REPORT OF A BOTANICAL EXPEDITION INTO THE MOUNTAINS OF WESTERN TEXAS

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INTRODUCTION

The mountainous country west of the Pecos has always challenged botanical collectors. The floras of many ranges are still totally unknown, although the collections of the pioneer botanists who passed through the region (Wright, Nealley, Schott, Bigelow, and Havard) have given us a fairly complete knowledge of the flora of the foothills and of a few of the mountain ranges. In the early part of this century, Baker, Earle and Tracy visited the Davis Mountains. Up to the time of her death, Dr. Mary S. Young was an enthusiastic student of this flora, visiting the Davis, Guadalupe, and Chisos ranges. The fact that these mountains constitute a meeting ground between the northern outposts of the typical Mexican flora and the southern relics of a northern Rocky Mountain flora has recently interested numerous botanists in the region.

We passed two months (June and July, 1931) in the region west of the Pecos, concentrating our collecting in the Davis, Chisos, and Guadalupe mountain ranges, as well as studying the flora of their foothills and the Rio Grande.

GENERAL GEOLOGY

In the United States the southernmost continuation of the Rocky Mountains is represented in western Texas by three ranges of mountains which stretch in a northwest-southeasterly direction in the region between the Pecos River and the Rio Grande. Northward all three of these ranges extend into New Mexico, and southward the two eastern ranges protrude into Mexico. The Rio Grande has cut a series of canyons through the two eastern ranges, a fact which suggests that the river was in existence before the mountains were uplifted across its course.

The westernmost range, the Franklin Mountains, is a continua-

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tion of the Organ and San Andreas ranges of New Mexico, and ends a few miles north of El Paso.

The next range to the east enters Texas from the north as the Hueco Mountains on the west, and the Cornudas Mountains on the east. This broad dissected plateau, the Diablo Plateau, is separated from the Franklin Mountains by the low Hueco Basin. The plateau is surmounted by subsidiary mountains, one set of which is near the eastern margin and the other near the western. Beginning on the north with the Hueco Mountains and Cerro Alto, this western line of mountains continues southeasterly in the Finlay, Sierra Blanca, Malone, Quitman, Devil's Ridge, and Eagle Mountains. The eastern line comprises successively from north to south the Cornudas, Sierra Tinaja Pinta, Sierra Prieta, Sierra Diablo, Baylor, Carrizo, Van Horn, Tierra Vieja, Chinati, Cienaga, Sierra Bofecillos, and the Mesa de Anguila. It is through this last elevated portion that the Rio Grande has cut the Santa Helena Canyon, approximately 1800 feet in depth and only 50 feet across at the base in some places.

The easternmost range of Trans-Pecos Texas, at this latitude the front range of the Western Cordillera, enters Texas on the North as the Guadalupe Mountains, and continues successively southward as the Delaware, the Davis (Limpia or Apache), the Mount Ord, the Santiago, and the Sierra del Carmen. The latter continues into Mexico trenched by the deep narrow canyons of the Rio Grande.

There are other minor mountains east of the front range proper. Such are the Barilla, Sierra Madera, Glass, the Marathon Uplift, and a series of four long ridges cut through by the Rio Grande in deep canyons between the Sierra del Carmen and the mouth of San Francisco Creek. These are regarded as subsidiary arches and folds in Comanchean and earlier sedimentary rocks and in later lavas (in the Barilla Mountains). These folds gradually die out eastward as the intensity of the orogenic forces decreased in that direction.

Most of the mountains are of the broad, somewhat flat, plateau type. A few, such as the Guadalupes and Chisos, are very rugged and greatly dissected. Elevations in the Trans-Pecos Mountain region range from 1500 feet in the Rio Grande valley,

at the eastern base of the Sierra del Carmen, to about 9500 feet in Guadalupe Peak near the New Mexico line, the highest point in Texas. Although the majority of the Trans-Pecos mountains are composed of folded and faulted sedimentary strata, some include areas of igneous rocks. These igneous rocks have intruded through or bowed up the sedimentary strata, as in the Chisos Mountains, or they have formed great plateau areas of lava flows, as is found in the Davis Mountains.

This mountainous country was formed by the uplifts and foldings which occurred at or towards the close of the Pliocene, and consequently is geologically recent. A brief summary of the recent Cenozoic geological history will serve to bring out this point:

> "At the end of the Eocene most of Texas became dry land and has remained dry land ever since. The only portion of Texas submerged beneath the waters of the Gulf since the close of the Eocene was a relatively narrow fringe along the present gulf border. All the Oligocene, Miocene, and Pliocene deposits of Texas are of non-marine origin in the region of their outcrops.
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> "Near or at the close of the Pliocene the mountains of New Mexico and Trans-Pecos Texas were again uplifted. In the Trans-Pecos mountain region the rocks were again folded and huge blocks of the earth surface were uplifted along lines of great dislocations or faults. The mountains of Trans-Pecos Texas as we see them today were formed at this time by these movements. Since then the mountains of New Mexico and Trans-Pecos Texas have been greatly eroded and debris from them was spread as a thin sheet of sands, gravels, and clays over nearly the whole of Texas. . . . Remnants of these deposits of sand and gravel, known as the Lafayette, are still found in all parts of Texas except on the surface of the Edwards Plateau and the summits and bedrock slopes of the Trans-Pecos Mountains. . . . All of the rivers of Texas, except the Rio Grande, the lower end of the Pecos, the Colorado, the Brazos, the Canadian, and possibly the Red, have cut their valleys since the Lafayette epoch. All the canyons in Texas, including . . . McKittrick canyon of the Guadalupe Mountains, Madera canyon of the Davis Mountains, the Santa Helena and other canyons of the Rio Grande, the canyon of the Pecos . . . have been cut since the beginning of the Lafayette epoch."[1]

The recent epoch is one of widespread erosion of Texas land and the materials are being transported to the Gulf by the rivers and there being deposited below the level of the tide.

Description of Regions Visited

Davis Mountains.—For an admirable description of the igneous flora, geology, and general features of this region, the

[1] Udden, J. A., C. L. Baker, and E. Bose. A review of the geology of Texas. Univ. Tex. Bull. 44. 1916.

reader is referred to E. J. Palmer's account.[2] Since he had already collected in the highest portions of these mountains, we confined our collecting to the regions of lower elevation in and around Little Aguja and Big Aguja Canyons.

Study Butte Area.—This is a region of low elevation and low relief, of heavily gullied and terraced bare hills, gypsum flats, and occasional barren sand ridges eroded from the Cretaceous Terlingua Beds and Tornillo Clays. This area is situated about 10 miles southwest of the Chisos Mountains and about 10 miles north of the Rio Grande. Plants growing on the gypsum flats, such as *Suaeda suffrutescens, Atriplex canescens, A. acanthocarpa,* are calciphiles, as are most plants of the area.

Chisos Mountains.—The flora of the Chisos Mountains includes a far greater proportion of the Mexican element than does the Davis Mountains. Although there are many species such as *Heuchera rubescens, Rhamnus Purshiana, Pseudotsuga taxifolia, Amesia gigantea,* and *Aquilegia chrysantha,* which come from the north into the Chisos Mountains, the Mexican species which extend north into the region constitute an important element in the flora. Palmer (loc. cit.) gives an excellent account of the region.

Canyons of the Rio Grande.—At Boquillas, the river enters a deep canyon in the Edwards limestone. We collected in and about the head of the canyon on the American side. Further upstream the river has cut St. Helena Canyon, a narrow limestone gorge 7 miles long with almost vertical walls 1800 feet high. At the lower end, it was possible to proceed for collecting less than half a mile up the canyon.

Guadalupe Mountains.—These are a southern extension of the Sacramento Range. While most of the Guadalupes lie in New Mexico, the highest and the wettest portion of the range extends into Culberson Co., Texas. Guadalupe Peak (9500 ft.), the highest peak of the range, is the highest point in Texas. The ruggedness of the mountains results from the deep, steep-walled, narrow, tortuous canyons, incised in the thick Permian limestone of which the range is largely composed. Some of the canyons, McKittrick and Dog, contain sizeable permanent streams, and

[2] Palmer, E. J. Ligneous flora of the Davis Mountains. Jour. Arn. Arb. **10**: 8–45. 1929.

support a mesophytic vegetation. In these cool moist canyons many northern species thrive. While a few Mexican species are found, such as *Selaginella Pringlei, Carex planostachys, Oryzopsis fimbriata,* the flora is dominated by Rocky Mountain species of more northern range. Some species are more common in the mountains of southern New Mexico and Arizona, and here make their eastern stand.

The Life Zones in the Guadalupe Mountains range from Lower Sonoran to Canadian. The characteristic vegetation of the Transition and Canadian Zones is found in the deep moist shaded canyons and on the high ridges and peaks. A few forms are endemic—*Tradescantia Wrightii, Sisyrinchium longipedunculatum, Laphamia quinqueflora, Valeriana texana, Polygala rimulicola, Festuca ligulata.*

For many things which contributed toward the success of our collecting trip, we thank Dr. George T. Moore, Director of the Missouri Botanical Garden; Dr. J. M. Greenman, Curator of the Herbarium of the Missouri Botanical Garden; Dr. B. C. Tharp, University of Texas; Mr. E. J. Palmer, Arnold Arboretum; Mr. Homer Wilson, Del Rio, Texas; Mr. M. McAlpine, Toyah, Texas. We acknowledge the hearty coöperation of the following specialists who determined many of our plants: Dr. A. S. Hitchcock, grasses; Dr. W. R. Maxon, ferns; Dr. A. W. Evans, hepatics; Prof. Oakes Ames, orchids; Mr. E. B. Bartram, mosses.

Sets of our "Plants of Texas" may be found in the herbaria at the following institutions (listed in order of size of set): Missouri Botanical Garden; Arnold Arboretum (ligneous plants only); Gray Herbarium; University of California; Academy of Natural Sciences of Philadelphia; University of Michigan; New York Botanical Garden; Stanford University; California Academy of Sciences; University of Minnesota; United States National Herbarium; Geo. E. Osterhout.

Notes on Species New or Rare in the Flora of Texas

Bryophyta

HEPATICAE

Riella americana Howe and Underwood. Davis Mountains, 3081. From the only known station in the mountains, now probably destroyed.

MUSCI

Venturiella sinensis (Vent.) C. M. Guadalupe Mountains, 3524. Found for the first time in North America, growing on the bark of *Acer grandidentatum* var. *brachypterum*, in the upper part of McKittrick Canyon. Previously known only from Japan, China, and Korea.

PTERIDOPHYTA

FILICALES

Cystopteris fragilis (L.) Bernh. Guadalupe Mountains, 3561. Moist crevices among shaded boulders in Devil's Canyon. A southern extension of the range of a northern species. The first collection from western Texas.

Notholaena Greggii (Mett.) Maxon. Boquillas Canyon, 3348. Our collection of this rare Mexican fern, from crevices of the high exposed bluffs near the west end of the canyon, is the first made in the United States.

LYCOPODIALES

Selaginella Pringlei Baker. Guadalupe Mountains, 3502. A Mexican species collected only twice previously in the United States. On moist limestone ledges, along stream, McKittrick Canyon.

SPERMATOPHYTA

GYMNOSPERMAE

PINACEAE

Cupressus arizonica Greene var. *bonita* Lemmon. Chisos Mountains, 3207. A small grove of trees in upper Boot Spring valley constitutes the farthest-east station for this species.

Juniperus flaccida Schlecht. Chisos Mountains, 3330. A Mexican tree known in the United States only from the Chisos. The pronounced weeping habit reminds one of *Thuja* or *Libocedrus*. At the heads of canyons and along streams in sheltered places.

ANGIOSPERMAE (DICOTYLEDONEAE)

AMARANTACEAE

Cladothrix lanuginosa Nutt. var. *carnosa* Steyermark, Ann. Mo. Bot. Gard. **19**: 389. 1932. Study Butte, 3795.

ASCLEPIADACEAE

Asclepias glaucescens HBK. Chisos Mountains, 3417. In sheltered rocky woods at head of Green Gulch. A species of Arizona, New Mexico, and Mexico, not previously reported from Texas.

BERBERIDACEAE

Mahonia repens (Lindl.) Don. Guadalupe Mountains, 3481. A northern species found here previously by Havard and Bailey. On moist shaded wooded slopes in McKittrick Canyon, and on the slopes of the ridge above the canyon.

BETULACEAE

Ostrya Baileyi Rose. Guadalupe Mountains, 3483. On the sheltered ridges above McKittrick Canyon, a small tree; in the canyon, a large tree. Known only from the Guadalupe and Chisos Mountains.

BORAGINACEAE

Lappula grisea Wooton & Standley. Guadalupe Mountains, 3583. Not previously collected in Texas. On moist shaded soil, McKittrick Canyon.

Lithospermum viride Greene. Guadalupe Mountains, 3648. A New Mexican species found for the first time in Texas. Limestone ledges along trail out of McKittrick Canyon.

CAMPANULACEAE

Campanula rotundifolia L. Guadalupe Mountains, 3449. Common in moist shaded grassy places, McKittrick Canyon. A northern form reaching the southern limit of distribution in the Guadalupe, Chenate, Davis, and San Antonio ranges.

CAPRIFOLIACEAE

Lonicera arizonica Rehder. Guadalupe Mountains, 3478. Shaded woods about the summit of Guadalupe Peak. The first collection from Texas.

Symphoricarpos rotundifolius Gray. Guadalupe Mountains, 3671. A northern species previously collected by Havard; in woods about Guadalupe Peak.

CARYOPHYLLACEAE

Drymaria gracilis Cham. & Schlecht. Davis Mountains, 3044. The northern limit for a Mexican species. Large clumps in sheltered soil pockets at base of bluff in Little Aguja Canyon.

COMPOSITAE

Actinea Richardsonii (Hook.) Ktze var. *floribunda* Gray. Guadalupe Mountains, 3676. New to Texas flora. Scattered colonies in *Pinus ponderosa* woods on the limestone ridge between Pine Canyon and Guadalupe Peak. A species commoner in central and southern Rocky Mountains.

Aplopappus gymnocephalus DC. forma **albus** Steyermark and Moore, f. nov. Ligulis albis. Ridge above McKittrick Canyon, Guadalupe Mountains, Culberson Co. Texas, July 17, 1931. Moore & Steyermark 3488, TYPE in Herbarium of Missouri Botanical Garden. The ligules on all the heads were white, their color in the species being some shade of pale purple or pink. The species is commoner in the central Rocky Mountains and has been collected here by Havard.

Brickellia Coulteri Gray. Boquillas Canyon Region, 3438. A low slender subligneous plant, on steep rocky slopes at head of sand dunes at the mouth of the canyon. Our collection differs from typical *B. Coulteri* in having broader more obtuse involucral bracts.

Brickellia Fendleri Gray. Guadalupe Mountains, 3557. A northern species found for the first time in Texas. Moist shaded slopes in a ravine of Devil's Canyon, also in McKittrick Canyon.

Coreopsis lanceolata L. Guadalupe Mountains, 3632. This station on the high grassy ridges is the farthest-west record for the species in Texas.

Eupatorium Parryi Gray. Chisos Mountains, 3408. This rare Mexican species

was found in dry sheltered rocky woods growing in rich soil at the head of Cat Tail Canyon, close by the falls. Our collection, the second ever to be made, adds this plant to the United States flora.

Hieracium carneum Greene. Guadalupe Mountains, 3644. Open rocky slopes above McKittrick Canyon. A species of the southern Rockies of New Mexico and Arizona, previously collected in the Davis Mountains by Ferris & Duncan.

Hymenopappus radiatus Rose. Guadalupe Mountains, 3484. A species new to the flora of Texas, previously known from New Mexico and Arizona. On rocky open ground and in thickets of *Cercocarpus argenteus*, *Amelanchier florida* and *Robinia luxurians*, on the high ridge north of McKittrick Canyon.

Laphamia quinqueflora Steyermark, Ann. Mo. Bot. Gard. **19**: 392. 1932. Guadalupe Mountains, 3547.

Perityle Parryi Gray. St. Helena Canyon, 3466. Known previously in Texas by Havard's collection in the Bofecillos Mountains. In crevices at base of canyon walls.

Pinaropappus parvus Blake. Guadalupe Mountains, 3588. A rare suffruticose dwarf composite, forming large clumps in the shaded crevices of limestone cliffs. Found in the Texas Guadalupes by Standley and ourselves.

Solidago Wrightii Gray. Guadalupe Mountains, 3629. A rare species, this being only the second collection from Texas. At high altitudes on the ridges.

Cruciferae

Sisymbrium diffusum Gray. Guadalupe Mountains, 3567. On limestone talus. Rare in these mountains; found previously in Texas in the Pena Colorado Mountains and Guadalupe Mountains by Havard, and by Wright on his El Paso expedition.

Ericaceae

Arctostaphylos pungens HBK. Davis Mountains, 3145. A species of the mountains of Arizona, Nevada, and California, here recorded for the first time from Texas. On a rocky mesa and adjacent scrub oak slopes above Little Aguja Canyon, along with *Pinus cembroides* var. *edulis* and other shrubs.

Euphorbiaceae

Euphorbia eriantha Benth. Boquillas Canyon region, 3440. Rocky slopes at west end of Canyon. Rare, previously found in Texas by Hanson, at Redford.

Fagaceae

Quercus hypoleuca Engelm. Davis Mountains, 3127. A rare oak, forming thickets about breast high on rocky slopes high above Little Aguja Canyon.

Gentianaceae

Frasera speciosa Dougl. Guadalupe Mountains, 3647. A northern plant known in Texas only from the Guadalupes. In open *Pinus flexilis* woods on high ridges.

Geraniaceae

Geranium caespitosum James. Guadalupe Mountains, 3486. A northern plant reaching Texas only in the Guadalupes. On the high ridges in the open grassy *Pinus flexilis* forest. An oxylophile occurring with *Panicum bulbosum*.

HYDROPHYLLACEAE

Nama Havardii Gray. Study Butte Area, 3248. On the gypsum flats associated with *Greggia camporum*. Other stations in the region are Hot Springs and the Tornillo Creek region.

Nama xylopodum (Wooton & Standley) C. Hitchcock. Guadalupe Mountains, 3562. Rock crevices and boulders along streams, McKittrick Canyon. Known in Texas only from the Guadalupe Mountains.

LEGUMINOSAE

Robinia luxurians (Dieck.) Rydb. Guadalupe Mountains, 3480. A northern tree known in Texas only from this range. On the high ridges, a shrub; in the canyons, a well-formed tree.

LINACEAE

Linum Schiedeanum Cham. & Schlecht. Chisos Mountains, 3225. A Mexican species now reported as an addition to the United States flora. In sheltered woods at high elevations near Boot Spring.

LOASACEAE

Mentzelia asperula Wooton & Standley. Guadalupe Mountains, 3679. A rare New Mexican species found for the first time in Texas. On dry limestone talus, ridge north of McKittrick Canyon.

LOGANIACEAE

Buddleia marrubifolia Benth. Boquillas Canyon Region, 3449. A Mexican species collected previously in the United States along the Rio Grande by Parry. In a small ravine north of Boquillas Canyon.

LORANTHACEAE

Arceuthobium vaginatum Eichler. Guadalupe Mountains, 3470. On *Pinus ponderosa*. A common species in the Rocky Mountains but found in Texas only in the Guadalupe and Davis ranges.

MONOTROPACEAE

Hypopitys sanguinea Heller. Guadalupe Mountains, 3623. A northern species now reported for the first time from Texas. The entire plant is a deep scarlet-red and contrasts brilliantly with the leaf mould on which it grows. Shaded slopes in McKittrick Canyon.

Pterospora Andromeda Nutt. Guadalupe Mountains, 3642. On high ridges above McKittrick Canyon, in open *Pinus ponderosa* forest. A new record for Texas.

NYCTAGINACEAE

Boerhaavia erioselenus Gray. Boquillas Canyon Region, 3456. Known in Texas only in the vicinity of Tornillo Creek and near Hot Springs.

POLEMONIACEAE

Loeselia Greggii Wats. Chisos Mountains, 3344. Our collection from dry rocky sheltered draws, above Blue Creek Canyon, adds this Mexican species to our flora.

POLYGALACEAE

Polygala rimulicola Steyermark, Ann. Mo. Bot. Gard. **19**: 390. 1932. Guadalupe Mountains, 3515. This endemic *Polygala* was so small that the specimens had to be dug out of the rock crevices with a penknife.

POLYGONACEAE

Eriogonum Havardii Wats. Guadalupe Mountains, 3609. Grass land on foothills below McKittrick Canyon; otherwise known in Texas from stations in the Chenate and Bofecillos Mountains, and at Langtry.

Eriogonum pannosum Wooton & Standley. Guadalupe Mountains, 3617. A rare species hitherto not reported from Texas. On the foothills below McKittrick Canyon.

RANUNCULACEAE

Aquilegia longissima Gray. Davis Mountains, 3104. The long-spurred columbine (spurs 6 inches long) has been found twice in Texas. Havard collected it in the upper ravines of the Chisos Mountains. Our station in the upper portion of Little Aguja Canyon, a shaded nook under a sheer bluff, is the second known from Texas.

Clematis alpina Mill. Guadalupe Mountains, 3670. A northern species known in Texas only from our collection near the summit of Guadalupe Peak.

RHAMNACEAE

Rhamnus fasciculata Greene. Chisos Mountains, 3161. A species of New Mexico and Arizona found first in Texas by E. J. Palmer in the Davis Mountains; our station in the Chisos is the second for Texas.

ROSACEAE

Eriogynia caespitosa Wats. Guadalupe Mountains, 3653. Shaded upper part of McKittrick Canyon, forming dense prostrate matted clumps. A rare species of higher latitudes, occurring in Texas only in the Guadalupe Range.

Holodiscus dumosus (Nutt.) Heller. Guadalupe Mountains, 3672. Our collection on the north-facing slopes of Guadalupe Peak links the northern distribution of the species with the outlying station found by E. J. Palmer on Mount Livermore in the Davis Mountains 100 miles to the southeast.

Prunus Havardii (Wight) Mason. Chisos Mountains, 3230. A rare shrub known formerly only from the collections of the Mexican Boundary Survey and of Havard from the Chisos Mountains. Our specimens were found at the head of Blue Creek Canyon. The gamosepalous calyces remain attached with the stamens to the fruit until maturity, and appear at first glance to be dried corollas.

Rosa mirifica Greene. Guadalupe Mountains, 3540. New to Texas flora, a rare species throughout the rest of its range. Along the stream, McKittrick Canyon.

Vauquelinia angustifolia Rydb. Chisos Mountains, 3203. A handsome shrub with the aspect of *Sorbus;* the flowers are fragrant. Known in the United States from this mountain range only. Gravelly banks, Oak Canyon and Blue Creek Canyon.

SAXIFRAGACEAE

Ribes mescalerium Coville. Guadalupe Mountains, 3669. Very rare outside type locality. On steep slopes below Guadalupe Peak.

SCROPHULARIACEAE

Pentstemon baccharifolius Hook. Boquillas Canyon region, 3450. High limestone hills along Boquillas Canyon, the farthest-west station for this species in Texas, more common on the Edwards Plateau.

VALERIANACEAE

Valeriana texana Steyermark, Ann. Mo. Bot. Gard. **19**: 393. 1932. Guadalupe Mountains, 3528.

VERBENACEAE

Bouchea spathulata Torr. Boquillas Canyon region, 3446. Collected previously in Texas by Hanson and Havard. Rock ridge above canyon. The plants are suffruticose at the base, have thick coriaceous leaves, and bright purple corollas.

MONOCOTYLEDONEAE

BROMELIACEAE

Tillandsia recurvata L. Chisos Mountains, 3198. Although the usual habitat of the plant is trees or telephone wires, it was found growing on smooth vertical cliff faces below Emory Peak.

COMMELINACEAE

Tradescantia Wrightii Rose & Bush. Guadalupe Mountains, 3578. This rare endemic has been previously collected by Havard, Wright, and by Standley. Our collection, the fourth ever to be made, was obtained from plants growing on rocky banks along the stream, McKittrick Canyon. The corolla is dark purple and the tuberous roots are long and slender.

CYPERACEAE

Carex microdonta Torr. & Hook. Guadalupe Mountains, 3511. The first record for western Texas. Moist grassy places along the creek in McKittrick Canyon.

Carex eburnea Boott. Guadalupe Mountains, 3572. At base of moist shaded limestone bluffs in McKittrick Canyon. Our collection represents the farthest-west station for the species. The only other record in Texas of this eastern and northern type is a collection from Harriman, Texas, by Ruth (U. S. National Herbarium).

GRAMINEAE

Festuca ligulata Swallen, Amer. Jour. Bot. **19**: 436. 1932. Guadalupe Mountains, 3576.

Sorghastrum nutans (L.) Nash. Guadalupe Mountains, 3628. A new southwestern limit for this species. Sandstone outcrop on ridge above McKittrick Canyon.

Sphenopholis obtusata (Michx.) Scribn. Guadalupe Mountains, 3564. The farthest southwest for the species.

LILIACEAE

Zygadenus elegans Pursh. Guadalupe Mountains, 3564. On moist shaded limestone cliffs along the stream in McKittrick Canyon. This is the first collection from Texas, a record extending the distribution of the death camas southeastward.

ORCHIDACEAE

Amesia gigantea (Dougl.) A. Nels. & Macbride. In the Chisos Mountains at the head of Cat Tail Canyon, in rich leaf mould associated with a most virulent species of poison ivy, 3406. Along the stream in McKittrick Canyon, Guadalupe Mountains, 3568.

Spiranthes saltensis Ames. Chisos Mountains, 3214. Prof. Ames informs us that there are but two other collections of this orchid, both from central Mexico. Ours is the first to be taken in the United States.

POTAMOGETONACEAE

Potamogeton clystocarpus Fernald. Davis Mountains, 3088. This new species, described by Professor Fernald from our collection, occurred in shallow rock pools along the stream in the upper portions of Little Aguja Canyon. We regret to learn from Dr. R. A. Studhalter that in September, 1932, the region was visited by a cloudburst which washed the canyon clean of aquatic vegetation.

Potamogeton diversifolius Raf. Chisos Mountains, 3186 and 3414. The usual form with floating leaves (3186) was found in the creek near Boot Spring, while the rarer submersed form (3414) was found in a still deep pool at the head of Cat Tail Canyon. The latter were slender nearly sterile plants about 20 inches tall. All the leaves were submersed and linear. This species was also found in the upper part of Little Aguja Canyon in the Davis Mountains.

ADDITIONAL RECORDS OF INTEREST

The following is a list of plants for which we found new stations or which are rare in Texas. Our collection numbers are cited with each species mentioned. Abbreviations indicating the regions to which records refer, are as follows:—

(C) — Chisos Mountains.
(D) — Davis Mountains.
(G) — Guadalupe Mountains.
(S) — Study Butte Region.
(H) — St. Helena Canyon.
(B) — Boquillas Canyon.

PTERIDOPHYTA—FILICALES

Bommeria hispida (Mett.) Underw. (D). 3042.
Cheilanthes castanea Maxon (C). 3191.
Cheilanthes Eatoni Baker (C, D). 3020, 3173.
Cheilanthes Fendleri Hook. (D). 3135.
Cheilanthes Wrightii Hook. (D). 3023.
Notholaena Standleyi Maxon (D). 3022.
Pellaea microphylla Mett. (C, G). 3370, 3514.
Pellaea Wrightiana Hook. (D). 3019.
Woodsia mexicana Fée (C). 3167.

PTERIDOPHYTA—LYCOPODIALES

Selaginella Sheldoni Maxon (D). 3047.

SPERMATOPHYTA

GYMNOSPERMAE—PINACEAE

Juniperus monosperma Sarg. (G). 3520.
Juniperus Pinchotii Sudw. (C, G). 3148, 3473.
Pinus flexilis James (G). 3469.

ANGIOSPERMAE—DICOTYLEDONEAE

ACANTHACEAE

Anisacanthus insignis Gray (C). 3202.
Ruellia Parryi Gray (H). 3459.

ASCLEPIADACEAE

Acerates auriculata Engelm. (G). 3553.

Asclepias macrotis Torr. (G). 3559.

Funastrum Torreyi (Gray) Schltr. (C). 3234.

Metastelma barbigerum Scheele (C). 3365.

Rouliniella unifaria (Scheele) Vail. (C). 3398.

BERBERIDACEAE

Mahonia haematocarpa (Wooton) Fedde (C). 3311.

BORAGINACEAE

Coldenia Greggii (T. & G.) Gray (B). 3452.

Heliotropium confertifolium Torr. (C). 3264.

Heliotropium convolvulaceum Gray (B). 3431.

CAPRIFOLIACEAE

Symphoricarpos longiflorus Gray (G). 3478.

CARYOPHYLLACEAE

Cerastium brachypodum (Engelm.) Robinson (C). 3168.

Paronychia Jamesii T. & G. (D, G). 3141, 3612.

Silene laciniata Cav. var. *Greggii* Wats. (C, G). 3190, 3646.

CELASTRACEAE

Mortonia scabrella Gray (G). 3665.

COMPOSITAE

Baccharis pteronioides DC. (C). 3346.

Berlandiera macrophylla (Gray) Jones (G). 3630.

Brickellia brachyphylla Gray (G). 3587.

Carpochaete Bigelovii Gray (C). 3201.

Chrysactinia mexicana Gray (C). 3170.

Chrysopsis fulcrata Greene (C, G). 3212, 3529.

Chrysopsis viscida Greene (D). 3071.

Heliopsis parvifolia Gray (C). 3213.

Lactuca ludoviciana DC. (C). 3393.

Laphamia rupestris Gray (D). 3041.

Perezia Wrightii Gray (C). 3337.

Stephanomeria tenuifolia (Torr.) Hall (G). 3534.

CONVOLVULACEAE

Dichondra brachypoda Woot. & Standl. (D, G). 3063, 3594.

CRASSULACEAE

Echeveria strictiforme Gray (C). 3336.

Sedum moranense HBK. (C). 3169.

CRUCIFERAE

Lesquerella purpurea Wats. (C). 3197.

Streptanthus platycarpus Gray (G). 3541.

EUPHORBIACEAE

Bernardia myricaefolia (Scheele) Wats. (C). 3289.

Ditaxis serrata (Torr.) Heller (H). 3464.

Euphorbia antisyphilitica Zucc. (B). 3443.

Euphorbia brachycera Engelm. (D, G). 3129, 3571.

Euphorbia cinerascens Engelm. (C). 3266.

Euphorbia Fendleri T. & G. var. *chaetocalyx* Boiss. (G). 3532.

Euphorbia heterophylla L. var. *graminifolia* Engelm. (G). 3531.

Euphorbia montana Engelm. (C). 3334.

Mozinnia sessiliflora (Hook.) Small (B). 3437.

FUMARIACEAE

Corydalis euchlamydea (Woot. & Standl.) Fedde (D, G). 3065, 3664.

LABIATAE

Brittonastrum neomexicanum Briq. (G). 3556.

Hedeoma mollis Torr. (C). 3409.

Hedeoma plicata Torr. (C, D). 3089, 3423.
Hedeoma thymoides Gray (B). 3445.
Salvia regla Cav. (C). 3179.
Scutellaria Drummondii Benth. (C). 3231.
Stachys Drummondii Benth. (D). 3099.

LEGUMINOSAE
Acacia cuspidata Schlecht. (C). 3338.
Cologania angustifolia Kunth (C). 3163.
Lotus Wrightii (Gray) Greene (C, D). 3143, 3224.
Parosela Jamesii (Torr.) Vail. (C). 3354.
Parosela mollis (Benth.) Heller var. *neomexicana* (Gray) Heller (C). 3270.

LINACEAE
Linum australe Heller (G). 3600.

LOASACEAE
Cevallia sinuata Lag. (C). 3253.
Eucnide bartonioides Zucc. (B). 3791.

LORANTHACEAE
Phoradendron Coryae Trel. (C). 3331.
Phoradendron Havardianum Trel. (G). 3608.

MALPIGHIACEAE
Janusia gracilis Gray (C). 3358.

MALVACEAE
Sphaeralcea Fendleri Gray (G). 3599.
Sphaeralcea incana Torr. (G). 3789.

MENISPERMACEAE
Cocculus carolinus DC. (C). 3401.

NYCTAGINACEAE
Allionia melanotricha Standl. (C). 3342.
Allionia pratensis Standl. (C). 3180.
Selinocarpus angustifolius Torr. (S). 3307.

OLEACEAE
Fraxinus Standleyi Rehder var. *lasia* Rehder (G). 3474.
Menodora decemfida (Gill.) Gray var. *longifolia* Steyermark (C). 3257.
Menodora scabra Gray var. *ramosissima* Steyermark (C). 3256.

ONAGRACEAE
Epilobium glandulosum Lehm. var. *adenocaulon* (Haussk.) Fernald (D). 3049.
Oenothera brachycarpa Gray var. *Wrightii* (Gray) Lévl. (G). 3554.

POLEMONIACEAE
Gilia incisa Benth. (C). 3315.
Gilia longiflora (Torr.) Don (S). 3305.

POLYGALACEAE
Polygala hemipterocarpa Gray (D). 3140.
Polygala macradenia Gray (C). 3274.
Polygala obscura Benth. (C). 3361.
Polygala puberula Gray (C). 3177.
Polygala scoparioides Chod. (C). 3251, 3273.
Polygala Tweedyi Britton (C). 3276.

PORTULACACEAE
Talinum brevifolium Torr. (G). 3677.

RANUNCULACEAE
Aquilegia Chaplinei Standley (G). 3549.
Aquilegia chrysantha Gray (C). 3405.
Thalictrum Fendleri Engelm. (G). 3566.

RHAMNACEAE
Ceanothus Greggii Gray (G). 3475.

ROSACEAE
Amelanchier florida Lindl. (G). 3482.

Cercocarpus argenteus Rydb. (G). 3489.
Cowania ericaefolia Torr. (B). 3451.
Physocarpus monogynus (Torr.) Coulter (G). 3666, 3673.

RUBIACEAE
Galium mexicanum HBK. (C). 3159.
Galium pilosum Ait. (C). 3162.
Galium Rothrockii Gray (C). 3322.
Houstonia fasciculata Gray (C). 3323.

RUTACEAE
Astrophyllum dumosum Torr. (G). 3552.
Ptelea monticola Greene (G). 3603.
Ptelea polyadenia Greene (C). 3184.

SALICACEAE
Salix taxifolia HBK. (D). 3125.

SAXIFRAGACEAE
Fendlerella utahensis (Wats.) Heller (G). 3626.
Heuchera rubescens Torr. (C, G). 3185, 3584.
Philadelphus serpyllifolius Gray (G). 3584.

SCROPHULARIACEAE
Mimulus glabratus HBK. var. *Fremontii* (Benth.) Grant (D). 3053.
Pentstemon dasyphyllus Gray (C). 3360.
Pentstemon Torreyi Benth. (C, G). 3313, 3631.

SOLANACEAE
Physalis hederaefolia Gray (H). 3462.
Physalis subintegra Fernald (C). 3195.

ULMACEAE
Celtis Douglasii Torr. (G). 3526.

UMBELLIFERAE
Pseudocymopterus montanus (Nutt.) C. & R. (D, G). 3131, 3136, 3573.

VERBENACEAE
Verbena perennis Wooton (G). 3611.
Verbena plicata Greene (S). 3299.

VITACEAE
Vitis arizonica Engelm. var. *glabra* Munson (G). 3527.

COMMELINACEAE
Setcreasea brevifolia (Rose) K. Schum. & Sydow (C, D). 3013, 3228.

CYPERACEAE
Carex hystericina Muhl. var. *Cooleyi* Dewey (G). 3503.
Carex planostachys Kunze (C). 3165.
Eleocharis arenicola Torr. (G). 3508.
Eleocharis caribaea (Rottb.) Blake (B). 3453.
Eleocharis mamillata Lindl. f. (G). 3505.
Mariscus jamaicensis (Crantz) Britton (G). 3679.

GRAMINEAE
Andropogon furcatus Muhl. (G). 3637.
Aristida glauca (Nees) Walp. (G). 3533.
Cathestecum erectum Vasey & Hack. (S). 3300.
Festuca ligulata Swallen (G). 3576.
Koeleria cristata (L.) Pers. (C, G). 3171, 3634.
Manisuris fasciculata (Lam.) Hitchc. (S). 3434.
Muhlenbergia pauciflora Buckl. (G). 3577, 3627.
Muhlenbergia polycaulis Scribn. (C). 3215.
Oryzopsis fimbriata (HBK.) Hemsl. (C, G). 3172, 3605.
Panicum bulbosum HBK. (C, G). 3371, 3633.
Sitanion hystrix (Nutt.) J. G. Smith (G). 3635.
Triodia avenacea HBK. (C). 3314, 3367.