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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

December 31, 1941

Mr. Harry Hoogstraal,
Department of Entomology,
University of Illinois,
Urbana, Illinois.

Dear Mr. Hoogstraal:

Through correspondence with Mr. Stephen S. White, of the Universuty of Michigan, I have learned that you may be collecting in central Mexico duting the coming summer.

I am preparing to monograph the willows of the Americas in a year or two, thereby rounding out some 50 years of work on them.

In the mountains of Central Mexico occurs a group of willows which is not found elsewhere. Herbarium material is scanty and much needed if they are to be adequately understood.

If you are able and willing to make collections, I will be glad to pay you for a set of specimens. A few notes may be of interest.

Practically all species can be recognized from foliage specimens alone, altho flowers and fruit are exceedingly desirable. Therefore, do not hesitate to collect vegetative specimens.

After flowering and fruiting are over, it often is possible to find old catkins stuck in the fork of a branch or in a cobweb in the twigs. Also they may be found on the ground under the plant. Such old fruits often help greatly.

Likewise if plants are found in flower or fruit before the leaves appear, old leaves sometimes may be found still attached at the tips of twigs or may be found on the ground under the plants.

In collecting foliage specimens, it is desirable to get the small-leaved fruiting twigs, the larger leaved seasonal shoots, and the very large-leaved sprouts which occur on the base of the trunk or larger branches.

Appreciating any consideration you may be able to give to this matter and with best New Year wishes, I am

Cordially Yours,

Carleton R. Ball
Executive Secretary

January 13, 1942

Professor Harry Hoogstraal,
Department of Entomology,
Entomology Building,
University of Illinois,
Ubbana, Illinois.

Dear Professor Hoogstraal:

Your letter of January 7 is here and I greatly appreciate your interest in the Mexican willows. I can easily understand your uncertainty as to future moves.

For purposes of present discussion, the willows of Mexico may be divided into two geographical groups -- those of the relatively lowlands and those of the mountains.

In the lowlands of northern Mexico occur several species which are found in southern and southwestern United States. These are Salix Gooddingii variety vallicola and Salix nigra Lindheimeri, the former in northwestern Mexico, the latter in northeastern Mexico. These, with the very narrow leafed Salix Humboldtiana of eastern Mexico, have leaves green on both sides and are closely related to the common Salix nigra of the eastern United States.

Salix bonplandiana and its narrow-leafed variety Toumeyi from northern and central Mexico, and Salix Jaliscana from western Mexico, have the long, slender, narrowly lanceolate leaves but white on the undersurface and the branchlets and leaves hairy in S. Jaliscana.

Then there are the long-leafed or sandbar willows of which S. exigua and S. taxifolia both are found in northern Mexico and southwestern United States. To these may be added S. lasiolepis, abundant from New Mexico to California and southward into Mexico.

In the mountains of central Mexico there likewise are three groups of willows, mostly very little known. I enclose a list of

Rio Tep.

The

Rio Tepalcatepec - Cerro Tancítaro

Transect of Michoacán, Mexico

Prepared to elucidate the investigations of the Roogstraal Mexican Biological Expeditions - especially for those specialists engaged in the study of specimens collected in the transect.

Harry Roogstraal
Urbana, Illinois
1941

Hiltoogstraal, Rio Tep-

THE RIO TEPALCAPEPEC - CERRO TANCÍTARO

TRANSECT OF MICHOACÁN, MEXICO

The Rio Tepalcatepec - Cerro Tancítaro transect is a fifty-mile long swath of land embracing an altitudinal ascent of some eleven thousand feet, from the sweltering Rio Tepalcatepec, its southern border, at about 1000 feet elevation, to the peak of Cerro (Mt.) Tancítaro, its northern border, at almost 12,000 feet elevation.

Just south of the Rio Tepalcatepec is the great Sierra Madre del Sur, a mountain range about seventy-five miles wide, which runs along the Pacific coast. Northward of Cerro Tancítaro is a great, wide area of confused mountain masses that lie southward of the vast triangular-shaped inland plateau, or mesa central, which occupies the whole central inland region of Mexico (see map). Cerro Tancítaro is an outlier of the mountains bordering the plateau, and is at the western end of a short, apparently isolated range running east and west for twenty miles or more. The mountains of this area are a part of the row of recent volcanoes that run along the nineteenth parallel from Colima eastward to Mexico City and which comprise one of the most actively volcanic regions on the continent.

The locale of this transect is within one of the most poorly mapped regions of Mexico. While fairly workable and somewhat accurate maps exist for many parts of Mexico, apparently none have been constructed for this section of the state of Michoacan.

The biotic and climatic characteristics of this transect are rather simply outlined as follows and are illustrated by the chart:

Rio Tep.
A. Hoogstraal
2

I Tierra Caliente (Hot Land) Rio Tepalcatepec to Apatzingan to the lower slope of the Tancitaro Plateau at Acahuato (1000 to 3000 ft.)
- A Tropical Deciduous Forest
- B Arid and Semi-arid Thorn Forest (semi-desert scrub)
- C Open Semi-desert with Scattered Trees (1200 to 3000 ft., only)

II Tierra Templada (Temperate Land) The Tancítaro Plateau from Acahuato to Tancítaro and beyond to an elevation of 9000 feet on the slopes of Cerro Tancítaro.
- A Pine Forest types
  - 1 Open Pine Forest - strongly transitional (3000 to 4000 ft.)
  - 2 Open Pine Forest - almost purely temperate (4000 to 7000 ft.)
  - 3 Pine-Oak Forest (circa 6000 ft.)
  - 4 Pine-Alder-Fir Forest (6000 to (?) 10,000 ft.)
- B Cloud Forest (in whide, humid ravine)
  - 1 Pine-Alder-Fir Forest (7000 to 8200 ft.)
  - 2 Fir Forest (8200 to 9500 ft.)

III Tierra Frio (Cold Land) upper slopes of Cerro Tancítaro (9000 to 11,800 ft.)
- A Open Pine Forest whith High Clump Grass (10,000 to 11,800 ft.)
- B Sub-alpine Forest (limited to ridges between 10,000 ft. and (including) the peak ridge at 11,800 ft.)

The tierra caliente is, for the most part, a wide, arid valley with an elevation of about 1200 ft. The weather is warm the year around (above 75° F. annual average temperature). There is some rain during the summer months, but it quickly drains and has relatively little value for agriculture, most of which is accomplished by irrigation. Nowhereis there a humid tropical jungle, but along the Rio Tepalcatepec, at the spring of La Majada, around the swamps of Hacienda California, and often bordering permanent and semi-permanent streams, the Tropical Deciduous Forest is well developed. Leguminous and other thorn-studded trees from the more arid semi-desert are always present in these forests. Tall, columnar cacti are often

Rio Tep. ..
H. Haagstraal

present, especially along the Rio Tepalcatepec, and there too are many vine-like climbing cacti, as well as great, hanging vines and impenetrable undergrowth that reminds one of its close affinities with the tropical jungle. The deciduous forests away from the river are more arid in general aspect, their undergrowth is not so luxuriant, and tall fig trees (Ficus) are usually dominant.

The Thorn Forest or Semi-desert Scrub ranges, depending on aridity from open plains with scattered thorn trees and few, if any, herbs, to dense stands of thorny trees with more or less herbage and shrubage. These dense stands often grade into the tropical deciduous forest near water. The general height of the trees throughout is from eight to twenty feet, and the most common genera are the leguminous Acacia, Mimosa, and Caesalpina.

Just north of Apatzingan, the slope up to the Tancítaro Plateau begins, and here, in a strip of apparently even greater aridity, is a semi-desert with very widely scattered trees, of which many genera are non-leguminous. It is, of course, closely related to the semi-desert scrub, mentioned above, but is distinctive enough to be classified separately. The semi-desert scrub intergrades with it locally throughout its range.

The outline of the Tancítaro Plateau is roughly indicated on the chart. In many places it is broken by ridges of volcanic rocks, more or less covered by vegetation, depending on their height, age, and distance between individual rocks. The vegetation in these volcanic pedregals is usually entirely undisturbed by man because of their formidable topography, and is usually rather specialized.

Rio Tep.
Hi Hoogstraal

The climate on the plateau is cool the year around with the hottest period in late April and in May and the coldest in December and January, when there may be very light snows. In June and July and early August of 1941 the thermometer once indicated a high temperatue of 73° F. but all other temperatures during the daytime were between 59° F. and 68° F., and from 57° F. to 61° F. during the night. Rain falls almost daily in the rainy season between June and Mid-October, often with great force and volume. The rains in the mountain and at the northern end of the plateau, around Tancítaro, are extremely heavy, and this region too is much cloudier than the southern part of the plateau.

Pine (Pinus <u>montezumae</u> and/or P. <u>montezumae</u>) forest covers the plateau. Between 8000 and 9000 feet, on the fairly steep slope, the herb and shrub layers are strongly transitional between characteristicly tropical and characteristicly temperate forms of plants and insects, and here the tropical ground squirrel <u>Citellus adocetus</u> reaches the upper limit of its range. Some of the plants and insects seem to have extended their ranges into this strip, either from above or below, and few <u>tierra caliente</u> forms extend above it while <u>tierra templada</u> forms extend below it. Other forms appear to be closely confined to this zone. While we have not yet given this transitional zone its proper amount of attention, its herb and shrub layers are probably the richest in animal and plant life of any in the transect.

Rio Tep.
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In places of altitudes equal to those of the plateau but some miles removed from our area, oak is quite frequent in the pine forest, but here Pine-Oak Forest is found only near Tancitaro.

Above 4000 feet the herb layer of the pine forest is usually fairly fruitful, but there is seldom any shrub layer. Along fields, paths, and other forest edges, beside and in canyons, and in cleared places, of course, there is a much-varied flora and fauna. Suffice it to say here that this flora and fauna is almost wholly temperate (Nearctic) in aspect. Trees to be found in one place or another are oak, willow, linden, haw, ash, and alder, besides madrono (Arbutus). Shrubs of the genera Viburnum, Caenothus, Solanum, Tournefortia, Lythrum, Cornus, Lobelia, Salvia, Arctostaphyllos, and Cassia are common. Herbs of the genera Piqueria, Drymaria, Cuphea, Borreria, Euphorbia, Ranuculus, Thallictrum, Verbena, Physalis, Plantago, Oxalis, Sisyrinchium, Hypoxis, Cynoglossum, Phaseolus, Crotalaria, and many other legumes are common.

Willow

North of Tancítaro, a quiet little town of some 3000 people, at least forty miles from any auto road, the ascent of Cerro Tancítaro begins. On exposed ridges from here to the peak, open pine forest is characteristic. In the valleys and protected slopes (which are as extensive as the ridges) the first forest we reach is a Pine-Alder-Fir Forest with rather heavy, though not impenetrable undergrowth. The extreme ruggedness of the mountain hindered us from determining the extent of this forest up to the present time, but it can be said that another Pine-Alder -Fir Forest does occur in valleys at 10,000 feet altitude

'Rio Top.
H. Hoogdyaal

and downwards, but that the upper forest is composed of different species and/or varieties, and that the undergrowth of the upper type is mostly clump grass.

The cloud forest through which we make our way up the mountain from 7200 feet to 9500 feet is a wet, cool jungle-like forest of closely growing trees and an extremely heavy growth of epiphytic bryophytes, pteridophytes, and lichens. From 7000 feet to 8200 feet, pine, alder, and fir are the dominant trees. The herb and shrub layers are varied and dense. But above 8200 feet and until the valley ends at 9500 feet very close stands of fir (Abies religiosa) constitute the cloud forest, the herb and shrub layers are sparser, and vines are more frequently noticed. Insects are particularly rare in these forests.

The upper slope of Cerro Tancitaro is certainly colder than the lower, but apparently receives somewhat less rainfall. In June and July the temperature at 10,500 feet varies from 40° F. to 65° F. Above 10,000 feet there are almost no alder or fir, and only pine (Pinus montezumae var. rudis), except for very rare individuals of juniper (Juniperus mexicanus) on exposed ridges, constitutes the arboreal fauna. The ground is very thickly covered by high, tough clump grass of which Calamogrostis orizabae is the most common species. In some places are many little colorful herbs, but the lupine (Lupinus persistens) is the most common, either as scattered plants or in large, dense clumps which force out all other vegetation. The trees are very widely scattered, and many have been struck by lightning and burned. Mistletoe (Arceuthobium vaginatum) is common on the pines up to 10,000 feet, but is sharply limited there and not found above.

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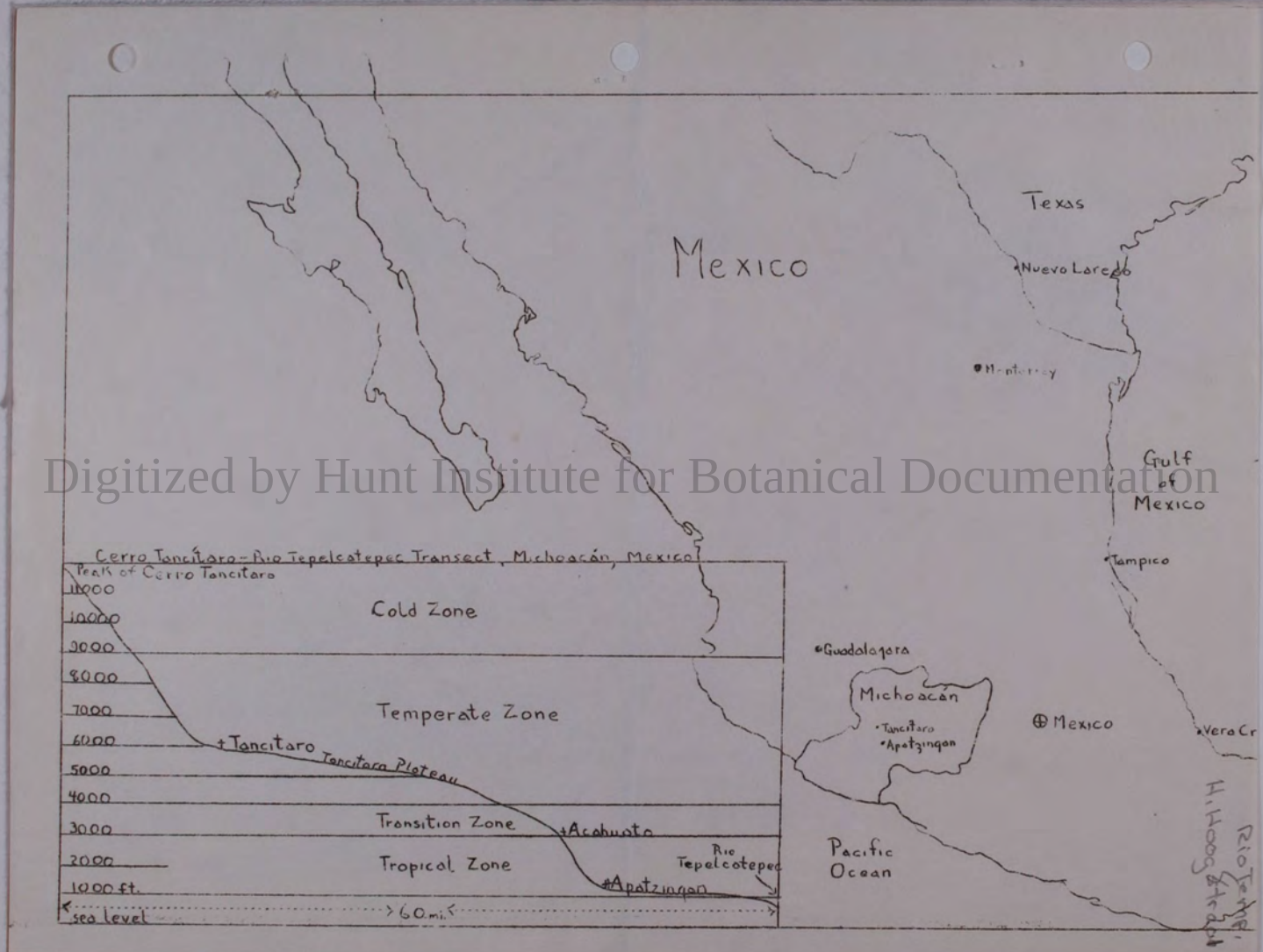
As we walk down the mountain, trees become more closely spaced, fir (Abies religiosa) and alder (Alnus arguta) come in at 10,000 feet, and there too the shrub layer starts to appear. The exact continuity of this Pine-Alder-Fir Forest we do not yet know.

Real subalpine forest is almost non-existant on Cerro Tancitaro. On the peak (11,800 feet) and on certain slightly lower exposed ridges, however, the trees have a stunted and gnarled appearance like those of other subalpine forests in Mexico. In these places, too, a special herb fauna is found.



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H. Hoogstraal

them with the States from which Schneider had seen specimens when he published on the willows of Mexico and southward in 1913.

Of the species in this list, Nos. 1 and 2, S. Hartwegii and S. Mexicana, are related to S. lasiolepis. Indeed, the former may not be specifically distinct from it, but the latter has serrate leaves.

Nos. 3 to 8 include four supposed species and two varieties. They belong to a group probably little known outside of central Mexico. In general they have large leaves somewhat resembling those of S. discolor of the eastern United States, Some of them being hairy and some glabrous. Some of them also have hairy fruits and some glabrous. We desperately need more material of these with records of elevation at which found.

Finally there is No. 9, S. cana, an almost unknown plant from the highest elevations and having exceedingly small leaves, apparently collected only on Mt. Orizaba.

I thank you for the information that your collections are in the Field Museum. I drop in there from time to time and certainly will study all their material before monographing. Should you find any duplicates now or later I will be very glad indeed to have them, of course, and will be quite willing to pay you for them.

Cordially yours,

Carleton R. Ball,
Executive Secretary

April 10, 1942

Professor Harry Hoogstraal,
Department of Entomology,
Entomology Building,
University of Illinois,
Urbana, Illinois.

Dear Professor Hoogstraal:

Recently I received from you the mimeographed paper discussing the physical conditions and flora of a Transect of Michoacan, Mexico. This looks to me like a very interesting paper representing some very good work and certainly it is exceedingly helpful to those who have not travelled in the area under discussion.

In your discussion of the Temperate Zone, I note that you mention the occurrence of a willow and from your letter of January 7, I find that you collected Salix bonplandiana at Tancitaro. This locality lies within the range of S. jaliscana Jones. This species differs from S. bonplandiana in having the vegetative organs quite hairy and the fruits hairy, at least while young. Later I shall get your material from the Field Museum, but now I have no time for such studies.

Thanking you for the paper, I am

Cordially yours,

Carleton R. Ball,
Executive Secretary