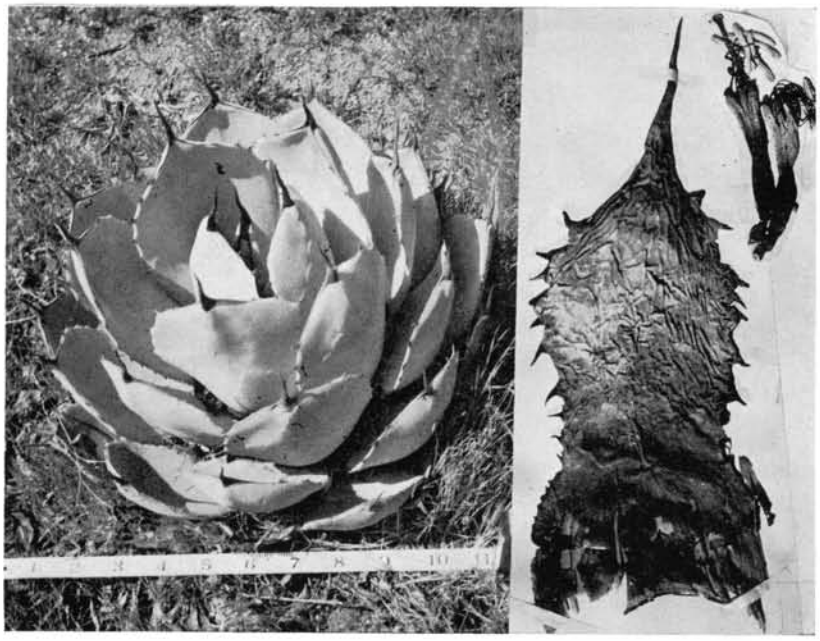
Agave promontorii Trelease, Rep. Mo. Bot. Gard. 22: 50, 1911.

Agave brandegeii Trelease, Rep. Mo. Bot. Gard. 22: 57, 1911.

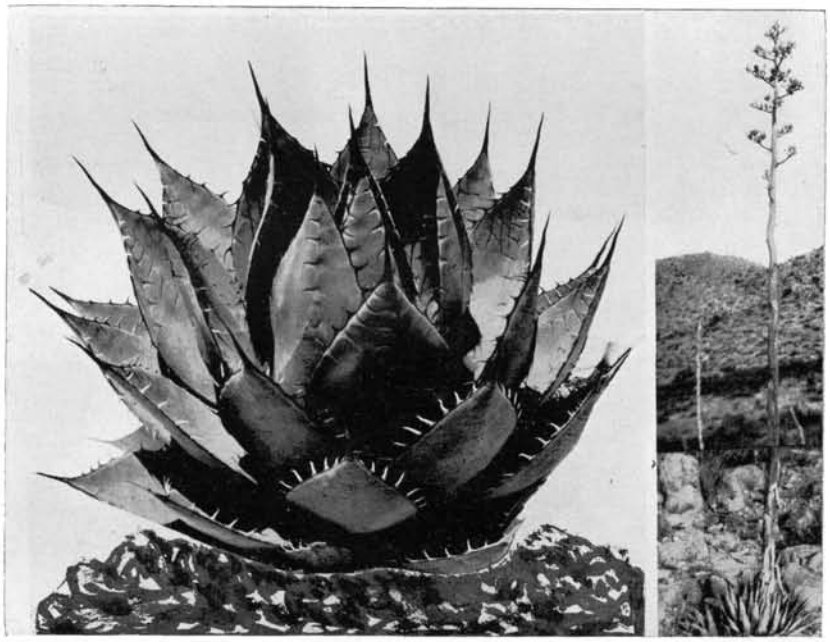
Distribution: Mexico; Cape region of peninsula of Baja, California; Sierra de Laguna and Cabot San Lucas.

Rosette 9 to 13 dm. in diameter, single, stemless; leaves 8 to 15 cm. wide, 60 to 75 or 100 cm. long, glabrous, glaucous, spine 5 to 6 mm. wide, 25 to 35 mm. long; glossy brown;

teeth similarly colored, 8 to 10 or 15 mm. apart, 2 mm. long, gently upcurved or occasionally hooked, obliquely deltoid, their bases 4 mm. wide, the intervening margin straight; inflorescence robust, paniculate; flowers golden, cup-shaped, 50 to 55 mm. long, including



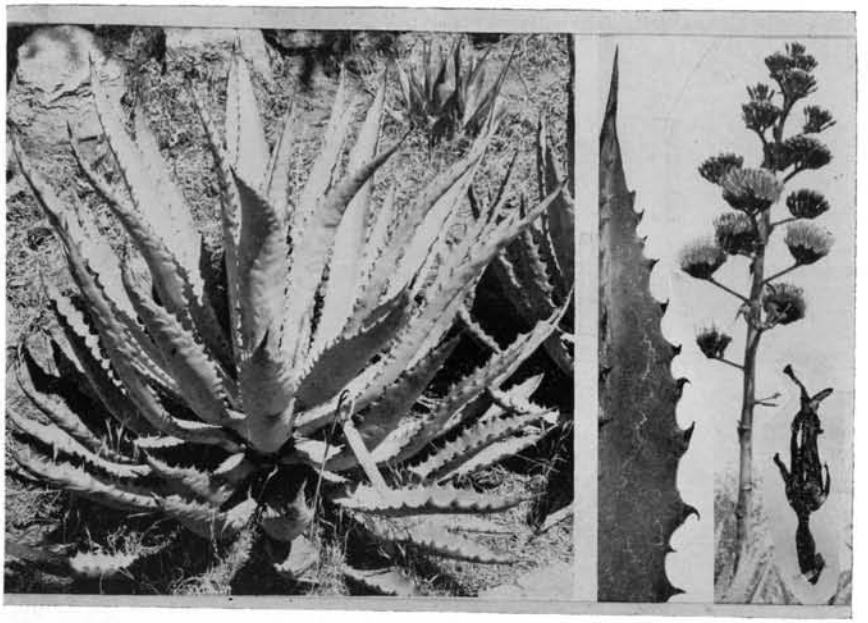
Agave flexispina. Rosette grown by Dr. Howard S. Gentry, Murrieta, Calif., approx. 1/5 natural size.



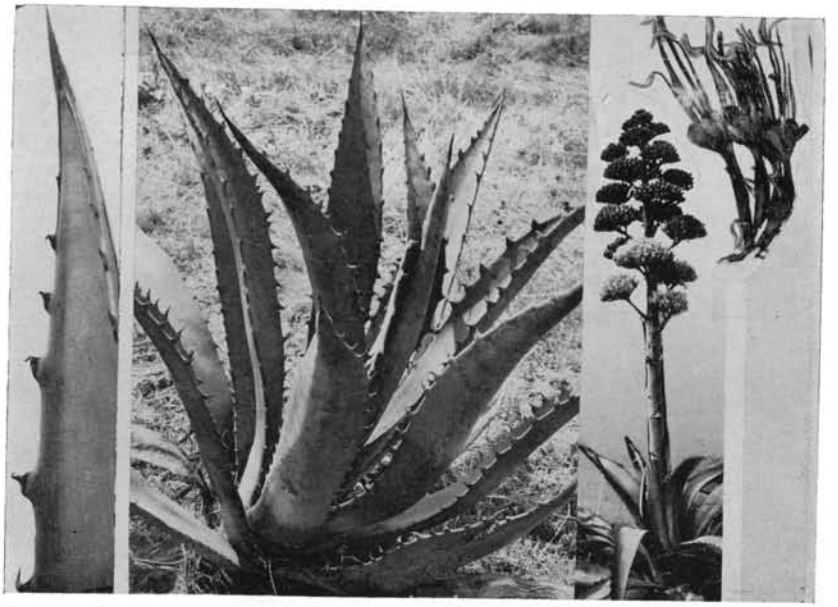
Agave gracilepes. Left: rosette grown by the University of California, Berkeley, Calif., approx. 1/5 natural size.

the ovary; perianth segments shorter than the tube; capsules shortly pyriform oblong 15 to 20 mm. wide, 30 to 35 mm. long.

After further study, Agave promontori may prove to be a variant or geographic race of Agave aurea, rather than a distinct species.



Agave aurea. Left: rosette grown by Dr. Howard S. Gentry, Murrieta, Calif.; cetner: leaf tip showing characteristic armature, approx. ⅓ natural size; right: inflorescence greatly reduced, inset: flower and ovary approx. ½ natural size.



Agave promontorii. Center: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/10 natural size; left: terminal portion of leaf showing terminal spine and marginal teeth; right: inflorescence greatly reduced; insert: flowers showing rounded perianth lobes; extreme right: leaf tip showing small close set marginal teeth.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

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1416 S. Glendale Ave., Glendale, California

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SERIES 8. DESERTICOLAE, Trelease

Agave deserti Engelmann, Trans. Acad. St. Louis 3: 310, 1875.

A. pringlei Engelmann, in Trelease, Rep. Mo. Bot. Gard. 22: 54, 1911.
A. dentiens Trelease, Rep. Mo. Bot. Gard. 22: 51, 1911.
A. disjuncta Trelease, Rep. Mo. Bot. Gard. 22: 51, 1911.
A. consociata Trelease, Rep. Mo. Bot. Gard. 22: 53, 1911.
A. nelsoni Trelease, Rep. Mo. Bot. Gard. 22: 61, 1911.
A. brandegei in part, not Trelease.

Distribution: widely distributed and under many guises on deserts of southern California (San Felipe, the type locality); adjacent Baja California; Arizona and Sonora.

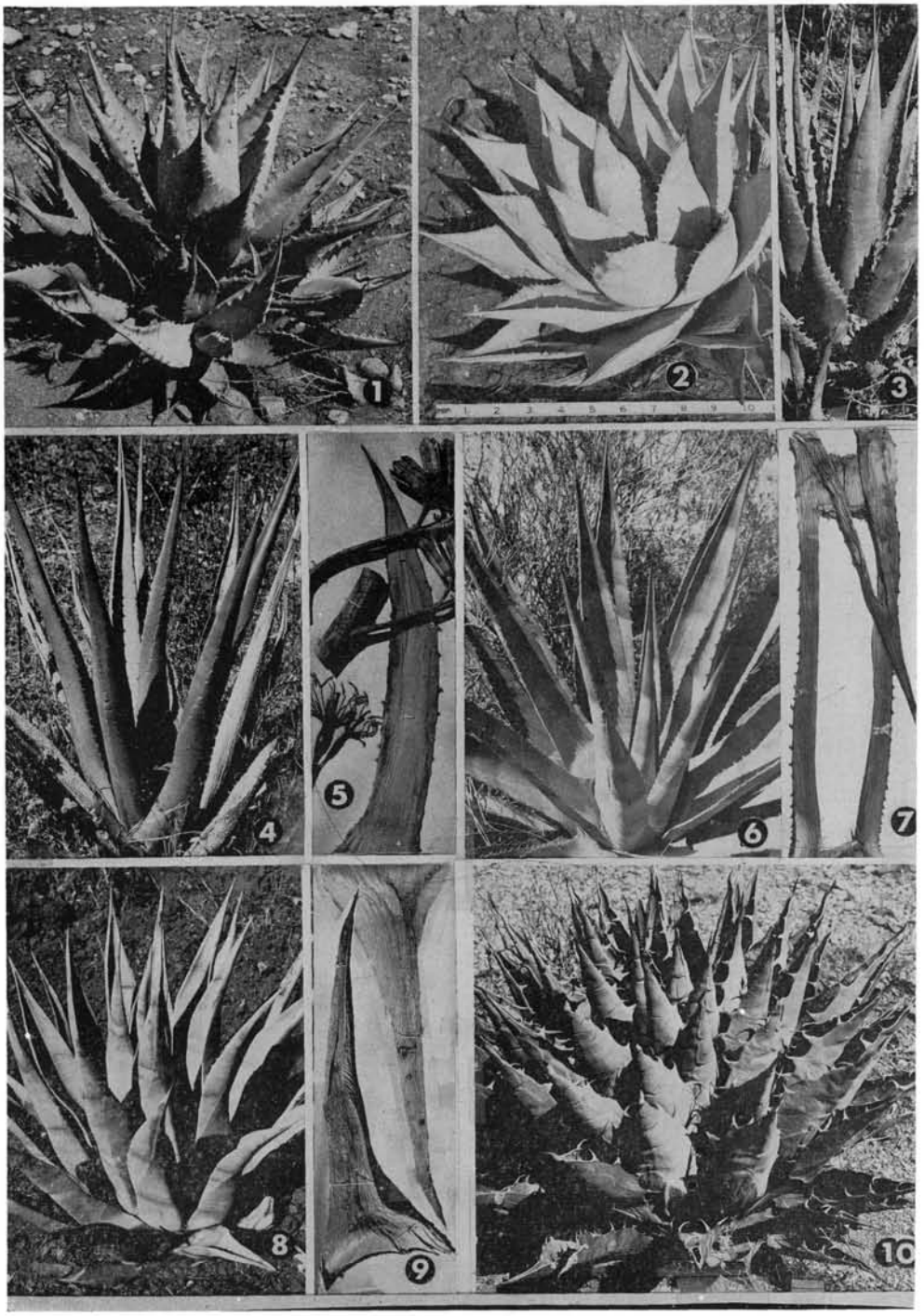
Rosette 4 to 8 dm. in diameter, usually densely caespitose or sometimes more openly colonial from long stolons, stemless; leaves 3 to 6 cm. wide, 15 to 40 cm. long, triangular-oblong-lanceolate, gradually acute, openly concave, becoming channeled, rigid, straight or falcately ascending, glaucous, gray-green, sometimes transversely banded, glabrous or slightly granular-roughened; spine variously acicular-conical, compressed, straight, 3 to 5 mm. wide, 25 to 50 mm. long, openly round-grooved below the middle or involute, decurrent for 3 to 10 cm., dull brown becoming gray; mragin variously armed or rarely entire on different individuals in the same local area; teeth ranging from csarcely 1 mm. long, 5 to 15 mm. apart on a straight margin to others with teeth up to 10 mm. long, 15 to 20 mm. apart betwen which the margin is concave; inflorescence 2 to 7 m. high; panicle with branches 0.5 to 3 dm. long; fllowers chrome-yellow, 35 to 50 mm. long; capsules 15 to 20 mm. in diaimeter, 35 to 50 mm. long. May-June.

Agave sobria Brandegee, Proc. Calif. Acad. II, 2: 207, 1889.

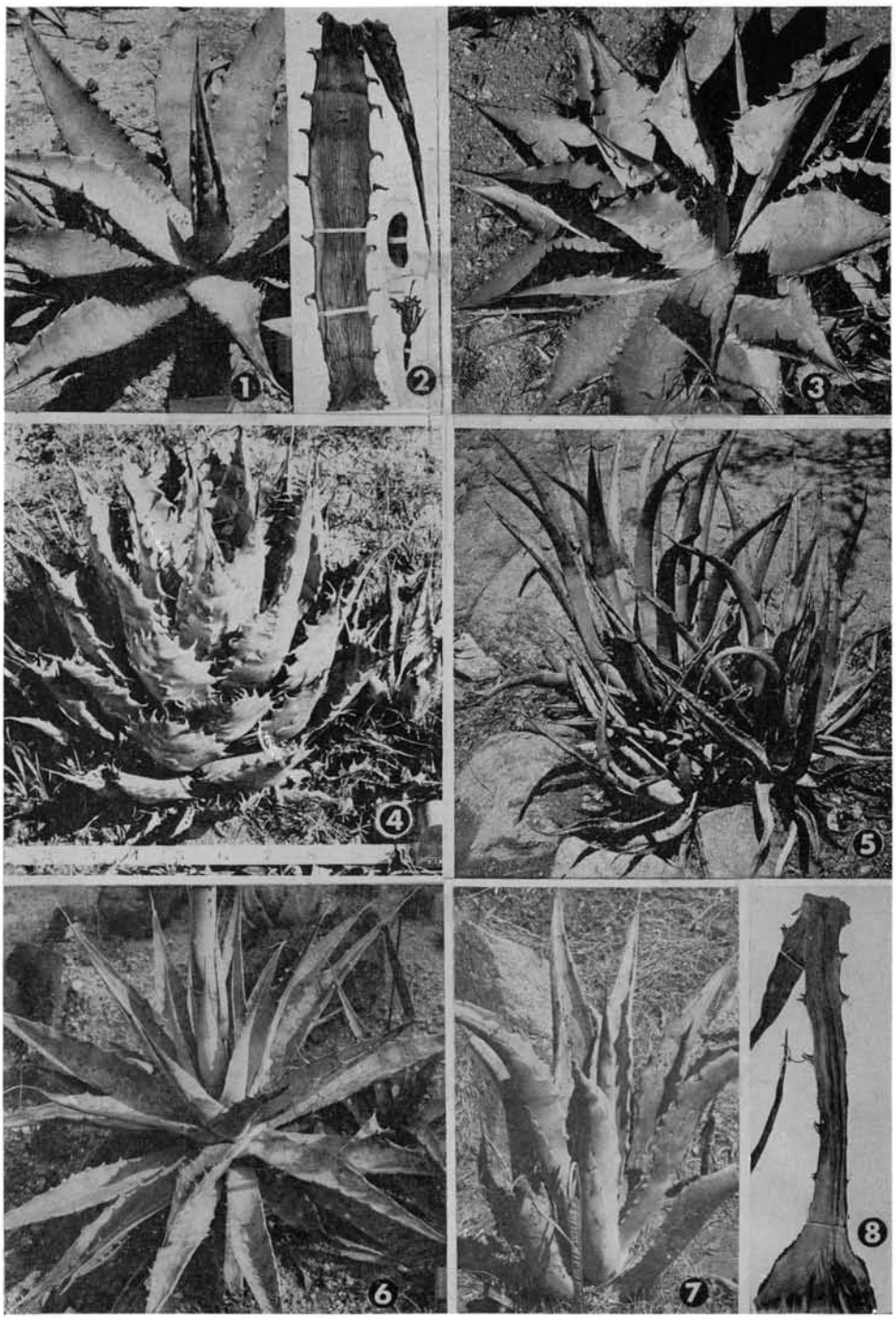
A. cerulata Trelease, Rep. Mo. Bot. Gard. 22: 55, 1911.
A. carminis Trelease, Rep. Mo. Bot. Gard. 22: 55, 1911.
A. affinis Trelease, Rep. Mo. Bot. Gard. 22: 56, 1911.
A. subsimplex Trelease, Rep. Mo. Bot. Gard. 22: 60, 1911.

Distribution: Mexico: central to southern Baja, California and islands off the Gulf of California, Sonora; type locality, Comondu.

Exceedingly variable in foliar characteristics. Rosette 3 to 11 dm. in diameter, solitary or densely caespitose, stemless; leaves rather few from linear-or oblong-triangular to broadly-oblong or elliptical-lanceolate, short acute to acuminate, deeply concave, becoming channeled near the end, thick, 2 to 5 cm. wide 15 to 50 cm. or up to 1 m. long, stiff somewhat spreading, glaucous, gray-green,occasionally somewhat transversely banded, glabrous to grandular-roughened; spine 2 to 4 mm. wide 20 to 50 mm. long, nearly straight to somewhat undulate, compressed acicular, round-to slit-grooved to the middle, short-to very long-decurrent, light brown becoming ashy-gray; teeth similarly colored, 3 to 10 mm. long, 10 to 30 or even 40 mm. apart, narrowly triangular, nearly straight or variously curved, sometimes a little lunately widened onto the tops of low fleshy prominences between which the margin is straight or concave; inflorescence 2 to 3 or up to 5 m. high with few branches; flowers yellow, 15 to 20 mm. in diameter, 30 to 65 mm. long. March-May.



Variations of *Agave deserti:* (1) *Agave consociata,* San Jacinto Mts., Calif.; (2) *Agave deserti,* Anza Desert, Calif.; (3) *A. Nelsoni,* Baja, California, Mexico; (4 & 5) *A. pringlei,* Baja, California; (6) comparable to *A. pringlei* in natural habitat, Hillside, Arizona; (7) *A. dentiens,* San Esteban Island, Gulf of California; (8) *A. deserti,* leaves entire, Anza Desert, Calif.; (9) *A. deserti,* Isla Angel de la Guarda, Gulf of California; (10) *A. deserti,* unusually large toothed form, in natural habitat, 10 mi. north of Wenden, Arizona.

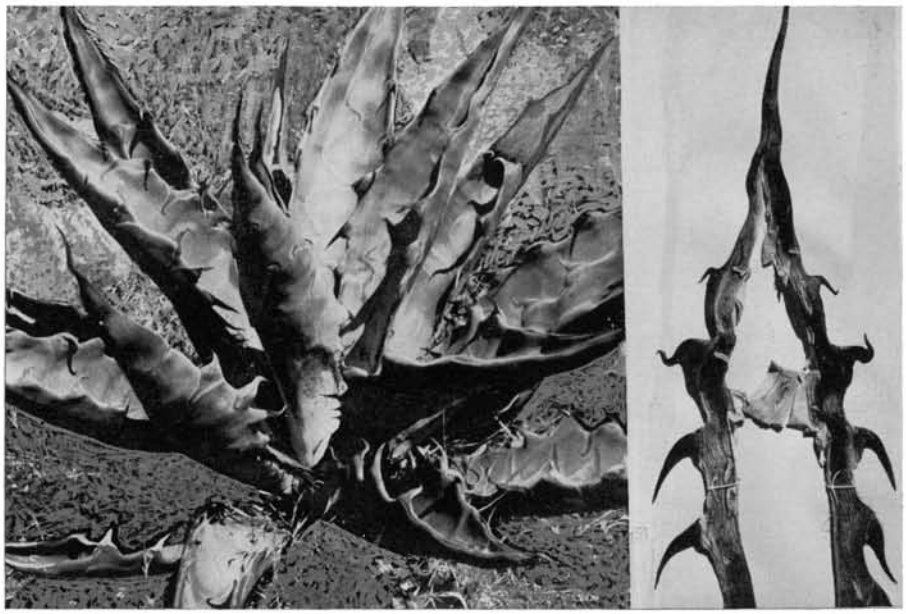


Variations of *Agave sobria:* (1) *A. sobria,* San Ignacio, Baja California, Hayes Schlundt (typical); (2) *A. sobria,* between Santa Rosalia and San Ignacio, I. L. Wiggins 5719, Herb. Stanford Univ.; (3) *A. affinis,* leaves rough, head of Conception Bay, Baja California, Howard S. Gates; (4) *A. subsimplex,* Seal Island, Gulf of California, H. S. Gentry; (5) *A. cerulata,* Calmalli, Baja California; Boyce Thompson Southwestern Arboretum; (6) *A. carminus,* Gallito Island, Gulf of California, Sonora, Collins & Kempton 9181, Huntington Botanical Garden; (7) *A. sleviniana,* Punta Frailes, Cape District, Baja California, H. S. Gentry 11257; (8) *A. sleviniana,* La Paz, Baja California, I. M. Johnston 3043 type, Herb. Calif. Acad. Sciences, San Francisco.

CULTIVATED AND NATIVE AGAVES IN THE SOUTHWESTERN UNITED STATES

AUGUST J. BREITUNG
1416 S. Glendale Ave., Glendale, California

PART 28



Agave sobria var. *roseana*. Left: rosette grown by Dr. H. S. Gentry, Murrieta, California, introduced from Espirito Santo Island, San Gabriel Bay, Baja California, approx. 1/8 natural size; Right: portion of leaf showing large armature, Espirito Santo Island, I. M. Johnston, 4002 type, Calif. Acad. Nat. Sci., San Francisco, approx. 1/3 natural size.

Agave sobria var. **roseana** (Trelease) I. M. Johnston, Proc. Calif. Sci., 4th series, 12: 1002, 1924.
A. roseana Trelease, Rep. Mo. Bot. Gard. 22: 59, 1911.
A. connochaetodon Trelease, Rep. Mo. Bot. Gard. 20: 59, 1911.

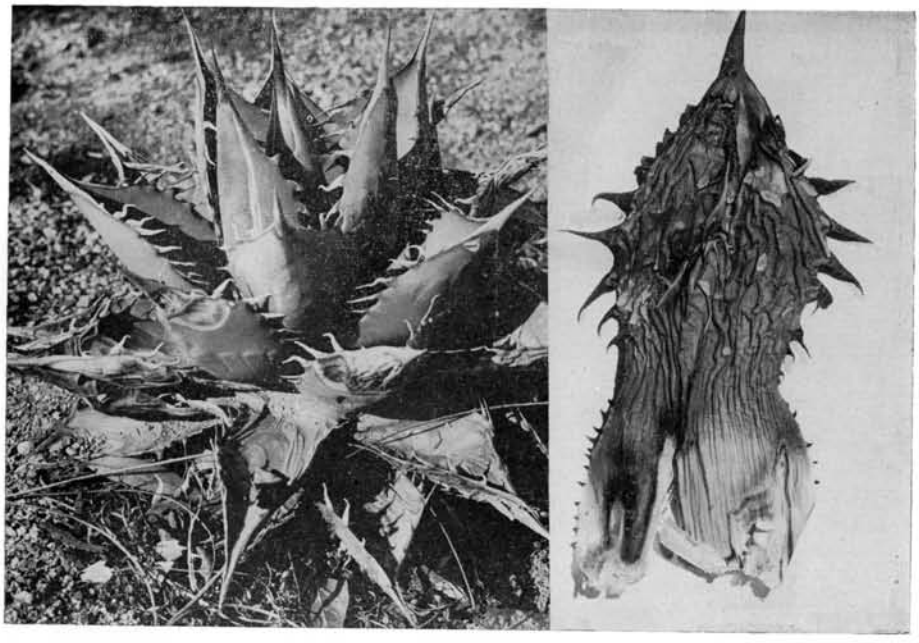
Distribution: Mexico; southern Baja California, Espirito Santo—the type locality; La Paz; on peninsula opposite Pichilinque Island; Santa Maria Bay—the type of *A. connochaetodon*.

Distinguished from the typical species by the coarse armature having teeth 10 to 25 mm. long, 10 mm. wide, mostly broadly triangular, variously and very irregularly curved, hooked or doubly flexed, abruptly or lunately dilated, sometimes to a width of 15 mm. onto the tops of large fleshy prominences between which the margin is very concave or straight; spine tortuous, 50 to 70 mm. long.

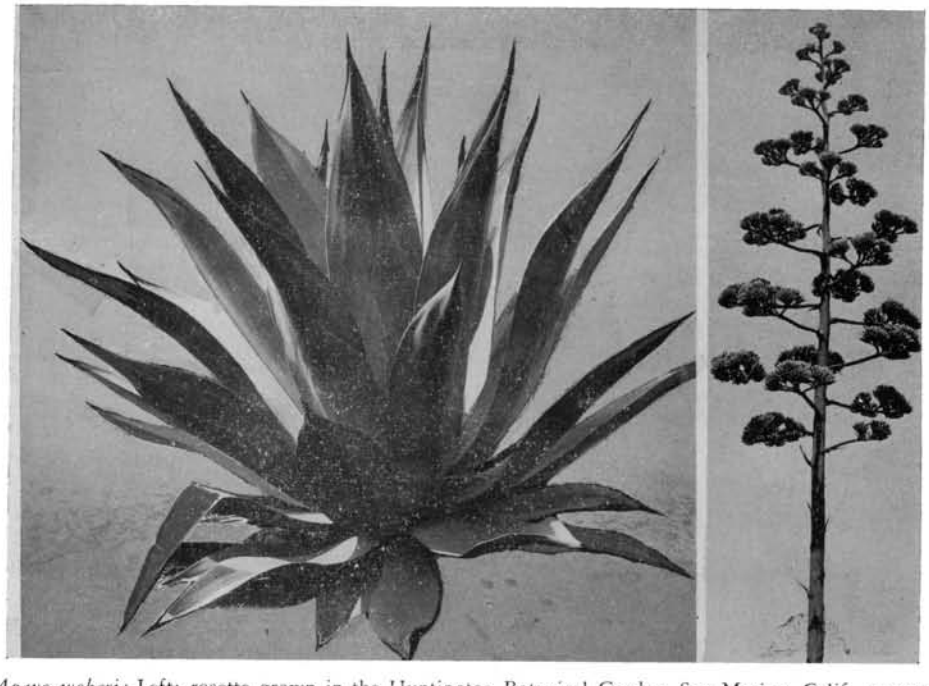
Agave margaritae Brandegee, Proc. Calif. Acad. Sci. series 2, 2: 206, 1889.

Distribution: Mexico; islands of southwestern Baja California; Magdalena Island, — the type locality; Santa Margarita Island.

Rosette 4 dm. in diameter, dense, globular, somewhat caespitose, stemless; leaves 6 to 10 cm. wide, 12 to 20 cm. long, nearly round to ovate-oblanceolate, acuminate, openly concave, channeled toward the end, openly spreading, green or transiently glaucous, glabrous; spine 3 to 5 mm. wide, 25 mm. long, round-grooved below the middle, decurrent for its own length or less, chestnut becoming gray; teeth similarly colored, 6 to 15 mm. long, 10 mm. apart, narrowly triangular, downcurved below and upcurved above, slightly widened into the tops of fleshy prominences between which the margin is concave; inflorescence



Agave margaritae. Left: rosette grown by H. S. Gates, Corona, Calif., approx. 1/5 natural size. Right: characteristic short, broad leaf with large teeth and stout spine, Magdalena Bay, Baja California, Reid Moran, 4187, Herb. Stanford University, approx. 1/3 natural size.



Agave weberi; Left: rosette grown in the Huntington Botanical Garden, San Marino, Calif., approx. 1/13 natural size.

3 to 4 m. high; panicle with short outcurved-ascending little divided branches; flowers light yellow, 45 to 50 mm. long; capsules 15 to 20 mm. in diameter, 30 to 50 mm. long. July.

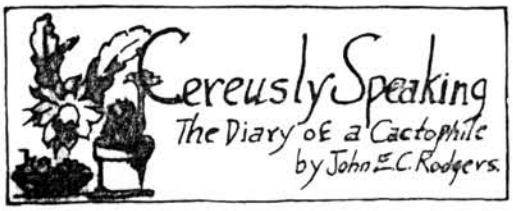
Perhaps an extreme form of *A. sobria.*

SERIES 9. SALMIANAE, Berger

Agave weberi Cels in Poisson, Bull. Mus. Hist. Nat. 7: 231, 1901.

Distribution: Mexico; Coahuila, Nuevo León, Durango and San Louis Potosi; type cultivated in Europe from Moctezuma, San Luis Potosi.

Rosette 1.8 to 3 m. in diameter, stemless, stoloniferous; leaves 15 to 20 cm. wide, 7 to 12 dm. long, lance-oblong, acuminate, broadly concave above, dorsally somewhat valleculate, ascending-spreading, glabrous, green, somewhat glaucous; spine conical, straight, brown, 5 mm. wide, 40 to 50 mm. long, grooved above, blackish-brown; margin typically entire or with a few small rudimentary teeth on juvenile plants; inflorescence 5 to 6 m. high. July-Aug.



Transcribed by Virginia Martin

To establish the site-bloom cycle after interruption and transportation to our site here is a problem. Very seldom does a collected plant of Echinocereus and Echinocactus flower the second season. Frequently the light, humidity, and new soil take two or more seasons to establish any semblance of regular flowering. The living rocks, peyote, mammillarias, "dahlia cactus", etc. do not seem to resent the disturbance and keep right on with their gorgeous display. I'm still not entirely satisfied with my results with the third revival of my Southwest Cacti enthusiasm. Perhaps my new finds will be more friendly and I will reciprocate with a more ideal location in my cactus collection.

Most of the Southwest Opuntias dry back from the edges and around the areoles. A dry spot around the edges can be removed. It leaves a fresh green tissue but the pad is scarred. Some soft brown rot destroys newer pads down to within an inch of the base. This can be removed leaving healthy tissue. New growth takes place but the unsightly stubs are not discarded by the plant. Some of the collectors think that our soils lack something. I do not as I've seen them in Texas have the same results and they use the soils in which the plants grow.

Some of the collectors of the rarer plants of Colorado, New Mexico and Arizona are mailing bags of soil with the plants to insure that certain something that we lack. I have had less serious losses with soil collected with the plant. I'm using the soils and keeping notes as to the effectiveness of the collected plants and soils.

Most botanists are agreed that a seed cannot select its own site to grow in. If a seed is unable to grow it loses its viability, while a seed that can grow adjusts itself to its environment even if it is not ideal. This no doubt explains why we get such good results with Cacti and other succulent seed when we plant them. We give them ideal growing conditions to which they respond, frequently doing as much growing in one season as they would have done in two or more in the wild. In spite of my precautions Pediocactus simpsonii seldom lasts more than two years in a greenhouse pot or a plastic-roofed bed outside.

I do not believe that the rarer plants such as Toumeya papyracantha, Pediocactus knowltonii, Colorado mesa verde, etc., should be tested in soils other than where they grew unless there is a plentiful supply of plants.

It is amusing to me to hear the eastern conservationist preaching how to care for everyone else's native plants while he neglects his own. I say if cactus are weeds in western lands, eliminate them. I should not tell you to keep a nuisance when I try to get rid of my own. I never ask anyone if I may dig out burdocks, dandelions, ragweeds, etc. If we want to conserve the plants as they were, we'd better turn it back to the Indians. It was virgin forest at that time. They were really conservationists. Our eastern magazines and newspapers are full of good, bad and indifferent offers of homesites, in the sunny southwest. I prefer to visit every two years and see plenty of cactus when I return home (my own collection).

Sometimes a plant seems to defy all cultural methods and literally stand still. Selenicereus spinulosus is one of my favorites in the selencereii. It bloomed regularly for seven or eight years. Then, no matter whether I left it where it had been or moved it to a more favorable location, it refused to flower. Last year, after I observed S. murrillii had rooted into a pot of Harrisias and was flourishing, I decided to set up a like condition. I filled a coffee can with leaf mold and put the shriveled stem on the leaf mold. Within three weeks it sent out two new shoots which are now two feet long. This year, one of the upright stems in the original pot put out two new shoots which are developing normally. The others had died back for the past three to five years. The old plant has not been repotted. Evidently nourishment has been carried back to the old plant from the leaf mold. There are two more shoots started since spring in the leaf mold. The older stem is still shrivelled and scarred. My other Selenicerii coniflorus, macdonaldiae, pteranthus, boekmannii, murrillii, pseudospinulosus, etc., do fine and flower regularly. The pots are on the bench in the shade while the stems are up in the sunlight. They all rest on the dry side during the winter.

Eriocereii and Harrisias are two other types of large flower producers that need special attention, especially during the winter. Too much warmth is not good, nor is too much cold. I store mine where I can maintain a 45°F temperature. The soil requirements are liberal as they are heavy feeders.

I've decided that I shall not be the unwilling victim of another winter like 1962-63. I'm going to have my electric auxiliary heater ready for use instead of having to set it up late in winter after all possible calamities had been experienced. I think for the next 10 years or so we will have cold winters. It is said that 1788 was called the year without any summer. Early settlers along the Ohio River had a killing frost in June and again the first week in September. The heavy snows of last winter left the ground saturated. The water soaked under my 8-inch footer construction so much that the usually dry soil under the benches was also wet. This caused early spring growth and etiolation.

Since plants cannot be set up in better light there is sure to be losses. We've had frosts back from Lake Erie several times in May. I did get my stored plants out by May 20 this year. Although the cool weather has held them back they'll be better off with better circulation of air about them.

—SELAH