



Some aspects of the natural history of the Capitan and Jicarilla mountains and Sierra Blanca region of New Mexico

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SOME ASPECTS OF THE NATURAL HISTORY OF THE CAPITAN AND JICARILLA MOUNTAINS, AND SIERRA BLANCA REGION OF NEW MEXICO

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INTRODUCTION

In this article certain aspects of the natural history of the Capitan and Jicarilla Mountains and Sierra Blanca region of southcentral New Mexico are discussed and some items of interest regarding this area are indicated. The primary interest and experience of the author is developed along botanical lines. Therefore, the plant life of this region is given the most attention, but some mention also is made of the animal life, primarily that of the mammals. Appreciation is extended to Dr. Clyde Jones, Assistant Curator, Museum of Southwestern Biology, for his comments and helpful criticism of the manuscript.

For a long time the Capitan and Jicarilla Mountains, Sierra Blanca, the surrounding plains, and the lowlands have continued to arouse the interest of naturalists and biologists. Botanists, in particular, have long recognized this region as one possessing unusual floristic characteristics. For example, a number of taxa described from this area in the late nineteenth century and the early twentieth century are recognized as being endemic to this part of the State. This relatively high proportion of endemics is probably a reflection of long-time isolation of this group of mountains from other mountain masses, thus providing many taxa with the opportunity to evolve independently from their counterparts elsewhere.

The Capitan and Jicarilla Mountains, and Sierra Blanca are of additional interest due to an ecological potential for the development of a very diversified flora and fauna. Few areas anywhere have such a variety of habitats to offer, and rarer still are those places that exhibit as many life zones in so small a space. Altitudes range from 4,500 feet in the vicinity of Tularosa and the Tularosa Basin to more than 12,000 feet at the top of Sierra Blanca Peak—called "Old Baldy" by natives of the region. Extensive areas, such as the ridge of the Capitan Mountains and other peaks in the vicinity reach altitudes considerably above 9,000 feet.

The amount and distribution of precipitation throughout this area also is an important factor in the development of the widely diversified flora and fauna as are found here. Rainfall certainly is not especially plentiful anywhere in this region, but the Jicarilla and Capitan Mountains are somewhat more xeric than Sierra Blanca. This condition is probably due to the lower altitude reached by both the Jicarillas and the Capitans and partly to the smaller masses of these ranges. In

addition, both ranges seem to be located somewhat in the rain shadow of the higher Sierra Blanca to the south.

Additional geographic features of the area include several relatively small mountains such as Carrizo Peak more than 9,600 feet high, Potos Mountain, approximately 8,400 feet, and several lower masses such as the Godfrey Hills lying between Sierra Blanca and Tularosa Basin to the west. Thus, the general character of this region is that of a series of peaks, ridges, and hills separated by high plateaus.

It is important to keep some continuity between types of organisms mentioned and certain measurable features of the terrain such as altitude. Therefore, the approach in this article is that of characterizing or listing a variety of the organisms that can be expected to exist in each of several altitudinal associations or zones. These associations can be roughly compared with the well-known life zones but no special attempt is made here to follow the life-zone concept with any degree of exactness because certain features, such as direction of exposure and availability of moisture, greatly modify the altitudinal range in which organisms can exist.

The associations discussed in this paper are based primarily on vegetational as well as altitudinal criteria, and include the desert grassland, pinyon-juniper, transition, spruce-fir, and alpine associations. This paper presents first the desert grassland association and proceeds step-by-step through successively higher associations to the alpine situation. A map of the area (fig. 1) is included to give the reader a general idea of the extent and distribution of the associations under discussion. The map indicates the position of the major peaks and their approximate altitudes, as well as other points of reference. The crosssection (fig. 2) shows the vertical extent and briefly summarizes the important biological characteristics of each association.

DESERT GRASSLAND ASSOCIATION

A relative small section of the study area is in the so-called desert grassland association, mostly west of the main mountain mass. The desert grassland includes the territory between an altitude of 4,500 feet at the edge of the Tularosa Basin and an altitude of 6,000 feet at the base of the Jicarilla Mountains to the north and in the vicinity of Bent to the south. A few areas east of Sierra Blanca can (also roughly) be designated as desert grassland, but, for the most part, these are located near the upper limits of the altitudinal range indicated for this association.

The section of the desert grassland bordering in the Tularosa Basin, although almost treeless, supports a num-

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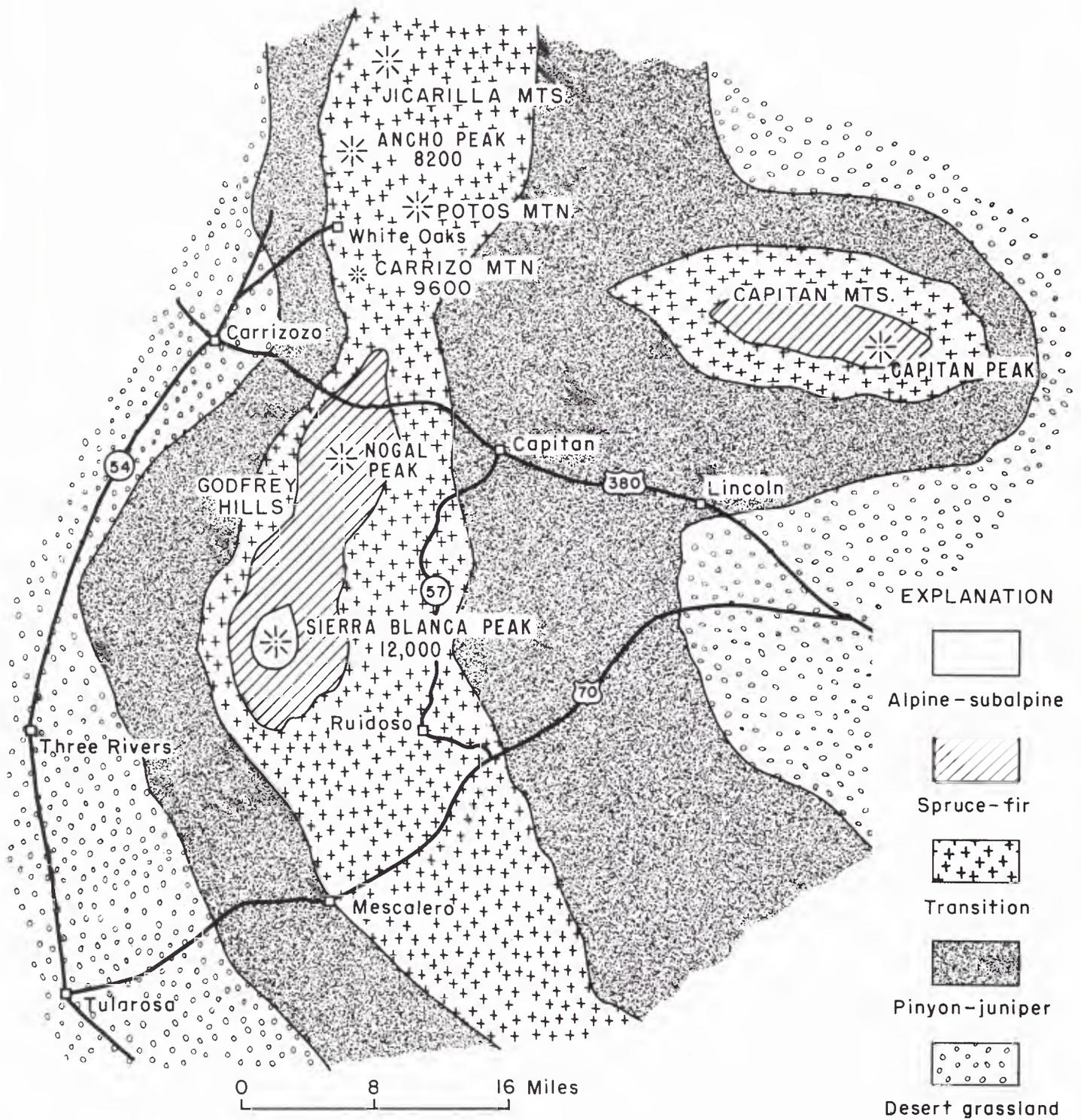
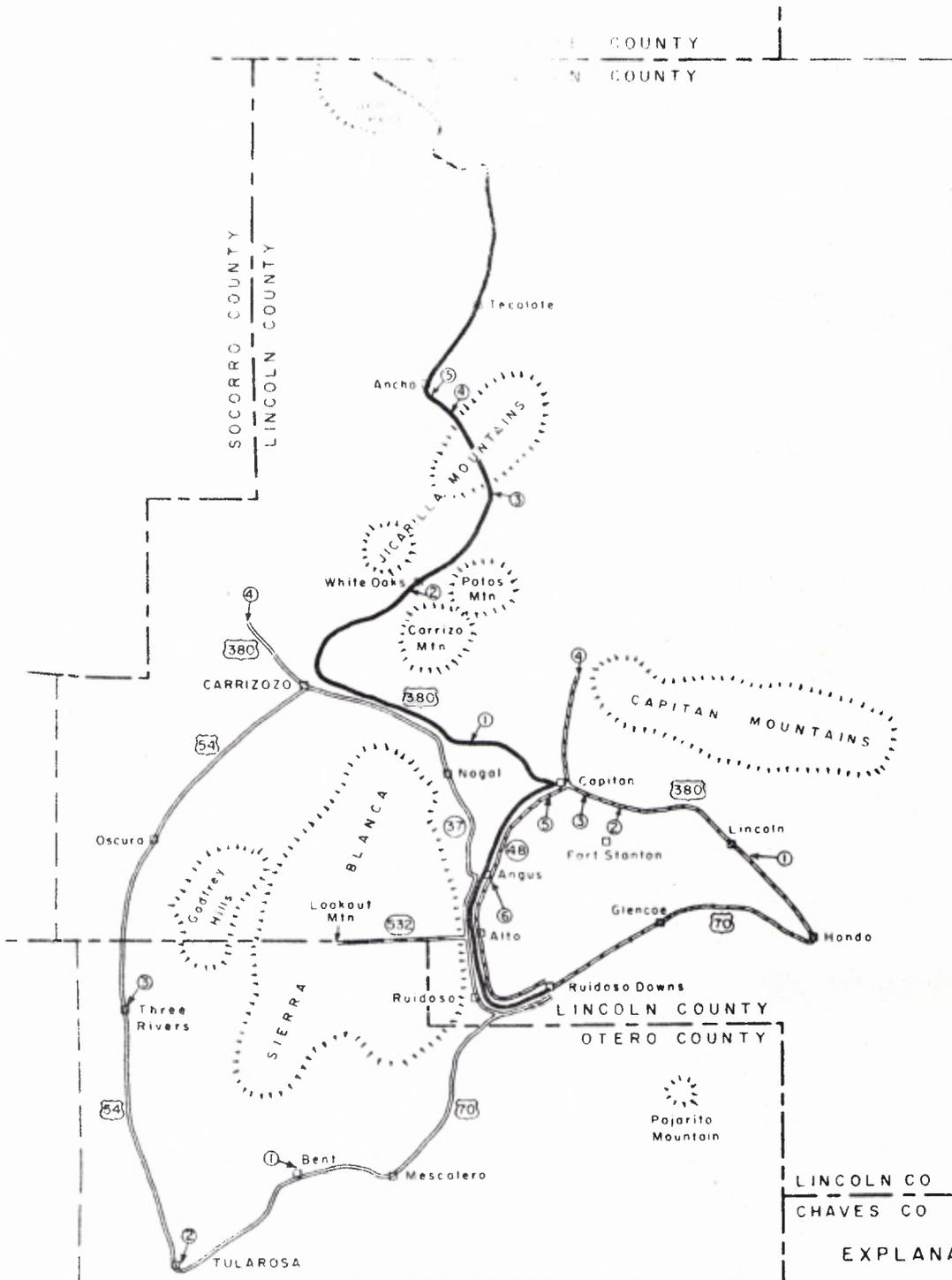


Figure 1. — Map showing the general distribution of life associations in Sierra Blanca and the Jicarilla and Capitan Mountains of New Mexico.



LINCOLN CO
CHAVES CO

EXPLANATION

-  First Day
-  Second Day
-  Third Day
-  Stops on Route

15th FIELD CONFERENCE OF NEW MEXICO GEOLOGICAL SOCIETY RUIDOSO COUNTRY
 SOUTHCENTRAL NEW MEXICO, OCTOBER 16, 17, 18, 1964
 (See route of conference on reverse side)

A highlight of this field conference will be a gondola lift ride up Lookout Mountain from which a spectacular view extends 200 miles in all directions. At the summit (11,400 feet) Dr. Vincent C. Kelley will explain the regional geology. Headquarters for the three days of the conference will be at the Chaparral Motel in Ruidoso Downs. Transportation on the field trips will be by private car with provisions made for those without transportation. There will be no catered meals. Stops will be made at places in the conference area that cover stratigraphy, paleontology, regional and local structures, geomorphology, petrology of igneous rocks, mineral deposits and water resources.

The hardbound guidebook (\$9.00), contains 18 road logs and 21 articles. The road logs are designed so that they may be used by persons wishing to make their own tour of the area at a later time. The articles include papers on: the tectonics and geology of the Ruidoso-Carrizozo region and a color tectonic map of this region is folded in the back pocket, the geology of the Little Black Peak quadrangle and a color geologic map of this quad is in the back pocket, mineral deposits of the Ruidoso Country, geologic sections of the Sierra Blanca Mountains, chemistry of water from limestone and gypsum, water resources of the Carrizozo area, and oil and gas wells in the Ruidoso Country. The guidebook also contains photographs of six of Peter Hurd's paintings.

Registration fee of \$16.00 includes one copy of the guidebook and the ride in the gondola lift up Lookout Mountain. Registration will be from 3:30 p.m. to 10:00 p.m. on Thursday, October 15 and from 7:00 a.m. to 8:30 a.m. on Friday, October 16 at the Chaparral Motor Hotel in Ruidoso Downs. The Chaparral will have about 85 rooms available for the conferees and will make guaranteed reservations for all requests received by October 1st (and later by phone, area code 505-378-5511). Conferees will make their own motel reservations.

Minimum rates for a few motels are as follows:

	1 person	2 persons (additional (with 2 beds) persons \$2.00 each)
Chaparral Motor Hotel, Ruidoso Downs	\$8.00	\$12.00
Gateway Motel, Ruidoso	6.00	8.00
Holiday House Motel, Ruidoso	8.00	12.00
Nob Hill Lodge, Ruidoso	6.00	12.00
Pines Motel, Ruidoso	6.00	10.00
Park Motel, Ruidoso	5.00	10.00
Sitzmark Chalet, Ruidoso	8.00	12.50
Tomahawk Lodge, Ruidoso	8.00	12.00
Villa Inn Motor Hotel, Ruidoso	7.00	12.00

There are about 25 other cabins, lodges or motels in the Ruidoso area so that persons arriving without a reservation can be assured of finding accommodations to their liking.

Cocktail hour and banquet on Saturday evening October 17th.

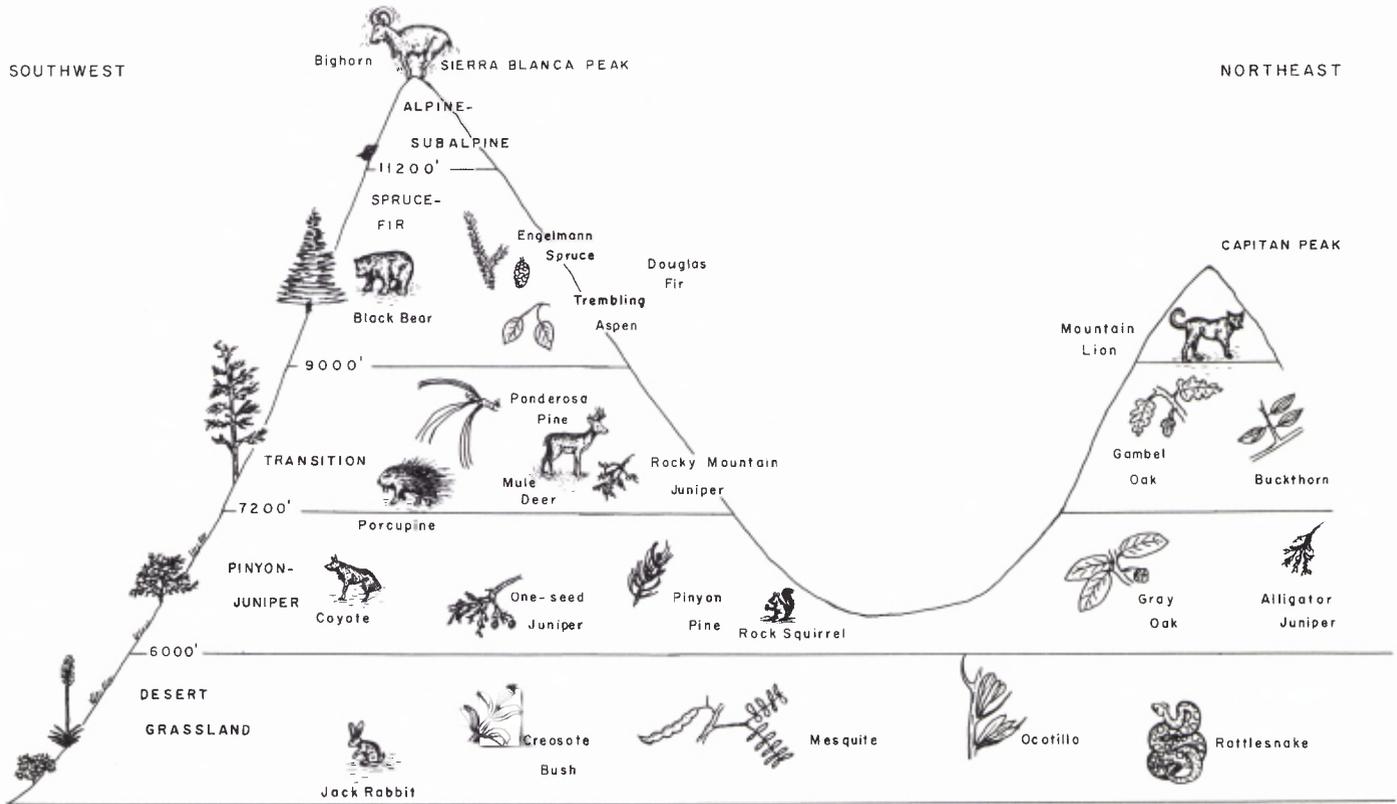


Figure 2. — A diagrammatic cross-section through Sierra Blanca Peak and the Capitan Mountains showing the approximate vertical distribution and characteristic members of life associations. View is looking northwestward.

ber of important shrub species including the well-known creosote bush (*Larrea tridentata*), the soapweed yucca (*Yucca elata*), the joint-fir (*Ephedra torreyana*), several members of the legume family including catclaw acacia (*Acacia greggii*), whiteball acacia (*Acacia angustissima*), and honey mesquite (*Prosopis glandulosa*), and some shrubby composites such as the low-growing snakeweed (*Gutierrezia sarothrae*), and tarbush (*Flourensia cernua*). A number of succulents belonging mainly to the genus *Opuntia* in the cactus family also grow in this association.

Although the lower part of the area occupied by the desert grassland association is very dry, many herbaceous plants make their home here. Some of the most spectacular wild flowers in New Mexico are to be found here, such as the stickleaf or blazing star (*Mentzelia* spp.) with its silvery white stems and huge, lemon-yellow flowers, the desert marigold (*Baileya multiradiata*) with bright yellow-orange flower heads and densely white-wooly stems, the widely distributed orange-red globe mallow (*Sphaeralcea coccinea*), and the straggly-stemmed, purple-flowered desert four-o'clock (*Boerhaavia* spp.). Other well known herbaceous dicots common to this area are wild zinnia (*Zinnia grandiflora*), hogpotato (*Hoffmanseggia densiflora*), doveweed croton (*Croton texensis*), various legumes known generally as loco weeds (*Astragalus* spp.), a relative of the nightshade, the horse

nettle (*Solanum elaeagnifolium*), paper daisy (*Psilostrophe tagetina*), so called because of the papery texture of the large yellow rays, and finally, a mustard called spectacle pod (*Dithyrea wislizenii*).

As in other associations, grasses play a major role in the vegetational cover of the desert grassland. Many species of the grass family grow here, but mention of a few of the more common ones will suffice. At lower levels are found sand dropseed (*Sporobolus flexuosus*), mesquite grass (*Muhlenbergia porteri*), three-awn (*Aristida* spp.), burro grass (*Scleropogon brevifolius*), and vine-mesquite (*Panicum obtusum*). In flat places or low swales, alkali sacaton (*Sporobolus airoides*) is often present as well as some grasslike plants from the rush family, for example, the Torrey rush (*Juncus torreyi*).

Toward the upper levels of the desert grassland, especially on low, rocky ridges and hills, the plant complement undergoes a definite change, giving away to additional species with a corresponding decrease in the frequency of plants common to lower altitudes. Among the shrubs making a first appearance are apache plume (*Falugia paradoxa*), ocotillo (*Fouquieria splendens*), and the not-very-shrublike beargrass (*Nolina microcarpa*). For the most part, additional herb species belong to the composite family, but several new euphorbias of the spurge family are also common as well as a member of the geranium family, the cranesbill (*Erodium cicutarium*),

a low-growing plant with deeply dissected leaves and strikingly elongated fruit capsules. Of all the plants of the arid regions, none attracts more attention than does the above mentioned ocotillo, with its large, terminal panicles of bright scarlet flowers and stiff, spiny stems densely covered with fascicles of spatulate leaves when there is sufficient soil moisture. These leaves fall quickly when very dry conditions prevail. Therefore, much of the year, this shrub is characterized only by its tall, slender, spiny, leafless stems.

Surprisingly enough, the desert grassland association abounds with animal life. Many kinds of reptiles as well as several species of mammals are able to tolerate the arid conditions. A few examples of mammals to be expected here are the hispid pocket mouse (*Perognathus hispidus*), rock pocket mouse (*Perognathus intermedius*), western harvest mouse (*Reithrodontomys megalotis*), cactus mouse (*Peromyscus eremicus*), hispid cotton rat (*Sigmodon hispidus*), desert cottontail (*Sylvilagus auduboni*), black-tailed jack rabbit (*Lepus californicus*), and an occasional hog-nosed skunk (*Conepatus leuconotus*). From this list, it would seem that the majority of the mammal life in this area belongs to the rodent order.

PINYON-JUNIPER ASSOCIATION

In the pinyon-juniper association which occurs generally between the altitudes of 6,000 and 7,200 feet, (an area corresponding roughly to the pinyon-juniper zone), the vegetation includes, in addition to grass and shrub cover, some arborescent forms. Throughout this association, prevailing low tree forms are one-seed juniper (*Juniperus monosperma*) and nut pine or pinyon (*Pinus edulis*). At the lower levels of the altitudinal range, the one-seeded juniper is the predominating tree form while, at higher altitudes, the pinyon pine is more common, in some areas practically to the exclusion of juniper. Another fairly common juniper toward the upper limits of the association is the alligator-bark juniper (*Juniperus deppeana*); the regular, rectangular, much-thickened bark scales giving the bark an appearance somewhat similar to the skin of the alligator. In rocky canyons and on rocky hillsides, the oaks begin to appear, principally the scrubby gray oak (*Quercus grisea*). This oak is one of the most common and certainly the most variable of the oaks in New Mexico.

Still apparent among the shrubby plants of the pinyon-juniper zone are apache plume, yucca, beargrass, joint-fir, and, of course, the cacti (*Opuntia* and *Mammillaria* spp.). A number of other shrubs begin to appear in the pinyon-juniper association, some of which are occasionally found in the upper part of the desert grassland association. The familiar catclaw mimosa (*Mimosa borealis*), the aromatic skunkbush sumac (*Rhus trilobata*), characterized by three-parted pinnately compound leaves, the spiny-leaved barberry (*Berberis haematacarpa*), and at least two species of rabbit brush (*Chrysothamnus* spp.) are noted along draws and dry hillsides.

As might be expected, grass species are liberally represented in the pinyon-juniper association and along with the shrub and tree cover are found throughout this area. Some of the important grass species are purple hair grass or sandhill muhly (*Muhlenbergia pungens*),

mesquite grass (*Muhlenbergia porteri*), mountain muhly (*Muhlenbergia montana*), mesa muhly (*Muhlenbergia monticola*), sand bunchgrass (*Oryzopsis hymenioides*), scratchgrass (*Sporobolus asperifolius*), sacaton (*Sporobolus wrightii*), alkali sacaton (*Sporobolus airoides*), wiregrass (*Aristida longiseta*), arizona three-awn (*Aristida arizonica*), wolftail or Texas timothy (*Lycurus phleoides*), galleta (*Hilaria jamesii*), and tobosa grass (*Hilaria mutica*); this is the approximate northern limit for tobosa. Also common are Texas crab grass (*Schedonardus paniculatus*), sideoats grama (*Bouteloua curtipendula*), six-weeks grama (*Bouteloua barbata*), black grama (*Bouteloua eriopoda*), Mexican lovegrass (*Eragrostis mexicana*), bluestem wheatgrass (*Agropyron smithii*), squirrel tail (*Hordeum jubatum*), and wild rye (*Elymus canadensis*), and blue grama (*Bouteloua gracilis*) which is beginning to appear at this altitude.

The dicot herbs are not as obvious here as at other locations but are usually represented by a large number of Compositae in late summer and autumn. An interesting herb of this area is Indian paint brush (*Castilleja integra*), characterized by its very irregular tubular flowers and bright red floral bracts. This is among the most colorful of all the plants of the association. Other herbs include species of globe mallow (*Sphaeralcea* spp.), daisy fleabane (*Erigeron* spp.), goldenrod (*Solidago* spp.), gum weed (*Grindelia aphanactis*), ground sorrel (*Senecio longilobus*), wild buckwheat (*Eriogonum* spp.), including both herbaceous and suffrutescent species, and here and there prickly poppy (*Argemone intermedia*).

The animal life of the pinyon-juniper association is diverse and includes the kit fox (*Vulpes velox*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), rock squirrel (*Citellus variegatus*), spotted ground squirrel (*Citellus spilosoma*), pocket gopher (*Thomomys bottae*), Mexican pocket gopher (*Cratogeomys castanops*), silky pocket mouse (*Perognathus flavus*), Ord's Kangaroo rat (*Dipodomys ordi*), banner-tail kangaroo rat (*Dipodomys spectabilis*), northern grasshopper mouse (*Onychomys leucogaster*), western harvest mouse (*Reithrodontomys megalotis*), pinyon deer mouse (*Peromyscus truei*), long-tailed deer mouse (*Peromyscus maniculatus*), brush deer mouse (*Peromyscus boylei*), possibly the southern plains woodrat (*Neotoma micropus*), white-throated woodrat (*Neotoma albigula*), hispid cotton rat (*Sigmodon hispidus*), desert cottontail (*Sylvilagus auduboni*), black-tailed jack rabbit (*Lepus californicus*), and the hog-nosed skunk (*Conepatus leuconotus*). A number of the species mentioned in this list are also present in the desert grassland.

TRANSITION ASSOCIATION

The transition association occurs above the pinyon-juniper association approximately between altitudes of 7,200 to 9,000 feet. In this zone, which is broken into several isolated units, the tree species for the first time become major features of the vegetation, and at least one important timber tree is found throughout this association. There are a few hold-over trees from the pinyon-juniper association such as an occasional one-seed juniper, which is seldom of any importance in the transition association and gray oak (*Quercus grisea*), still appearing on dry, rocky slopes of the lower part of this area.

The alligator-bark juniper, often making its appearance in the upper part of the pinyon-juniper level, is often well represented in the lower part of the transition association. Another juniper, the Rocky Mountain juniper (*Juniperus scopulorum*), is common here and, at higher altitudes, gradually replaces the other junipers. The Rocky Mountain juniper can be recognized by its slender, drooping, gray-green foliage, having none of the stiff, clustered appearance of either the one-seed or alligator-bark junipers. The juniper picture usually becomes somewhat confusing in the lower part of the transition association, as hybridization is common between all of these species.

The really important tree of this area and association is the ponderosa pine (*Pinus ponderosa*), one of the more valuable timber trees of the west. This one is the typical three-needled variety; apparently the five-needled var. *arizonica* does not extend this far east. While the ponderosa pine is common throughout the transition association, it is gradually replaced by douglas fir and white fir toward the upper limits of the association. Other trees of less importance include the southwestern chokecherry (*Prunus virens*), the black chokecherry (*Prunus virginiana* var. *melanocarpa*) in canyons and other mesic areas, and the western black walnut (*Juglans major*) common to gravelly outwash areas on canyon floors. Principal trees of riparian habitats are the narrow-leaved cottonwood (*Populus angustifolia*), ash-leaf maple (*Acer negundo*), and the Rocky Mountain maple (*Acer glabrum*). In addition to the gray oak, two other oak species also grow here. Gambel oak (*Quercus gambellii*) is common at this altitude over much of the state but tends to inhabit canyons or damp slopes. The chestnut oak (*Quercus muhlenbergii*), not a common tree in this part of the state, is reported from the slopes of the Capitan Mountains. It is so called because the leaves resemble those of American chestnuts.

The shrub complement of the transition association includes the spiny-leaved barberry (*Berberis haematacarpa*), apache plume (*Fallugia paradoxa*), skunkbush sumac (*Rhus trilobata*), mountain mahogany (*Cercocarpus montanus*), buckthorn (*Ceanothus fendleri*), and western mock orange (*Philadelphus microphyllus*) on generally open, rocky slopes or in dry thickets. In shaded areas bush rockspirea (*Holodiscus dumosus*), mescalero currant (*Ribes mescalerium*), creeping barberry or Oregon grape (*Berberis repens*), and wild grape (*Vitis arizonica*) are common. Along streams the willows such as blue-stem willow (*Salix irrorata*), and coyote willow (*Salix exigua*) predominate.

Many shade-loving herbaceous plants occur in this association. In partially shaded areas are common vetch (*Vicia americana*) in the legume family; several daisy fleabanes (*Erigeron* spp.), and a number of asters (*Aster* spp.) in the composite family; fireweed (*Epilobium angustifolium*), and evening primrose (*Oenothera* spp.), both in the evening primrose family; western wallflower (*Erysimum capitatum*), and wild geraniums (*Geranium* spp.). Herbs growing along streams include several species of monkeyflower (*Mimulus* spp.) and coneflower (*Rudbeckia laciniata*). Species tending to prefer open or sunny areas are Indian paint brush (*Castilleja* spp.), some members of the mustard family, whitlow grass (*Draba* spp.), bladderpod (*Lesquerella fendleri*), peppergrass (*Lepidium montanum*), and others such as

Rocky Mountain bee plant (*Cleome serrulata*), wild onion (*Allium* spp.), lambsquarters (*Chenopodium* spp.), and the amaranth or pigweed (*Amaranthus retroflexus*), Indian hemp (*Apocynum cannabinum*), four-o'clock (*Mirabilis multiflorus*), little primrose (*Gaura coccinea*), lupine (*Lupinus* spp.), and one of the most popular of our wild flowers, the orange-flowered milkweed or butterfly weed (*Asclepias tuberosa*), so called because hordes of butterflies are attracted to the flower.

Fewer species of grasses might be expected in the transition association than in lower areas, but the importance of grasses in the overall cover here should not be underestimated. Some commonly noted grasses include prairie junegrass (*Koeleria cristata*), several muhly grasses such as spikemuhly (*Muhlenbergia wrightii*), bullgrass (*Muhlenbergia emersleyi*), and deergrass (*Muhlenbergia rigens*), three-awn (*Aristida* spp.), Arizona fescue (*Festuca arizonica*), nodding brome (*Bromus anomalus*), Kentucky bluegrass (*Poa pratensis*), Bigelow bluegrass (*Poa bigelovii*) several wheat grasses, some of them introduced (*Agropyron* spp.), squirreltail (*Sitanion hystrix*), foxtail barley (*Hordeum jubatum*), grama grasses, blue grama and side-oats grama, already mentioned for the upper level of the pinyon-juniper association, red top (*Agrostis alba*), sleepy grass (*Stipa vaseyi*), and wild rye (*Elymus canadensis*). In wet areas and along the edges of marshes, a number of sedges are expected, these, for the most part, belonging to three genera (*Carex*, *Cyperus*, and *Scirpus*).

The transition association provides many habitats for a diversified population of animal life, but some of those noted for the pinyon-juniper association are also present here. These are the bobcat, rock squirrel, golden mantle ground squirrel, valley pocket gopher, long-tailed deer mouse, and brush deer mouse. Other mammals found in this association are the Mexican vole (*Microtus mexicanus*), porcupine (*Erethizon dorsatum*), a very serious pest of young pine stands, muledeer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), mountain lion (*Felis concolor*), to be looked for at almost any altitude, striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), ranging from the upper part of the transition, raccoon (*Procyon lotor*), and black bear (*Ursus americanus*).

SPRUCE - FIR ASSOCIATION

The spruce-fir association, ranging from altitudes of 9,000 feet to more than 11,000 feet, is often divided into two levels. At the lower level, the predominant trees are douglas fir (*Pseudotsuga taxifolia*), and white fir (*Abies concolor*), although a scattering of ponderosa pine may appear here and there. Higher in this association the spruce becomes dominant and the limber pine (*Pinus flexilis*) makes an appearance on the drier slopes and ridges. Blue spruce (*Picea pungens*), and Engelmann spruce (*Picea engelmannii*) make up the bulk of the spruce level. Blue spruce seems to be somewhat more restricted as to distribution, preferring canyons and moist areas, while Engelmann spruce seems to be more tolerant of a wide range of habitats. In riparian associations the Rocky Mountain maple, several willow species, among them Bebb willow (*Salix bebbiana*), and the alder (*Alnus oblongifolia*) are to be expected. Another common

tree found almost anywhere in the spruce-fir zone is the quaking aspen (*Populus tremuloides* var. *aurea*). It generally grows along small streams or ravines or cool, damp hillsides and is considered to be a rather fast-growing but short-lived tree. It is one of the first plants to enter an area after a burn and quickly develops a thick stand which acts as a nurse crop to allow the slower growing conifers to become established.

In the often dense tree cover of the spruce-fir association, shade tolerant shrubs are numerous. In shaded or partially shaded situations are the thimble berry (*Rubus parviflorus*), Rocky Mountain clematis (*Clematis pseudoalpina*), bush rockspirea (*Holodiscus dumosus*), ninebark (*Physocarpus monogynus*), the low growing evergreen myrtle boxleaf (*Pachystima myrsinites*), orange gooseberry (*Ribes pinetorum*), Rothrock currant (*Ribes wolfii*), mescalero currant (*Ribes mescalerium*), this currant also is found in transition areas and appears to be endemic to this part of the state, New Mexican elder (*Sambucus neomexicana*), and black bead elder (*Sambucus melanocarpa*). The New Mexican elder often attains tree-like proportions. Shrubs that generally inhabit clearings or open, rocky areas are cliff jamesia (*Jamesia americana*), roundleaf snowberry (*Symphoricarpos rotundifolius*), shrubby cinquefoil (*Potentilla fruticosa*), and New Mexican locust (*Robinia neomexicana*), the last usually common in upper transition and lower spruce-fir associations and characterized by, pinnately-compound leaves and large, drooping panicles of reddish purple flowers in early summer.

The spruce-fir association supports a lush understory of herbs such as wafer parsnip (*Pseudocymopterus montanus*), wild strawberry (*Fragaria bracteata*), blue flag (*Iris missouriensis*), horsemint (*Monarda menthaefolia*), red columbine (*Aquilegia elegantula*), rock jasmine (*Androsace septentrionalis*), yarrow (*Achillea lanulosa*), Rusby primula (*Primula rusbyi*), valerian (*Valeriana acutiloba*), owl's claws (*Helenium hoopsii*), cohosh (*Actaea viridiflora*), Canada violet (*Viola canadensis*), cardinal flower (*Penstemon cardinalis*), Jacob's ladder (*Polemonium filicinum*), Gray's lousewort (*Pedicularis grayi*), buttercups (*Ranunculus* spp.), camas or wand lily (*Zygadenus elegans*), bluebell (*Campanula rotundifolia*), bog orchis (*Habenaria brevifolia*), and fairy slipper (*Calypso bulbosa*).

Grasses common to the spruce-fir association of these mountains include mountain brome (*Bromus marginatus*), bearded wheatgrass (*Agropyron subsecundum*), slender wheatgrass (*Agropyron trachycaulum*), thurber fescue (*Festuca thurberi*), Columbia needlegrass (*Stipa columbiana*), mountain timothy (*Phleum alpinum*), timber danthonia (*Danthonia intermedia*), tufted hairgrass (*Deschampsia caespitosa*), bull wildrye (*Elymus glaucus*), New Mexican bluegrass (*Poa occidentalis*), melic grass (*Melica porteri*).

In addition to animals normally present in this association such as the pocket gopher, bobcat, chipmunk, mountain lion, long-tailed vole and black bear, we can add the dusky shrew (*Sorex vagrans*) to the list.

ALPINE ASSOCIATION

There is no doubt some room for argument as to the extent of the alpine association in this region. None of the peaks except Sierra Blanca are high enough to support anything resembling alpine vegetation. Since Sierra Blanca Peak reaches an altitude of more than 12,000 feet, it seems logical that at least a small portion at the top of the peak should fall into the alpine category. The alpine zone is not as clear-cut on Sierra Blanca Peak, however, as on comparable peaks farther north. The alpine association generally is regarded as beginning at about 12,000 feet on most peaks of the Sangre de Cristo range, but the alpine limit theoretically should begin somewhat lower on these peaks than on Sierra Blanca Peak owing to climatic changes associated with latitude and relative size of surrounding mountain masses. Although there is evidence of glaciation having occurred on Sierra Blanca Peak, the time of permanent snow fields on this peak is apparently long past.

At any rate, a small area of the top of the peak seems to have some characteristics of an alpine situation. However, many species of plants common to the alpine region of the Sangre de Cristo range have no representatives on Sierra Blanca Peak.

The shrub cover which could be classed as alpine would be represented only by arctic willow (*Salix petrophila*), while herbs include campion (*Silene* spp.), avens (*Geum turbinatum*), sandwort (*Arenaria obtusiloba*), White Mountain cinquefoil (*Potentilla sierrae-blancae*), gentian (*Gentiana strictiflora*), and bitterweed (*Hymenoxys grandiflora*). Rushes and sedges make up an important part of the vegetation here; the majority belong to two genera (*Luzula* and *Carex*).

SELECTED REFERENCES

- Harris, A. H., 1956, A distributional check-list of New Mexican mammals: Univ. New Mexico unpub. Masters thesis, 463 p.
- Hitchcock, A. S., 1950, Manual of the grasses of the United States. 2d ed., revised by Agnes Chase: U.S. Dept. Agr. Pub. 200, 1051 p.
- Kearney, T. H., and Peebles, R. H., 1960, Arizona flora, 2d ed. with supplement by J. T. Howell, E. McClintock and collaborators: Berkeley and Los Angeles, Univ. Calif. Press, 1085 p.
- Martin, W. C., and Castetter, E. F., 1964, A checklist of gymnosperms and angiosperms of New Mexico: Univ. New Mexico Pub. Biol. In press.
- Wootton, E. O., and Standley, P. C., 1915, Flora of New Mexico: U.S. Natl. Herbarium Contr. v. 19, 794 p.

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