1947 Cinchona Expedition
(27169-27658)

UNITED STATES
Illinois, Wabash River (from B&O train) ... 1-2
Texas (from Miss. Pac. train) .... 2-3

MEXICO
Monte Rey, Saltillo, Vanegas ... 5-12
Mexico City, n. of Mexico City ... 13-15
Mexico City-Uruapan rail trip ... 16-19
Uruapan ... 20-21
Parachico ... 22
Trip Uruapan-Volcan (by car) ... 22-26
Uruapan-Mexico " " ... 27
Mexico City-Vera Cruz (by rail) ... 28-29
Vera Cruz-Suchiate (by rail) ... 30-35
n. w. Andres ... 36-37

GUATEMALA
Finca El Naranjo ... 27169-27208 ... 40-49
Los Andes, Finca Panama ... 27209-27228 ... 48-55
Guatemala City ... 27229-27281 ... 54-55, 64-65
Concepcion, below ... 27230-27258 ... 56-61

HONDURAS ... 66-67

COSTA RICA
Quebrada la Tonta ... 27282-27289 ... 68-71
Santa Cruz ... 27290-27291 ... 70-71
Paraiso ... n. and n. e. of ... 27292-27299 ... 72-75
Cerro Buena Vista ... 27300-27334 ... 74-83
Trinidad-Inst. Interam. de Agriculture
5 km s. w. ... 27335 ... 82-83
btw Volcan Barbac-Volcan Poas ... 27336-27338 ... 82-83

COSTA RICA (continued)
Isla Bonita ... 27339-27347 ... 84-87, 90
Finca Los Ensayos ... 27348-27350 ... 86-87
(B. Vista) ... 27351-27352 ... 88-89
San Ramon, s. of ... 27353-27362 ... 92-95
Turrialba, Inst. Interam. de Agriculture ... 27363-27366 ... 94-95

PANAMA
David ... 27367-27388 ... 96-102
btw Gamboa-Summit ... 27389-27390 ... 104-105
Chiva Chiva Rd (C. Zone) ... 27391-27392 ... 104-105
Madden Rd (Summit " " ) ... 27393-27394 ... 104-105

COLOMBIA
Cartago ... 27395-27401 ... 106-107
Saladito (San Antonio) ... 27402-27405 ... 106-109
La Elsa ... 27406-27407-27411 ... 108-117
Calli-Ipiales flight ... 116-117

ECUADOR
El Voladero ... 27442-27445 ... 118-119
above El Angel (Chavallan) ... 27446-27450 ... 118-121
Rio Papallacta valley
n. of Volcan Antisana ... 122-123
below Cuyuja ... 27451-27507 ... 126-137
Rio Chalpi ... 27543-27544 ... 146-147
below Papallacta ... 27545-27550 ... 146-149
Papallacta ... 27551-27557 ... 148-151
Laguna Papallacta ... 27558-27595 ... 150-157
Rio Papallacta-" " ... 27626 ... 164
Cuyuja ... 27451-27460 ... 124-127
Paso de Guamaní ... 27508-27542 ... 136-145
Quito ... 27596-27625 ... 158-164
Santa Rosa ... 29632-29632 ... 168-169
Machachi r. r. station ... 29633-29634 ... 168-169
Chuqui ... 27636-27637 ... 168-173
rail trip s. of Quito ... 170-171
Dauli ... 27638-27640 ... 172-173
Lasso ... 27641 ... 172-173
Riohamba ... 27642-27649 ... 174-175
Palmyra ... 27650 ... 178-179
Tixan ... 27651 ... 178-179
Sibambe ... 27652-27656 ... 178-181
Olimpo ... 27657-27658 ... 180-181
Guayaquil ... 180-181
Puerto Bolivar, Machala, Santa Rosa, Arenillas ... 182-183
Items on AGS map 1:100,000 to be checked.

On NC 16 + 17 are two provinces in Costa Rica both called Puntarenas.

On NC 16 the boundary bet. Prov. Heredia and Prov. Alajuela as it crosses saddle bet. Volcan Paz y U. Barba is marked as a straight n.r.s. line but is said actually to follow road.

On NC 17 Cerro Cambutal is 4750 feet.

Cerro Tute should be Cerro Tute.

Cerro Gaitan peaks around El Valle run up to 1200 m.
- No plant for Mexico.  See 27148 (19) and book 212.

- Guatemala, Belmopan.

- Collect about noon, more (see each below) on parallel course.  27216 p. 52k8.  From Guatemala.

- Study with 27295 (p. 706, 19) and complete checklist.

- Panama, p. 184.  
- Collected p. 108.  
- Ecuador p. 119.  120.  121.

- Ecuador p. 119.  120.  121.  122.  124.  OK

- What are and L in book 20?  
- How many plants returned in 1957 22?

- Where are Guasco flanks (see book 20, 21)?

- Note L, what does Cen (30 p. 4) stand for?

- Blank f. 27694.  ?
  27673 x 1.
  27754 x 3.

- 27789 x 1.

- 27732 x 1.

- 2774 x 1.
Feb. 21

F-5 wrong? indeed 1128
Watts for 2832 28409 28458 924 handheld were printed wrong
29712 287363 more dirty
all were dirty, models unclear.

Feb. 22
OK w.r. Grant
F. R. Fosberg
Collection book #19
Nos. 27168 - 27658

Collecting nos.
27168 - 27658

Miniature
Account Book
No. S 136
UNIT RULED
Journal
Cash Book
Record (29 Lines)
Ledger, Double Entry
Ledger, Single Entry
Made in 200 and 300 Pages

TO REORDER, SPECIFY NUMBER,
RULING AND THICKNESS INDICATED
ON BACKBONE OF THIS BOOK.

If found, please mail
F. R. Fosberg, ½ E. P. Killips,
Smithsonian Institution,
Washington, D.C.

or nearest U.S. Consulate
or Embassy.
1947 Cincinnati Expedition

Left Washington at 3:00 PM.
March 21 via B & O.

Illinois 1947

March 22 - crossing southern Illinois via B & O.
B & O. bet. Vincennes & Evansville
(from letter to the Evans)

"Just a little while ago we crossed the Wabash River. It is quite a majestic stream this far down. And the really are squamores. Here the country is rather flat, with corn-fields, but not too flat or too continuous corn-fields. There are patches of woods, wooded bottoms, and wooded knobs - all deciduous woods here. Back in Ohio and Indiana we scattered junipers and even pines. Surprisingly, though it is sunny and warm there is no sign of spring yet. Not a leaf has appeared, nor a flower. Last year when I came across there about a week later red-buds and
many other things were in full bloom. This year is really late. It is queer to see such sunlight on such a completely leafless landscape (except for dry oak and beech leaves still persisting). The fields of Andropogon add a touch of rich pinkish tan here and there. Big oaks are scattered in the fields. Thickets are scattered along the fences and in depressions. Some parts of the middle West might be quite pleasant to live in.

March 23 - Missouri Pacific line from St. Louis to San Antonio. Before reaching Palestine is a red soil country dominated by pinestumps. Deciduous trees down this far show little or no signs of spring except noticeable swelling of buds. South of Palestine almost immediately spring was evident. Trees were beginning to leaf out. Several wild-flowers were in bloom. Near Taylor, northeast of Austin, forests of oaks, largely evergreen oaks, but mixed with deciduous, and junipers became very evident. Tillandsia festoons occasional trees. This continued to Austin. Melia azedarach is common.
along roads and near houses. Carcis is occasional and in full bloom. Prunus americana (?) is common in the thickest.

Crossed Rio Grande to Nuevo Laredo just before midnight Mar. 23.

Mar. 24 - near Monterey flats and valley floors are covered by a scruffy than forest with much Prosopis glandulosa, Acacia farnesiana, Eucalyptus (?), Ceanothus (?) (large, dense tree with white fls.), Yucca (an abundant form with rather long drooping inflorescences), Opuntia phaeacantha var. clavata, and various other things, Agave americana. The mountains are of sedimentary beds, often very much tilted, bare, dry, with a thin desert vegetation. No coniferous or mesophytic vegetation seen from train.

Some parts of the valley floor above Monterey, badly eaten by large herds of goats. Nunneinani mexicanus local in valley floor near our track swell
above Monterey.

Near it a small rising up valley from Mono City extensive fields of Larrea in the several operations space. Several larrea plus or minus 10 feet high, indicating again up.

About this the valley narrows abruptly and goes thru a small canyon with a steam, salis, etc. Then opens out into extensive desert flats again.

With even slight increase in elevation the composition changes rapidly around settlements.

Eucalyptus, Casuarina, Tamarix, Nicotiana glauca. Various additional cacti (Cylindropuntia, Echinocereus, etc.) come in with altitude, as do many other shrubs.

At the foot of the mountains cacti are abundant as the whole landscape is a veritable cactus garden.

Further up, the canyon bottoms are cultivated gardens and patches of grain. The canyon walls are in places as covered by a small again, as looks from a distance like grass. Still further up, the canyon bottom is filled with salis along a small stream.

Around Saltills the flat valley bottoms are cultivated. Populus is the characteristic tree.

In Saltills Casuarina, Cupressus, (15 ft.), Ficus carica, Fraxinus, and various other things are cultivated. The Casuarinae are all dead after reaching 1-1/2 dm. diam.

Above Saltills are vineyards, also walnut groves, but also much...
overgrazed and eroded land. Some lake bed formation very seriously cut into straight-sided barrancas. Sticks are not abundant because so little is left to eat.

Barley is sown in flat places where irrigation is possible.

Some miles above are extensive flats with Lisanca, great patches of the same tiny Agave, and unbranched adolescent yucca 15 feet tall. Quite a few cacti, a number of cacti in fact, as Century Cactus with bright red spines. One oasis of Populus and irrigated fields toward the head of this.

Above this the vegetation changes as the river goes up a narrow valley to Camarones. Nolina, Juniperus, Berberis and Ephedra become common. The small agave and yucca are still dominant. Cacti abundant and of various kinds. Nolina at some spots dominates. Above this the valley broadens again into a lake bed then narrows among rounded hills. Some cultivation here and there, but too little water. Not obvious at this season what is being grown. The yucca almost universally have the leaves cut off— the ideal plant or half. No evidence as to what does it, but almost universal. At one place people were seen harvesting leaves of the small agave, but not apparent what for.
Above this on the slope around another large lake bed, in Larena. Yucca, Noting Chuntita grass vegetation another large spray of Echinocactus ribes quercus seen, along with the red spined creositoone as seen before. Here also a low matted straw spined Chuntita common. Another rather short but brood-leaved Agave here.

Further along the R. across a large lake bed. The slopes are dominantly Larena, but the flat is dominated by a large Chuntita like Q. Indefinita, also spiny into the Larena surrounding this.

On the plateau are enormous flats of Larena here and there dominated by pines of branchling arborescent Yuccas. No noticeable admixture of Flomencia. Depression here and there with different vegetation but not close enough to see what it is. General vegetation composition very simple here. Higher parts with a tall cylinder Chuntita common.

South of Variegae yet is a extensive flat of mixed Atriplices and Larena. Further south, in more less the same sort of country Echinus molle is scattered over the flats. It is not apparent whether or not it is native, as not far away at Catere it also grows around houses.

South of Wadley Sta. The W. slope of the mts. to the east appears covered by pines, grass, and too far away to be sure.
Not far north of San Luis Potosí a dense candalabra-like Cereus become common. Various Opuntias and locally Agave are co-dominant with Cereus. Locally Prosopis is dominant or even exclusive.

Just a little further on a Cereus (strophoecus?) becomes common, but especially around villages where it is used as a living fence.

Mar. 25 - from 100 to 40 km. n. of Mexico City. Plateau land with gray soil. Plantations of perhaps 1/4 of gray agave. Flat is usually cultivated. Dehina molle is perhaps the most common tree - growing spontaneously everywhere - many large cedrel trees. Prosopis also common - flowering abundantly. Opuntia of magacantha type also abundant.

In villages Eucalyptus, Cupressus (gray et.), Salix etc. common, as well as Dehina, Prosopis, Opuntia etc. Populus.

About 100 km. n. The slopes are covered abundantly with a candalabra-like Cereus.

As Mexico City is approached the flat is more and more cultivated, villages.
more common.
The slopes are very
universally over-gazed.
The surface layers of
soil are long since gone.
At this season the grass is
very dry and eaten to
the ground.
Close to Mexico, the
Agave plantations even
climb the slopes.

Plants cultivated in
parks, gardens, along
streets, etc.

Trachinus sp. dominant
Washingtonia filifera
Liquistium (evergreen)
Phoenix dactylifera
Chamaerops
Plumbago auriculata
Punica granatum
Nerium oleander indica
Cupressus globulus
Eucalyptus sp.
Cedrus libani
Dracaena draco
Cupressus sempervirens
Cupressus funwamiana
Chamaerops sp.
Prunus armeniaca
Bellis perennis (in lawn)
Sclerurus molle
Nedera helix
Pelargonium (ivy geranium)
Jasminum (yellow)
Bougainvillea glabra
Cotoneaster pannosus
March 23 - Trip by rail from Mexico to Toluca. (Casual observations from train window).

At Doz. Rivas (2,645 m.) the forest is Pinus radiata, above this Cupressus, and

inimportant and even
dominant.

Farming here is carried out on steep slopes, and

is good contour farming, semi-terraced, with

continuous aprons.

A high meadow

is at Talamanca, surrounded.

by forest-trees, to the north, south,

and west.

From here on the country

is a series of lake beds, probably of volcanic

ash, with mountains, largely dead volcanic cones, between them.

The railroad goes from

me to another of these. The

largest is that where

Toluca is located.

They are much like

the Habana de Bogotá in

Colombia. They are

essentially open either

pastured or cultivated,

where pasture is usually

seriously overgrazed,

sometimes even miniature

cad lands. Topography.

Along shallow streams

with water on wet

ground, Salix sp. is

common along these

and around villages.

Below Tepetlano the valley

becomes rocky (lava), and

Opuntia (cactus) sp. becomes dominant, with

a small red flat. Everything

like L. herbaria, conspicuous.

Maravatia (2017 ft.) is

in another great lake bed

this one open and cultivated.

Below Maravatia the plain

becomes dry and supports

a sparse woodland of

Acacia, Prosopis, Opuntia

(End of roll #1, 6x6. Panatomic)
Below Acambay there is a sparse woodland of xerophytes, especially Opuntia, and another unidentified cacti tree, Bursera sp., or Prosopis.

From here on there is a curious habit of storing fodder in Prosopis trees, probably to keep it out of reach of animals.

At Huinos is Laguna de Cuatitlán, a large lake surrounded in most part by broad Distichlis flats or Leccinum lacustre (slough) flats, then by luxuriant Prosopis forest on the flats. The sort looks albacore, with white deposits in the cultivated parts. The leccinum was being harvested.

From above Queré to well below Chivos the flat meandering valley bottom is quite luxuriant. Plants are cult., and along streams and sloughs Taxodium and Salix, as well as Cedrinas, Tránsitos, etc. are common. The Taxodium is especially along the water, and is beautifully covered by Tillandia undulata. The appearance is quite like S.E. U.S. No dances were seen from train. At Chivos were a couple of trees of Salvif. of a narrow Almanor form, as S. chilensis in S.E.

Below Morelia are dry volcanic hills, grassy and over-grazed, with brushy canyons that look as though the flora might be interesting.

Below this, the rocky slopes and low hills are lined with by Typhaeae, Opuntia, & an unident. tree.

The valley floor is very green. Below, oak forest gradually gives. Beyond fatuajes are pine-slash or pine forest, very nice, tal forest with little undergrowth. Dead volcanoes are numerous.

The season is very dry everywhere, and dusty.
March 29. - Uruapan and vicinity. Surrounding Uruapan is a volcanic plateau, varying from 1,600 to 1,800 m. alt., liberally sprinkled with small extinct cones. The river Cuapaú is arisen in a large spring, practically within the city, called Rodolfo del Diablo from a mark like a knee print in the rock. It has cut a large canyon to a depth of 150-160 m. in the plateau. The river is a beautiful abundant stream of water, fed by springs all along.

Canyon below for waterfall.

Several miles below the city is a beautiful waterfall, called Salto de la Garita. From the top of the main river, the amphitheater formed by it is surrounded at the head by a curtain of small falls from a stratum which produces water. The plateau is mainly an open forest of at least 7 sp. of Pinus (one looking like P. palustris, the other plumose and shade needle). The canyon walls are covered by oak forests mixed with other things. The country is very dry at this season. The rains are said to begin in May, spreading great mats of foliage.
March 29 - Parachico
This town does a great deal of wood-work turnings, etc. The wood used is an Arbutus (called Madrono) which is common in the pine forests between and Uruapan. The wood, in short logs about 4 dm. long, is boiled in water before turning as it won’t crack. It is dull finishing and takes a good polish.

The trip from Uruapan to Whan Parantica takes about 1½ hours by car. First part over paved highway, then a rather poor branch dirt road. The general vegetation is pine forest with clearings and meadows here and there. The country is dotted with extinct cones. After a time (just before "las lomas") large areas of ash appear. Even near Uruapan there is a thin blue-gray coating of ash all over the ground. But here it is so thick that on the flat places it has killed all herbaceous vegetation. The limes and such shrubs as oaks, criataques, lencios, etc. are not evidently injured. From here on ash becomes more abundant.

The Zapotec taxi driver (Juan Ruiz — good man, speaks English, educated in Nogales, Ariz., with "titicanta phrases," Parantica) told me that the Tarascan Indians had planted wheat and maize in this ash, with curious results. The maize grew, but produced no ears. The wheat yielded more than a normal crop.

The road ends near the edge of an extensive lava flow, several miles...
from the volcanos. This flow covers a great extent of territory, and destroyed several villages, Panza, car, and Santa Rosa. The church tower of the latter sticks up in the middle of the flow. About 4,000 people were made homeless and some killed. All of the lava seen is aa; the moving flow seen at about 0.5 miles from the cone moved imperceptibly, the evidence being a continual breaking of the road at the edge, crumbling off, the heat in the vicinity, and many glowing places at night. The flows seem to come from the base or even somewhat away from the base of the cone. On the north and west sides, at least the vicinity of the cone is completely covered by the flows. Several hills in their path have had their trees killed, the completeness varying with distance from the cone. These hills are deeply covered with ash, which may be what killed the trees. The last plants to disappear are cacti, cecnis, and a large bunch grass—in the order named—the grass persists on some slopes away from the cone or closer than anything else. The skeletons of the trees are everywhere where the ground is not covered by lava. At a distance from the cone, trees are still alive quite close to the edge of the flows. There is complete devastation over an area of a number of square miles. The lava seems, on an average 6 m. or more deep, and
it is hard to tell how deep the ash is, but in one place a gully was cut about 1.5 m. into it. The volcanos send forth continual explosions with great clouds of ash; occasional showers of rocks which either fall back into the crater or roll down the slopes of the cone. The variation in intensity is marked, but ash seems to be continually sent forth. How much continuous energy and such enormous quantities of material can be emitted over such a period of time is not evident. At the present time the cone is comparable in size with about the average of those around about. It is not emptying as intensely as formerly, but there is still plenty of activity.

Mar. 31. Trip by highway from Uruapan to Mexico. Crosses four main high ridges, to the south of the railroad. One is just above Uruapan. Here the forest is pines, and in another north and focuses, with pines dominant. Bet. Morelia and C. Hidalgo is a great highland, with pines and pines. The general dryness is less marked here, and many things are in flower. Puebla, Tehuacán, etc., this would not play a role. The highly arid west of the Tolucan Plain is similar but not so high as luxuriantly forested, at least where the road crosses it. The me just west of Mexico has extensive fir forests, almost pure.
1947 - Mexico

March 14th - Trip by rail (Ferrocarriles Mexicanos) from Mexico City to Vera Cruz. This route gives a fine transit of eastern Mexico.

North of Mexico City, the fact that El Valle de México is an old lake bed is obvious. Here is an extensive marshy area, with ditches and roots of willows. Then is an enormous flat area devoted to Mayagua culture. Enormous breaches in this flat and now slightly upon the base of the nearby volcano. After a while, some of the land is open, but still large areas are devoted to guadua production.

Near the edge of the plateau, before Cimarrones, are pine and forests, rather sparse.

Going on the edge beyond Cimarrones, the m. exhibits along first below the

Top of the rim, through a moist region of bushy mingled forest, with pines with peculiarly drooping needles, great number of things in bloom. As lower altitudes are reached, the region becomes dry, until the bottom of a large valley at middle altitudes, is quite dry at this season with little vegetation. Then another expanse is reached, and the vegetation is a tropical one. Sugar cane is important at the base. From here the plain extends to the sea. The moist sugar cane region gradually changes to thin forest or naked green forest. It is mostly bare now. A tree Mopaled is found here.
April 7 - Isla Mujeres, P.R.

from Vera Cruz to Acapulco.

At Vera Cruz are sand dunes, then low-lying brushy land that is rather moist water table close to the surface. This soon turns to palm savanna, or palm thicket. Several palms seem very common, incl. a tall royal. Bocconia sp. common.

With only slight increase in alt. palms become scarcer and a "rainy-grain" forest, largely of Lagunaria or Introdolobium, Punicaria, etc., broken by cult. Patches are dominant. It seems about half-leaved cacti.

The abundance of species of palms varies. There are also large stretches of grassland on savanna, where are some woods. From the number of burned patches I suspect this is maintained by fire. It does not seem overgrown. In place palm thicket dominate.

After Guayabo the country becomes a true palm savanna, on high dry ground. dominated by a tall royal. There are some other trees & shrubs, mostly legume. The grass is dry. There are epiphytic Corpse (or Cryptophyllum) in the palms.

(See photos, and of Leptochilum sp.)

(some near Piedras Negras)

(several photos of palm savanna, etc. Bocconia Negras & Maderas, several of cacti & of Introdolobium at Piedras Negras.

After about Joaquin, the palm savanna gives way to a dry forest, in places largely of Introdolobium, with palms scattered, in places abundant, but with many other things.
Occasional sloughs are covered with lillies, etc.

As we approach Tiera Blanca the forest becomes greener and more luxuriant along streams it is well developed and of large trees.

After Tiera Blanca this forest, though dense, becomes very rotten by clearings and burns. Burning seems to be common practice.

After Poalco from the forest develops into a thick jungle - probably second growth, tangled with vines and shrubs. Much is cleared.

Near Tiera Bonita are fields of pineapple, mostly with maize growing in them.

A large river bottom just off Tiera Blanca. Rocked bottomland, much of it cleared and grown to brush, but large trees along the river and in the uncleared parts. Winding sloughs, white herons. Much of the brush seems to be papyrus.

Beyond Aguateca is broken forest - large trees in patches - the open country between having been burned but mostly not recently, and dominated by a curious edge - a feeling of ecological with a dense brown gramine. Some of the trees look like salar but the altimeters only say 200 ft.

Beyond Aguateca is tall jungle, very dense in places, and largely palmae thicker than anything so far, with enough canopy where it has not been disturbed to make the undergrowth thin.
Around Isla is a vast open plain, partly dominated by the sedges mentioned above, part planted to well kept pineapple fields. The pineapple plants ramp in color from bright blue-gray to reddish yellow, the fields being more or less uniform. There are ponds here and there, with white herons. Southward it gets more and more bushy, but in patches. Uncultivated orais have certainly been burned, probably often.

April 3 - Got. Arrived and
Tomala, on the Gulf of Tehuantepec. The coastal lowlands are covered with dry forest, largely Bursera. Much is cleared and cultivated.

At Tomala more fruit is to be seen for sale along
Mar. 3 8 a.m. Mr. and Mrs. Andrews, Cet. Tonalá & Pijijiapan, Chiapas, weeds in thickets along railroad in dry forests.

The lowlands gradually become moister toward the southeast, the forest more luxuriant, until beyond Pijijiapan it becomes swampy, with stretches of open marsh filled with Panicum, and pools with Pistia, inhabited by great flocks of white (and darker) herons. Triplaris is an important tree, except in wet places.

The area looks more prosperous. The people healthier and happier. Much fruit offered for sale.

Chicago

vine flowers large, purplish within, white without (seed sample)

Back of these lowlands is a range of rather high and definitely interesting-looking mountains. They vary in distance from the coast, from quite close to 15 mi. or more and arise from the coastal plain abruptly.

As we get toward Mazapa the trees get larger, some firs being positively immense when the forest is not dense. Gradually a tall lowland forest, with Tabebuia, Cecropia, Bursera, Ficus, etc. crested with vines and vines, develops. It is not a rain forest but is definitely a jungle.
1947 - Mexico

Between Mapastepec and Tapachula bananas are grown commercially for shipment by rail.

Castilla rubber trees are occasional and have been tapped.

Xanthoxylon, looking much like the Pacific one, but becoming caule蠢tent is common. Leaf shape is extremely variable, incl. basal lobes.

Great areas of clear swamp with Heliconia and the silver-leaved marantaceae.

In Tapachula is a Piper with oblong leaves and erect spikes, a tree with trunk 15 cm. diam. common along streets, though probably not actually cultivated.

1947 Guatemala

April 6 - Finca El Naranjo, south slopes of Volcan Santa Clara, 12 A.M.

S.W. of Lago de Atitlan,

Dept. de Chuchitepeque
90°19' W. 14°30' N. 1170-1250 m.

Steep slopes here have been cleared for planting of Cinchona. The forest was evidently once quite thick. The soil is good and the drainage good.

In a small patch of young Cinchona were observed a colonial spider, a tremendous mass of webs strung between and enveloping the trees, with thousands of spiders of all sizes. Specimens were collected.

A scale is rather common on the underside of the leaves of Cinchona. It is a thin yellow one. The damage to the Cinchona is not conspicuous (specimen collected).
40 1947 Guatemala

27169 Salvia

cultivated about house as ornamental.

70 Polygala

weed in open grass around garden

71 Coryza

det. Plutocassia

weed in Cinchona plantation, open.

72 Cinchona

planted, not shaded

73 Psamphamus

common weed in Cinchona plantation, partial shade.

74 Cinchona

planted, not shaded

75 Bocaria laevis (Lam.) Giseb.

common weed in Cinchona plantation, partial shade

76 Richardia scabra

common weed in Cinchona plantation, partial shade

77 Camp

weed in Cinchona plantation, partial shade

Luchitsequez

dow rounded bush, calyxes deep crimson, corolla light crimson.

roots with wintergreen odor, flowers white.

heads yellowish.

small tree, 4 m. tall.

flowers leaf, dull, green with reddish midrib; flowers somewhat fragrant, cream-white, spreading, depressed clump.

small tree 5 m. tall.

leaves dull green, reddish on petiole, midrib + veins; flowers cream-white, somewhat fragrant

flowers white

spreading, flowers pinkish-white.

flowers yellow, heads gyrometric.
1947 Guatemala

27178 gram.

79 Centropogon sp. [in Cinchona plantation, shaded]

80 Centropogon sp. [in Cinchona plantation, shaded thinly]

31 Diastataea

82 Cinchona planted, not shaded

33 Euphorbia

84 Cinchona planted

85 Parmeum?

86 Begonia

87 Centradenia floribunda, Planch var. floribunda

Luchitepequez

creeping, forming a thin mat, panicle erect;
lactiferous, flowers bright crimson, anthers blue-black;
flowers white

fls. lavender

small tree 5 m. tall, leaves green; flowers white; glandular

small tree 4 m. tall, leaves sub-globose, midrib reddish;
tufts, culms spreading

flowers white

leaves purplish beneath, flowers rose colored.
1947 Guatemala

Apr. 7

37188 Cinchona pubescens var. succiniana
cultivated in sunny slope

39 Cinchona pubescens var.
cultivated in sunny slope

90 Cinchona calisaya
cult. in plantation, not shaded

91 Cinchona calisaya
cult. in plantation, not shaded

92 Antirrhinum litorale
race in bottom of gulch

93 Hoffmannia
occasional in brush in bottom
of gulch

94 Cinchona (hybrid)
planted, not shaded

95 Cinchona (hybrid)
planted, not shaded

Luchitepequez

stem scarcely 4 sets, scarcely plenty,
seedling 2 m. tall, sterile,
leaves green with red petiole
+ midrib, stipules exst.
from Ecuador

growing beside # 71787, not
as vigorous.

seedling 2.5 m. tall, leaves
green, glossy, veins strong,
red; stipules divergent
at tips, stiff. stem 4 sided.
from Costa Rica

growing beside # 77187, more vigorous.
small tree, 3 m. tall,
leaves dull, veins red.

small tree, 5 m. tall;
leaves somewhat
sub-glossy, veins reddish,
prostrate shrub 1 m.

long, flowers purple,
sparsely branched
straggling shrub; flowers
greenish, yellow.

small tree 4 m. tall,
leaves, dull, green.

Exp. Bl. & Z 93 G.

small tree, 4 m. tall; leave,
dull, green.

Exp. Bl. & Z 51 P1. *104247
1947 Guatemala

27194 Cinchona (hybrid calix succ.)
cult., not shaded

27200 Lophelia
common in openings on slopes, and along trails

27200 Dioscorea
twining on small cinchona tree at edge of planting

Apr. 8

02 Cinchona
cult., not shaded

03 Cinchona (hybrid)
cult., not shaded

Luchitespargus

small tree 5 m. tall, leaves, glossy, turning very red, panicles naked. Exs. fl. #H 2492-8

erect, fls. greenish
pendent.

erect

erect, sparsely branched, 1.5 m. tall, flowers orange-red.
vine, twining to right, fluminous, for almost entire length.

small tree 5 m. tall, leaves dull, said to be "succulent," but possibly not pure. Inflouorin with leaves when old.
tree 8 m. tall, fls. rather dull, dark green, flowers pale pink (rubescens type, with strongly recurved lobes), fragrant but unpleasantly so. Exs. fl. #N 168.
1947 Guatamala

27204 Canelona pubescen var succulenta, planted on commercial scale.

05 Farmington, along trail in canyon

06 Canelona (hybrid) cult. not shaded

07 Canelona (hybrid) cult. not shaded

08 Canelona cult. not shaded

Laxander, upper part

April 10 - Finca Panama, south base of Volcan Atitlan

Virgin rain forest, the lower part largely cleared for coffee plantations. The soil is largely a sand-like volcanic ash resulting from an eruption of Volcan Atitlan, about 1770. There is a strip of pine forest running from about middle altitude on the mountain down to about 1000 m. that is said to have come in on ash after the eruption. There is another pine on the Pacific slope in Guatemala and this is

Suchitepequez

small tree 5 m. tall, stalk, the typical "succulenta" of the plantations. Leaves dull, satiny above.

shrub 3 m. tall; flower green, fruit not mature.

small tree 4 m. tall, leaves green (typical of the "hybrid" that segregates out from "edgaria"

seed) NH 339

tree 6 m. tall, leaves green Z 51 G

sterile small tree 4 m. tall, leaves dull. The so-called "African succulenta"

Exp. H 7 662 (note few veins)
1947 Guatemala

said not to have been there before the eruption.
The slopes between 1200 and 1400 m are being cleared of their virgin forest of tall trees for Cinchona plantations.

In the afternoon was observed a remarkable congregation of the bird called the "ayaguana". These birds flew in principally from the south, for some little time, gathering in an enormous whirling column, many hundreds of feet high. This was said to be preparatory to departure for the north, and was said to occur always at the beginning of the rainy season. I did not see them go, but a few minutes later they were gone.

27209 Acalypha

in hedge near dwelling

10 Asplenium

on mossy rock in stream

and by splashing water

11 Polypody

tall wet forest being cleared

on tree trunks, rare

1230 m shrub 2.5 m tall

1250 m dark green.

1340 m pond, leathery
17. Polygodium
   epiphytic on tree trunk in

14

15. Antidema?

16. Finially
   parasitic on undetermined sterile tree in

17. epiphytic on tree trunk in

18. epiphytic in

19. Sloanea
   common

20. End
   epiphytic on branches of tall tree

21. Sloanea
   epiphytic on branches of tall tree

22. Persea
   common on branches of tall tree

23. Willia soumisp
   epiphytic in

Lucite Preguez

tre many m. tall, with a creamy latex that turns reddish, orange or orange to air.

stems stiff but weak

tree

fruit fleshy, red when ripe, longitudinally rugose.

dark green

leaf gray, brittle, coral red, flowers blue-violet.

clump, with abundant aerial roots, flower purple, red.

tree 25 m. tall, fruit red.

flowers whitish

flowers pale greenish, with reddish center.

prostrate, leaves fleshy,

nearly sterile

vine-like, sterile, sub-fleshy.
1947 Guatemala

in Cinchona plantation
Phyllanthus
open clearing

25 Drymarchonandra (L.) Wild.
on slope and ground under tree

24 Cinchona ledgeriana
27 Cinchona ledgeriana

28 Acalypha
weed in.

1380 m
Polygnum-like in appearance
diffuse; fls. white.
pedicles very sticky, even when in flower.
small tree 5 m. tall, fls. dull.
small tree 4 m. tall, leaves
dull, flowers white,

1250 m
crest shrub 1.5 m. tall,

17224

Am. 13 Guatemala City
Guatemala

29 Pinguicula
cult. in pan of water from
plant brought in from wild

Luchitepequez
1947 Guatemala

April 13 - below Mapacan Linda
headwaters of Rio Limula, 7 km, e.s.e.
San Jose Limula, 23 km, e.s.e. Guatemala.
Canyon bottom with rocky cliffs and brush along
stream margins
partly cultivated 1450 m

calliandra
steep, brushy, bank

1 27/30
open pebbly stream margin

31 euphorbia
open pebbly stream bank

32 richardia
open pebbly stream bank

34 / Rich Rendleii ?
common in thicket

35 quercus
in thicket, near stream

36 ferevexis thomasii Klotz. det. S. Castiglione
occasional in thicket near stream

37 burria laevis (fem.) querc.
occasional near stream

38 / Kuta.
in thicket near stream

39 ancentobium
parasitic on small pine tree

40 acalypha
thicket, near stream

shrub, stamens
red
flowers purple


glands white

prostrate, flowers white

shrub 3 m, tall, flowers
dried up, stipules disarticulate
small tree 6 m tall

ever herb 1-1.5 m, tall,
flowers yellow

flowers white

tree 6 m tall, flowers
pale green
yellow-green

unbranched
Triumphetta
weeds in thicket near steam

Drymarea婆子
grassy spot below spring

common in thickets

tea

Lenechid saxatilis green, sc. at saxatilis,
common in thickets

Lenechid patens sc. sc. at saxatilis,
common in thickets

Cuphea

 tales at base of cliff

Dryopteris

crevice in cliff

Blechnum

top of talus at base of cliff

Joachine

in deep crevice in cliff

Desmodium

in deep crevice in cliff

Blechnum occidentale

in crevice in cliff

Cuphea

top of talus at base of cliff

Polypondium

in old stone wall

Persicaria

in old stone wall

Guatemala

croftaceous herb 1 m.
tall, flowers yellow.
prostrate.

shrub 3 m. tall.
panicled rosettes, tips
fruit black.
exact herb 1-2 m. tall,
flowers yellow.
exact herb 1-2 m. tall,
flowers yellow
petals maroon

tuft

crested, petals deep purple,
curving up with dews
more or less prostrate,
flashing.
1947 Guatemala

57 Guazuma
common in thickets

58 Acalypha
occasional in thickets near stream

59 Lantana velutina var. dulicosa (Berg)
common weed in edges of thickets on slopes

Apr. 13 above Concepcion Picacho.
Theodore, 4 km. E.S.E. San Jose Simula, 2.0 km. E.S.E. Guatemala City, brushy woods and open earth. Trees on canyon wall.

59 Trinchesia
openings in brush in small draw, moist earth.

Fuchsia
rare in brush

Rubus
occasional in brush

Eupatorium
common in edges of brush

Eupatorium
common in edges of brush

Guatemala
fl. white
shrub 4 m. tall, fruit green.
shrub 1.5 m. tall, style red.

Aromatic shrub 3 m. tall, flowers greenish, flower green, scent, white, red.

shrub 4 m. tall, flowers crimson, stems, leaves, glaucous beneath, possibly 22217.

Liana, no flowers seen, flowers pink, fruit black and sour when ripe.
1947 Guatemala

27264 Eugenia
common in brushy woods

25 Boesinia frutescens
common in brushy woods

66 mossy overhanging bank

47 Psychotria (?)
common in brushy woods

50 Eugenia
common in brushy woods

71 Osway
common weed in openings

71 Phyllodaca
occasional in openings

73 Acalypha
occasional in brush

74 Bouteloua
occasional on open banks

75 Panicum
abundant on grassy run banks

Guatemala

67 small tree 6 m. tall, fruit orange

68 shrub 3 m. tall, fruiting panicles pendent and of seed red

69 prostrate, pendent, flowers green mottled with purple

70 drooping shrub 3 m. tall, fruit fleshy, white, wounded shrub 1.5 m. tall, flowers greenish white

71 slender shrub 1 m. tall, flowers white

72 small tree. flowers white, fruit yellow (specimen from two trees)

73 suffrutescent herb 1 m. tall, sepals red petals pink, herb 1 m. tall, much branched, flowers purplish pinkish, fruit translucent purple

74 slender shrub 1 m. tall, staminate catkins yellowish red, styles red
1947 Guatemala

27/76 occasional in brush
77 Myrsine occasional in brushy woods
78 Salvia occasional in brush
79 Acalypha occasional in brush

April 14
Guatemala City, Guat.

May 8
Eryngium common weed in lawn
81 Cupressus common ornamental

This is the dry season here. Rains begin in May. It is so dry that everything is dusty, grass is all dry, and many plants are not in bloom.
The porous volcanic ash soil is especially dry because of the drainage. The region here is an old lake-bed filled with ash, cut by straight

Guatemala

shrub 2m tall, leaves glaucous, densely (27/76?)
small tree 5m tall, fruit immature aromatic shrub 1m tall, much branched, flowers violet
2 electrode, shrub?, stamens, calyx and style style red

scapes spreading 0
ascending, heads bluish
Tree 20m tall
sided "Bananas" or ravines

April 16 - Finca las Chacaras, at Amatitlan, and just at city limits of Guat. In the Republic there are 150 kinds of eucalyptus of which they are entirely harvesting 5 for oil. Several are grown for timber

Feeding of turkeys, cattle, calves are very unhappy to dry, trees 5-8 ft. tall are completely in bloom like a huge influenza. Some leafless.
Apr. 17. The hills bet. Tequiquilapa and El Valle de Granma are rocky--apparently sedimentary--purple and green conglomerate, massive shale, sandstone, etc. The land is so eroded that little soil is left. The lower parts are sparse than forest. The upper parts are pine and oak, well developed at higher elevates, 4800' at lower. The top of the road is over 5000' in good part. Mt. Uyeca is over 6000', and is covered by a cacti of rain forest. The escuela intends to buy it for a biological present. One of the miners has 4 or 5 needles (usually 5).

Andecia abundant near the lower edge of the pine resembles A. farnesiana but with much longer thorns, smaller, more abundant flower heads.

The agricultural school, la Escuela Agrícola Panamericana at Uyeca, maintained by United Fruit Co., has 2500 acres of land, 1000 of it good valley land. total investment about $250,000.

Building of stone, very attractive, not elaborate. Living quarters comfortable. The architectural style is very simple, designed by Lescence and his engineer. The buildings are low, on one floor, with tile roof, wood ceiling, joint, and beams, tile roof, very little ornamentation, only carved beams over the entrances. Tile roofs with about 30° slope. The stone is white, rough-cut, flat rectangular.

The climate is harsh by dry season with drying winds. Many things simply will not thrive (i.e. cacao, cacao, hemp, etc.). The common ornamental tree is Astronia mexicana (?)
April 19. A few miles south of San Jose, the landscape is very gentle, almost a dry landscape, with mostly coffee plantations and their shade trees, with abundant bananas. South of Paoare, the land becomes much more mountainous, with spectacular gorges and canyons. This continues to the Turrialba region.

Apr. 19: Quebrada la Torata, Río Azul, above Santa Cruz, on the slopes of Volcán Turrialba, the Turrialba, in the cut side of deep wooded ravine.

83 Cinchona (Coca-Booba)
common

84 Galium hypochondrium
occasional on cut banana

85 Rambuschia
occasional on

Cartago's
Turrialba itself is in a wide valley. The climate is, in general, wet. This has been a severely dry year, and yet everything is green in the Turrialba area, though around Cartago the hills present a rather dry appearance.

9° 39' N
83° 46' W
1,700 m (5,590 ft)

small tree

tree 10 m tall, 3 dm thick, flowers white, mostly gone, heavily fragrant.

vino - hibés, tangled in bushes, fruit orange, fleshy, shrub - 3 m tall.
70 1947 Costa Rica

70.186 Cinchona (C. abeja) common on

71.87 Gomphrena ephemeric on tree-trunk

71.88 Elaeagia common on

72.89 Fuchsia boliviensis Carrière ornamental in yard of dwelling Det. P.E. Berry, 1998

April 17 - Santa Cruz, on Rio Azul, lower slopes of Volcan Tumialal, Tumialal, broken words along stream in pasture

70.189 Cinchona pubescens occasional in

72.91 Fuchsia boliviensis Carrière ornamental in yard of dwelling Det. P.E. Berry, 1998

3 m. tall, flowers scarlet, tree 3 m. tall, leaves stiff, buds without - missing?

93.100 Cinchona pubescens occasional in

272.91 small tree 3 m. tall, flowers white within, flushed with reddish without, very fragrant leaves glossy above, dull below veins red, stipules erect or slightly divergent.

Tree 3 m. tall, later yellow, sticky, buds rose colored, said to persist unopened for months, fruit rare, immature
Cinchona (C. Lindenbergii)
common

87 Glumnea
epiphytic on tree-trunk

88 Elaeagnus
common

89 Fuchsia boliviana Carrier
ornamental in yard of dwelling Det. P. E. Berry, 1968

April 17 - Santa Cruz, on Rio Azul, lower slopes of Volcan Turrialba, Turrialba broken woods along stream in pasture

90 Cinchona pubescens
occasional

-----

Tree 10 m. tall, 3 dm. thick, flowers mostly gone, white, heavily fragrant.
Leaves fleshly, flower scarlet.
Tree 10 m. tall, leaves thin but stiff, buds without gum.
Shrub 3 m. tall, flowers crimson, clusters pendant.

Small tree 3 m. tall, 1 dm. thick, flowers white within, flushed with reddish, without, very fragrant.
Leaves glossy, acutate, ovate, red, stipules erect, slightly divergent.

Tree 8 m. tall, later yellow, sticky, buds rose colored, said to persist unopened for months, fruit rare, immature.
April 20 - 7 km. m. e. of Paraiso, P. Cartago
secondary woods on slope
Cinchora pubescens Vahl var.
occasional in

1947 Costa Rica

72

4° 51' N.
83° 46' W.

73

Cartago

Leaf-cutting ants had almost
defoliated this tree.

tree 15 m. tall, 2.5 dm. thick,
bark very bitter, leaves
rather dull on upper surface,
veins reddish, stipules,
ced, slant;
flowers white within,
reddish white without,
very fragrant. (Park sample)

April 20 - Finca of M. C.H.
Sanchez, 1.2 km. m. of
Paraiso, P. Cartago
1340 m. (c)
cultivated in garden

93 Lonicera
low swampy place

94 Tournefortia
low swampy place

95 Curvura
on fallen log

96 Hillea chiapensis
on fallen log

97 Rhamnus
in low swampy place
27.298 Clerodendrum

99 Vaccinium
  growing in bath house

Cerro de Buena Vista
April 20 - (Cerro de la Muerte)
Panamanian Highway,
Cal de Talamanca, Cartago - San Jose boundary
open páramo-like summit
of range, with brushy patches,
27.320 Hedyotis
  common in more open place

01 Ventera granadensis
  rare, on open ground

02 Deschampsia
  occasional, on open ground

Cartago, San Jose

shrub 3 m. tall, flowers blue, anthers blackish, from
(plant brought from Africa)

shrub, flowers pale
  coral with pale greening
tips.

Lat. 9°33' N
Long. 83°45' W

31.25 m.

leaves thick, glossy, white
  beneath, flowers white,
  purplish without, rather
  unpleasantly fragrant,
tightly matted to ground.

leaves stiff, flowers
  greenish, berries many,
  tufts, panicle, purple
  growth.
27.903  Eryngium
common in open ground

04  Carax
common in open ground

05  Eriogonum sp.  det. Fluctuaceae
occasional on talus

06  Alchemilla
common on talus

07  Solanum
occasional on steep slope

08  Carex
occasional on slope

09  Phytolacca
common

10  Erythrophloium
occasional on steep bank

11  Hypericum
common

12  Hedyotis
common

13  Hypericum
common

cressitae, leaves glossy, winged, white beneath, with yellow veins, odor strong, tufted.
cressitae, stems purple, rays white.
cressitae, matted, flowers green, ovaries becoming purple in fruit, elongate herb, flowers dull purplish.
cressitae, calyx spreading, spikes drooping, herb, densely branching, up to 1 m. tall,formings clumps; petals deciduous as wing in stem; flowers pink.
crepitans, creeping, stiff.
sub-shrub, somewhat glaucous-green, flowers bright yellow.
prostrate, forming dense carpet; leaves glossy,  bush 1-1.5 m. tall; flowers for bright yellow.
1947 Costa Rica

27.314 Chusquea weberbaueri
common

15 Pernettya
common

16 occasional

17 Bonarea
occasional

19 Jasminia
common, occurring in large
dense patches

19 Castilleja
common

20 Solanum

21 Senecio multiflorus Bent. det. J. Curtis cases
common

forming large clumps, up to 1.5 m. tall, one
clump seen fertile, sterile
and fertile parts of this
specimen from different clump
and shrub, forming
large clumps; leaves
stiff, whitish beneath;
flowers white, red;
fruits purplish red when
mature.

stems red; flowers
bright, chartreuse yellow.
short vine, twining in bushes,
flowers red tinged with
dull orange.

flowers very erect.

brittle herb up to 1 m. tall;
stalks scarlet; calyxes
purple edged with chartreuse
cap, chartreuse above,
orange red beneath.

shrub, flowers purple.
(brought to me by someone)

herb 1 m. tall, branched;
flowers bright, deep
chartreuse yellow.
C.-^/v/yuo'T/^^

4f

4 23 Lycopodium
vare on bank

5 24 Acaena
occasional

3 25 Blechnum
occasional

4 26 Valeriana
common

27 LerociscoccetianusBenth.det.J.Cuatrechas
occasional

1 28 Valeriana
occasional

3 29 Rubus
common

1 30 Alchemilla

1 30 Alchemilla
very common

1 31 Stellaris
occasional

4 32 Valeria
occasional

1 33 Stellaris
occasional

wounded densely branched
shrub 1 m. tall; head pale
yellow.

spreading herb, branches
at base

caespitose herb, with
unpleasant color; flowers
white within, purple
without.

erect, 1 m. tall, rays yellow.

flowers purple without,
white within

young cane glamous;
leaves white beneath;
flowers white; berries
dark red (but perhaps not mature)
forming a mat on ground,
all seen sterile.

prostrate

caespitose, flowers
greenish, yellow

3000 m
pendent
1947 Costa Rica

27334
Vertera granadensis; abundant m road cut

April 21 - Institute Internacione de Agricultura; Fajenbal
35 Ursia laciniosa. Weeks; small patch in low ground.

532 m. (m.)

Vertera granadensis; vertical cut & Bank in sun; common locally

27336

Rubus glaucus; common in roadside tangles.

Plant densely matted; leaves stiff; flowers greenish; fruit translucent; red; juicy; stone 2; bushy up to 2 m. high; forming tangles; stems very glaucous; flowers white; fruits large, rather sweet; good flavored; almost black when ripe; flesh small; shrub 3 m. tall, bark purgant to taste; leaves glaucous beneath; fruit black.

Drimys; shrub planted as fence post.
1947 Costa Rica
Jola Bonita
April 22
n.e. slopes of Poas Volcano
7 km. n.n.w. of Vara Blanca, Prov. Alajuela, 357 m.
dense very wet forest
on slopes, cleared recently
here and there

27339 Cinchona (adenicola)
27340 (42) common locally in forest

Alajuela

tree 10 m. tall, 2.5 dm. thick
leaves coriaceous, margin
slightly revolute, dark green, rather glossy above,
pale beneath, petiole
and midrib reddish
flowers white,
strongly and heavily fragrant, mostly not
in flower, and only very old fruit

bush up to 1 m. tall,
rather succulent,
flowers light salmon pink,
fruits purple, teeth
not quite mature
flowers vermilion, with
yellow conspicuous nectar
and green lobes.

41 Cleome
rare, local, this colony
in wet vegetation near
base of waterfall

42 Centropogon
rare, at base of waterfall

43 in undergrowth
1947 Costa Rica

Cinchona pubescens Vahl var.
common in forest, this
tree in open clearing

46 Gonzalagunoq
occasional in undergrowth

47 Cinchona pubescens Vahl var.
common

April 23 - Finca los Ensayos,
1500 m. above Buena Vista de
San Carlos, N.W. Alajuela

Cleaned slopes with
scattered trees and
patches of wood.

48 Conubidornia wulici
persisting in clearing

49 Cinchona pubescens Vahl var.
common in woods, this
specimen from tree in clearing

50 Cinchona (bodenbergia)
persisting in clearing

Alajuela

Tree 8 m. tall, 1 dm. thick.
old leaves red, leaves
rather glossy above, cream
green; very few old fruits.

shoot 2-3 m. tall, arching.
flowers white within,
rose without; fruit
white when ripe (specimen
from 2 bushes, we will
ripe fruit)
tree; flowers pendant
within and without
(plant brought by try).
1947 Costa Rica

April 13 - slope above
Time for Ensayo toward
El Zapote Chn. of A. Garcia
de San Carlos Pto. Alajuela 1400m.
27°35'1
Cinchona pubescens tall on
edge of patch of woods
common.

52 Cephalis
undergrowth in wet
forest.

The plantation of Mercy
Co. at Los Ensayos is
large, on rather gentle
slopes, appearing
rather dry at this season,
There are about 200
acres planted, in full
sun, mostly ledger,
but some succulents
and others. There is
considerable disease -
canker and a disease
that attacks from the
tips when the plant
is well grown. They
have suffered much loss

Alajuela

10°13'N.
34°24'W.

small tree 3m. tall,
leaves sub-glossy
abax, turning red with
age.
3 leaves 12m. tall,
bracts red, flowers
white.

from both. It seems
possible that the canker
is endemic in the rather
canmon native C. pubescens,
which it attacks but
not fatally. This
is well distributed
in a belt from about
3000' - 4500'. This attacks
both suu. & ledger. A disease
called salmon-back, attacks succulents. The
other two disease only attacks ledger.
The plantation at Isla Bonita is in a topographically wet region with high moisture, well distributed. It is cleared from the virgin forest. The trees of all sorts have not made as much growth as I would have expected. There have been serious losses from canker. This canker is spotty but widespread in its occurrence. The only area really free from it are old clearings. This leads me to suspect that it is a disease of the common native C. pubescens or of some other subterranean native plant. In the clearings the spines have gradually died.

Alajuelas

The native variety of C. pubescens here has pinprick flowers (only one cluster of very bristled once seen). It is a tree up to 15 m tall and 3 dm thick, in a forest 35-40 m tall. Thus it is a second story tree, but grows in the virgin forest. Seldom does it reach the canopy. This year there seem to be no fruits. Flowering has scarcely started yet. When cut down it sends up vigorous suckers, but few seedlings appear in clearings. Where it has been allowed to persist in clearings it has a bedraggled appearance, probably due to exposure, or to leaf cutting ants, which are common and very fond of cineum.
1947 Costa Rica

April 24 - hills, S. of San Ramón, Prov. Alajuela. Wet, muddy forest, logged out and very decedent.

in places weedy 1,200 m.

27353 occasional

54 Piper occasional

55 D. occidentalis occasional

56 Costus common

57 Polypodium epiphytic on tree trunk

58 C. infundibulata common around edges of wood

59 Epidendrum common, epiphytic on branches

alajuela

This is the place where, in 1921, Albert Menz first found Cinchona in Costa Rica. A second, in company with Bures, failed to reveal any remaining trees.

Small cauliflorous shrub or low tree 5' or less; flowers yellow.

Localities

Hills 23 km. S. of San Ramón

Occurrence

Lat. 10° 41' S., Long. 84° 13' W.

Date: April 24, 1947

Alt. 1,200 m. (estimated)

1947 Government Expedition

No. F.K. Foster

Remarks

Peruvian vine, up to 1 m. tall, flowers fragrant, flowers white...
PLANTS OF COSTA RICA
Prov. de Alajuela

Locality
hills 2-3 km. south of SAN RAMON
Lat. 10°04'5"N., Long. 84°029'6"W.
Occurrence occasional
wet mossy or scarcely moist forest, logged out and
decadent, in places very weedy, tangled with vines
Date April 24, 1947 Alt. 1200m. (estimated)
Coll. F.R. Fosberg No.
Remarks

1947 Cinchona Expedition

PLANTS OF COSTA RICA
Prov. de Alajuela

Locality
hills 2-3 km. south of SAN RAMON
Lat. 10°04'5"N., Long. 84°029'6"W.
Occurrence occasional
wet mossy or scarcely moist forest, logged out and
decadent, in places very weedy, tangled with vines
Date April 24, 1947 Alt. 1200m. (estimated)
Coll. F.R. Fosberg No. 27353
Remarks small tree 4m. tall;
ca

1947 Cinchona Expedition

PLANTS OF COSTA RICA
Prov. de Alajuela

Cinchona pubescens Wall. var.
Det. F.R.F.
Locality
hills 2-3 km. south of SAN RAMON
Lat. 10°04'5"N., Long. 84°029'6"W.
Occurrence rare, one tree seen in
wet mossy or scarcely moist forest, logged out and
decadent, in places very weedy, tangled with vines
Date April 24, 1947 Alt. 1200m. (estimated)
Coll. F.R. Fosberg No.
Remarks

1947 Cinchona Expedition

PLANTS OF COSTA RICA
Prov. de Alajuela

Faramea
Det.
Locality
hills 2-3 km. south of SAN RAMON
Lat. 10°04'5"N., Long. 84°029'6"S.
Occurrence occasional in patches of
wet mossy or scarcely moist forest, logged out and
decadent, in places very weedy, tangled with vines
Date April 24, 1947 Alt. 1200m. (estimated)
Coll. F.R. Fosberg No. 27361
Remarks about 4m. tall;

1947 Cinchona Expedition
1947 Costa Rica

Apr. 24 - hills & 3 km.
or San Ramón, Pass Alajuela
wet many forest, logged
out and very decadent,
in places weedy 1200 m. 2

27353 occasional

54 Piper
occasional

55 Dalse
occasional

56 Costus
common

57 Polypodium
epiphytic on tree trunks

58 Cuphea infundibula
common around edges of wood

59 Epidendrum
criner, epiphytic on branches

10° 4'N
34° 29'W

This is the place where in 1921,
Alberto Bremen first found cinchona
in Costa Rica. A second, in company
with Bremen, failed to reveal any
remaining trees.

small tree 4 m. tall,
cauliflower, racemes
of rose flowers along trunk
to ground.

shrub 2 m. tall,
spires erect.
leaves stiff, spikes erect.
shrub 1.5 m. tall.
shrub 1-2 m. tall, un-
branched, leaves in a
conspicuous spiral;
fruits red, flowers
yellow.

diffusosedent 5-6 m.
tall, flowers spreading.
flowers whiteish.
April 24 - hills 2 km. off San Ramón, Prov. Alajuela.

Patch of scarcely moist woods, tangled with vines, on a steep slope, 1100 m. a.s.l.

27360 Farninia patens

common

61 Farninia occasional

561 Cinchona pubescens Wild. var.

rare, one tree seen

62 April 25 - grounds of Instituto Interamericana de Agricultura, Turrialba

weeds along roadside

63 Richardia

64 Buxus laevig. (Fam.) Grisel.

65 Emilia jaranica (Burn.) Rob.

66 Dipinaria cordata (L.) Willd.

10°5' N.
39°29' W.

straggling shrub

4 to 5 m. tall; flower red, buds orange.

shrub 4 m. tall,

flowers white, fragrant.

3 m. tall, 2 dm. thick,

sterile, old leaves red.

leaves dull to sub-glossy

not very vigorous.

(contains quin.

base but 6 m. tall.)

9°55' N.
37°40' W.

577 m. (1890 ft.)

prostrate; flowers white.

prostrate, flowers white.

flowers red.

prostrate, exes ascending.
April 26 - From the air the country south and west of Volcan Chiriqui looks densely forested, with many trees devoid of leaves at this season. Near the coast are large areas of mangrove swamp; much of it with tall, almost leafless trees scattered abundantly in it.

April 26 David, Prov. de Chiriqui, Panama. Weeds along roadside.

27 207 Lantana camara L. occasional

3 63 Leptaria dulcis L. common

5 69 common

5 70 Gonphera common

cultivated in park

71 Jasminum

72 Pentas crenata

North of Puerto Armuelles is a large area cleared and apparently in bananas. From here to David are patches of cleared land.

8 25 'm
8 27 'w

shrub, 1m. tall, stems square; flowers orange; fruit green.

flowers pale greenish, 4-petaled, hairy within, one anther reduced.

prostrate, long stems from strong central root.

prostrate from strong tap root; heads white.

bush, 1m. tall, flowers white.

herb 0.8 m. tall, flowers crimson.
1947 Panama

April 27 - same

1 Hibiscus
    cultivated in park

274 weed in roadside

75 Lyca
    cultivated in garden

36 common in fence rows, probably planted as living fence

1 April 27 - near the airport
    km. 2 of David, Panama
    flat plain with scattered trees, mostly Anacardium occidentale

27 roadside on bare soil

78 common
    common along roadside

79 Croton
    occasional

80 occasional

Chiriqui

shrub 1 - 1.5 m tall, branching
shrive, rugose; flowers rich maroon, almost black, 5 lobes, closed in afternoon,
caespite, somewhat aromatic herb up to 1 m. tall; flowers white.
small tree 4 m. tall; flowers white, somewhat fragrant; apparently does not set fruit here.
straight tree with strong leading shoot and drooping branches.

calfeitoes, flowers yellow, closed in afternoon.

flowers yellow.
1997 Panama

1. *Anacardium occidentale* - common in fence rows and scattered in plain.

2. *Richardia* - roadside

3. April 28 - David Chinigui gardens and roadside

4. *Boerhavia* - roadside, common

5. Climbing on fence around garden

6. *Eryngium foetidum* - common tree in fence rows and vacant lots

7. Cultivated in garden

8. *Eryngium foetidum* - spontaneous in garden

Chinigui

tree 5 m tall, flowers yellowish, turning reddish. Fruit oblong with greatly enlarged fleshy pedicel. Prostrate, spreading from leafy wing root, flower white.

Ascending from prostrate base hexagonal stems, flower whitish.

tree 5 m tall, flowers greenish.

tree 3 m tall, ripe fruit black with red receptacle.

Shrub 1 m tall, straggly branches. Flower bright yellow, petal thin. Herbage with a strong unpleasant odor. "Celinte" used to flavor food.
April 29 - trip by road from David to Panama City.

From David to somewhat east of the eastern boundary of Chiriqui having the vegetation in largely a second growth of cleared wet forest with Cerojiba, etc. In the region of the Bocas la Hondo there extensive mangrove swamps. At the road passes over the range of hills just west of Darién, the vegetation changes to a scrubby savanna, with legumes, Byssomma cassipula, etc. There are even large stretches of grassland.

Just northeast of Bocas passing over another range of hills, the road again enters a rainy region of wet forest.

May 3 - packed for shipment, in plgs. 2-7 all Atlanta right to #27388, plgs. 2-6 sent with green range tags & USN. Hoboken, in forwarding to Chicago Mus. #7 sent directly to Chicago. Colls. 27389-27394 & be dried by Paul Allen and sent as plgs. #8 to Chicago.

May 5 - flew from Panama to Medellín - Pacific coast of Darién is a typical sinking coast - dominated by estuaries. Few settlements, solid forest until observed by clouds in intense country low, but with long water south ridge. Cavallieres in rainy region are abundant even where except in some of the ridges and in the mangrove swamps.
1947 - Panama
half way between
April 30 - Gamboa and summit, C.Z.
Emilia sonchifolia
sawed in crack in sidewalk

May 4 - same

90

weed along roadside, common

May 4 - Chiriqui Road, 5 mi. S. N.W. of summit, C.Z.
derelict forest, rather dry, with sparse undergrowth.

91

(bright side of ravine)

92

Marsilea angustifolia (Plants) vellum
wooded slope

May 4 - Madden R.d. 3 mi.
S of summit, C.Z.
second growth thickets along roadside

93

Colubrina heterocarpa (bush) hard

94

Godmania aceratifolia (H.B.K) hard

Canal Zone

79°40' W
9°5' N
75 m.

flowers purple

spikes erect, flowers minute, purple.

95

79°35' W
9°5' N
75 m.

shrubs, sparsely branched
catkins pendent
small tree, 7 m. tall, 1.5 dm. thick.

96

79°38' W
9°4' N
75 m.

shrubs 4 m. tall. leaves very young
spreading tree 8 m. tall
flowers yellow, with fine purple projection within an allele within upper part of calyx.
1947 Columbia

May 7 - Cartago
roadside

Codia

Coryza tonasciensis f. publiloosa Cart., det. Juanicasas

Enchurus

Malpiaq

cultivated in yard of dwelling

Ipuspulum
principal grass in lawn
of plaza.

Stachyta phyto cayennensis (C. & R.)
roadside. det. maleke

May 9 - just below Faladity, 94 m.
Carretera del Mar, headwater
of Rio Cali, 10 km. N.W. of Cali.

1780 m.

brushy ravine on cleared slope

Grassland

occasional in brushy places
from here down to 1500 m.

Col Valle

tall, leaves thick,

firm, reddish; petal, greenish, flower cream,

violet tinged, turning dull tan,

with a fragrant odor,

very strong perfume, calyx

dehiscent even before anthesis; fruit immature

shrub, 1 m. tall, flowers white,

fruits red, not ripe

herb, flowers white, fruit red

depressed much branched

herb, branched erect, ray

dull white, disk yellow,

branched herb, branches tending to be distichous,

flowers yellow,

tree 4 m. tall, petals yellow

fruit immature,

flowering culms ascending

from prostrate superficial

rhizome,

branched herb, flowers

pale lavender.
27407  Galium hydrocarpum Bent.,
   in brush

2. May 9 - Above Carmen

- Cleared hills
- Cichorium intybus L., very common in fences, rows
- and persisting in cleared pasture

- 04 Cichorium pubescens Hall.,
- small tree 4 ft m. tall,
- leaves dull, old more turning
- red, fruits not ripe, but
- are attached by insects
- dehiscing
- rounded tree 7 ft m. tall,
- fruit dry.

3. May 9 - La Elsa, Guachaca
   la Cistalina

- Thicks tangles wet woods,
  partly cleared.

- 06 Fabaceae
  edge of woods

- 07 Baliospermum
  edge of woods

- vine climbing in brush,
- flowers pink,
- shrub 3 m. tall; thorns
- red, purple, turning greenish,
- purple, flowers purple,
- fruit immature
27-408 Trichomanes elegans
dry, wet forest
common in dry forest

edge of grassy pasture

31 Drymania cordata
common

10 Verb.
common in fence-row

5-13 Peperomia
epiphytic on trunk in fence-row

14 Peperomia
epiphytic on trunk of tree in fence-row

F.R. same May 11
black, wet wood on top and side of ridge

15 Peperomia
climbing on the trunk

16 Gesner
vines, climbing in bushes

17 Brunfelsia
epiphytic, rare

El Valle
fronds of a pecula,
bluish green color.
small, slender tree
5 m. tall, bark very bitter.
fruit mostly immatures

flowers white.

flowers white

small tree 5 m. tall
flowers purple, vine fruit
black.

not especially fleshy,
tiny, round, below,
square above.

demonstrant, spalls,
green, reflexed. Fruit soft,
lavender, translucent.

somewhat fleshy,
clinging to

vines, flower red

shrub, flowers green
27413

19

Asplenium

in deep shade, terrestrial

parasitic on roots, steep slope

Cal Valle

rhizome short, erect

plants rosy pink. head yellowish
tessellate, plates with an
umbrella in less conic and
stout, plate caduceus
in age, leaving soft
pith, hair-like processes
which later fall off,
leaving firm central
core showing somewhat
tessellate markings.

small sparsely branched
tree, branches leafy, new
ages, cupules vermilion,
corolla vermilion, with
yellow lobes, fruit immat.
leaves dark green above,

gold beneath; flower white.

scrambling vine-like

slowly, influence every
down to base, three vermilion
corolla green-white, half
to white tips.

flowers plum-pink

24. Weinmannia

tree 7 m. tall, thin
branch, young, sterile
26  Espagia
very common on and near
top of ridge. All in flower,
less common below
27  Lindenia (lindenia)
common, especially on
top of ridge

28  Psychotria
top of ridge

29  Peperomia
epiphytic on tree trunk
on top of ridge

30  Micranthes trinitatis Triana (det. Wurdack 1968)
top of ridge

31  Besleria
top of ridge

Bleckia podagrifica Triana (det. Wurdack 1968)

32  Copapeta
top of ridge, uncommon

33  Leptostigma Palicourea
common in undergrowth

34  Palicourea
rare on ridge top

P. Valle

seedling, m. tall

tree 15 m. tall. Flower
white, peculiarly fragrant.

tree 5 m. tall. 7 cm. thick.

fruit immature but
probably full sized.

through ascending in

unbranched thorn

1 m. tall, with fruit

orange

somewhat fleshy

shrub 5 m. tall.

fruit white.

shrub with weak

branches. Flowers orange,
succulent, fruit spherical

shrub 7 m. tall, fruit

rose pink.

shrub 15 m. tall,

flowers white, fruit immature

fruit bluish green, with

paler lines.
1947 Colombia

May 13. Flight from Cali to Iquiales, in south part of Cauca valley and dense patches of Guadua. East of Rio Cauca from Santander south, and south of it to divide south of Popayan, the country is a rolling, dissected plateau, mostly in pasture, with thin patches of woods here and there.

South of Popayan, to about La Union, the country is made up of rugged absolutely treeless hills with thin grass and very few inhabitants. How such absolute desolation could have been accomplished by so few people is astounding. Perhaps a fundamental stenlty of the soil may have helped, as M.A. always suggested.

Cunnings, noodled, cistern, collections, t.m., etc.

5/9
May 14 - El Voladero, Páramos del Angel, 10 km. n.e. of El Angel, Pw. de Canchi

Open páramos 3,650-2,700 m. dominated by Espeletia

5 43 Diplostephium glandulosum Hieron. dtt. H.C. common

5 44 Hedynotis common

5 45 Espeletia hartwegii Bush. abundant, the dominant shrub

(photos on roll 7)

5 46 Festuca common weed

5 47 Papaver common on cut banks

5 48 May 14 - Hacienda Charallana, just above El Angel, Pw. Canchi.

Road cuts 3,730 m
Veins 8 - 10 - 12 - (16)

lvs. obovate to lance-obovate, rarely broadly lanceolate or elliptic chartaceous

usually cuneate - attenuate at base, rounded or obtuse at apex, rarely a tree with pointed lvs.

Domatic usually present but variable in dist. occurring at all or part of axils and all or part of main frst.
if limited, then usually more toward apical end of leaf.

stipules often to create a hood
create lanceolate
not strongly curved or acute.

branches thin.
with usually small

leaf surface dull, rarely sub-glossy
PLANTS OF PERU
Dept. de Cajamarca

Locality

Drainage of Rio Limon
above Cortagana (Chimuch)
30-32 km. n.n.w. of CELENDIN, Prov. de Celendin
Lat. 6°33'S., Long. 78°17-18' W.

Occurrence
dense wet forest

Date July 2, 1947 Alt. 2300-2500m. (estimated)
Coll. F.R. Fosberg No.

Remarks

1947 Cinchona Expedition
May 14 - El Voladores, Páramos del Angel, 10 km. n.e. of El Angel, Prov. de Carchi
open páramos dominated by Espeletia

43 Diplolobium glandulosum Hieron. dt. common

44 Hedypotis common

45 Espeletia hartwegii Buxh. abundant, the dominant shrub
    (photo on roll 7)

46 Festuca common weed

47 Papaver common on cut banks

47°47 ' N
77°37 ' W.

Carchi

clumps, purple purple

shrubs less than 1 m. tall, flowers lavender, pink, forming mats and cushions, flowers white within, purple without. leaves glistening, fleshy, pale beneath. (note sp. spicate) leaves and pointed buds. trunks 2m. tall, leaves in a single large rosette at top, inflorescence ascending, flowers yellow.

lactiferous, latex white, buds nodding, petals mauve with deep mauve spot at base. "damiana"
1947 Ecuador

27442 Calceolaria
Common

47 Setch. Solanum
Occasional

50 Spergula
Common

May 15 - Drive from Tulcan to Quito.
Not far south of El Angel, at middle altitude, Hedyotis thyrsidis (?) dominates certain
grazed slopes. This same vegetation is found at various places between here
and Quito.

At Ibarra in the plaza is a tremendous old Balsa tree - Odronera,
At 7500' alt.
May 19 - Valley of Río Papallacta north of Volcan Antisana starts at the Pass de Guaramani, at about 4000 m. In this pass there is open grassland with many paramo plants - a real flower garden when not grazed by goats. Here and there are patches of low woods almost all of Gymnops trees. Going downward one finds sub-paramo-like brush, largely melastomas, etc. gradually changing to woods. From the village of Papallacta down the country is wooded. Just above Papallacta a large flow, relatively recent, has dammed up the valley and caused Laguna de Papallacta, a sizeable body of water. The large flow has a thin vegetation with a Blechnum (Lomaria) very prominent.

Below Papallacta the forest becomes tall, very wet. In the valley bottom Alnus is dominant down to 3000 m. or below. The sides have a mixed forest, with some melastomas, Brunellia, etc. but with a conspicuous scarcity of Rubiaceae. No linchinas seen.

About half way to Cuyuga the Río Papallacta is joined by the Río Chalpaji (and becomes the Río Guijos. There is some local dispute as to where the name R. Guijos is correctly applied.) The Río Chalpaji is larger than the R. Papallacta and enters from the north.

Cuyuga is said to be about half way bet. Papallacta and Baeza, and said to be about 2800 m. alt. It is a tiny village.
May 19 - Cuyaja, valley of Río Guapi, Papallacta, 2745 m. 78° 1' W

Muddy trail side with running water.

Drynaria common in mud

Polygnum occasional

Cardamine common

Polygnum common

Venus occasional

Nasturtium occasional

Mimulus occasional

Callitriche abundant in water, emerging.
| 1 | 20.95 | Eichhornia | common in mud |
| 2 | 60.60 | Epilobium | rare at edges of mud |
| 3 | May 20 - Valley of Rio Papallacta | 26\°5' | 78°W | 1.5 km below Cuyuna | cleared slopes and benches with thickets and wooded ravines | small tree, others up to 10 m. tall, often; flowers white, fruit eaten; small tree, others up to 12 m. tall, flo. whiteish, bark fiber used for rope-making | herb 1.5 m. tall; flowers purplish, green; leaves very rugose; fruit immature. herb 1 m. tall, flowers white. | heads rusty. | flowers white. | flowers yellow, said to be an effective remedy for toothache, much eaten by cattle. |
27463 *Dymana* ovata
common

69 *Carica*
common

---

*Napo-Pastaza*

gray green, procumbent, flowers white

Tree up to 5 m tall, simple or branched, candleabra fashion; flowers green, almost sessile; fruits below leaves, range yellow when ripe, 5 ridged, pulp around seeds edible, tart, flesh watery, said to be used for preserves, juice makes lips sore.

(Seed sample) (with #27471)

flowers blue

---

70 *Cynoglossum occasional*

(Seed)

71 *Carica*
common

---

72 *Barnadesia serriflora* Bruce det. Illustr. cases
common both in open and in thickets

---

Tree up to 5 m tall, simple or branched, candleabra fashion; 67 flowers green, paniculate, leaves usually larger than on this specimen (with #27469)

Tree 5 m tall, others much taller; trunk covered with clusters of spines; branchlets becoming less spiny, ultimate flowering one spineless; flowers rose-purple.
1947 Ecuador

Broken-down forest filled with chusquena.

1 77 Hesperomia
uncommon in ravines and in steep slopes.

2 74 Begonia urticae L.f. det. L.B. Smith
rare

3 75 Tragia
common in open places under trees.

4 76 Lycoc lineatus
common in open places under trees.

5 77 Benoita
rare in open places under trees.

6 78 Panoenia
occasional on fallen tree trunks.

7 79 Malaxis
rare, terrestrial.

8 80 Laminula
occasional in open spaces under trees.

9 81 Hedysorum
occasional

10 82 Pilea
common in open places under trees.

Napo, Pastaza

Tharsely-branched shrub, 1 m. tall; flowers yellow; fruit immature; herb up to 1 m. tall; stem fleshy; flower pink; stem fleshy; stems fleshy, reddish; leaves green; without white markings (with #7477).

Stems fleshy, reddish; leaves with hairs above with conspicuous white protuslate base (with #7476).

More or less fleshy; used to congregate milk in cheese making; flowers greenish; small tree, fragrant when broken; "Jamie" changes less in meat meal; mostly starchy.
27482
epiphytic on tree trunks

Deep wooded river ravine

24
Craspedia
Common everywhere

15
Vaccinium
Local, just above river

36
Epigalia
Rare on bench above river

37
Phytolacca
dark on bench above river

33
Travina
Common on benches above river

51
Cestrum
Rare, just above river

50
Rare, just above river

Napo-Vastaga
Flowers dull reddish-brown

Ferning tangled masses, clambering in trees, stem solid, up to 2.5 cm. thick. Only one plant seen in flower, sterile + sterile of specimen, petiole of flower not seen, for same plant.

Vine-like, climbing in brush, leaves arranged distichously, corolla white.

Leaf 1 m. tall, sparsely branched, flowers deep crimson-purple.

Stem maroon, flowers deep rose-pink. Fruit said to be used to wash clothes. "Ataza" shrub 2 m. tall; flowers pale green, fruit green. Stem 2 m. tall; flower sepals purple, without, green within, fruit black.

Vine, tangled in brush; fruit immature.
27491  Pilea
commun in opening under
             trees
32  Epidendrum
             rare, on fallen tree

cut banks and second growth
thickets along trail.

93  Polypodium
\text{pendent, from overgrown bank}

94  Galium
\text{on old tree trunks}

95  Helaria
\text{cut banks}

96  Liatris
thicket

97  Tomentosa
\text{common in thickets}

98  \text{common in woods and thickets}

99  Centipogon
\text{common in thickets}

\text{Napo Pastaza}
zeams feathery, flowers
\text{white, white, purpleish green.}

flowers crimson, magenta,
column whiteish.

rhizomes creeping, spade
\text{tipped, \text{"calaquada," used}
to purify the blood.}

\text{prostrate, tangled,}
\text{climbing.}

\text{vine-like, tangled,}
\text{flowers white, petals}
\text{pale.}

\text{scrambling on bank, bands,}
\text{several M. long, definitely}
\text{lactiferous, flowers yellow.}

\text{shrub 2 M. tall, leaves}
\text{very mucous, flowers}
\text{purplish white.}

\text{scrambling vine-like,}
\text{shrub, flowers pendulous,}
\text{deep orange, equal at mouth,}
\text{said to contain sweet fluid}
\text{that is eaten.}

\text{scrambling shrub}
\text{trollius red with yellow lobes,}
\text{flowers white, anthers dark purplish.}
1947 Ecuador

2500 Tradescantia with thicket

5 01 Fuchsia scabriuscula Benth. thicket, common. Det. P.E. Bury, 1948

1 02 Solanum tuberosum rare on bank

5 03 Pinus occasional, climbing in small trees

1 04 Oenothera rare on trampled dry grass bank

3 05 Pontia occasional

8 06 Brevic lasius rare along trail

5 07 Citharex occasional

comm in thicket, also

in pasture

5 1 May 21 - Cuyuna, valley of Río Papallacta

along trail

18 Salvia common

Naivu-Vestaga

vines-like, flowers bright magenta-pink, 3-parted, petal, equal, broadly elliptic, acute, scrambling shrub; flowers crimson; flowers deep purple, with yellow anthers; vines-like, branched petals red, yellow at tips, latigurna, small tree, becoming much larger, flowers pale green; "lignum" fruit eaten; flowers white, scrambling herb, flowers yellow.

shrub on tall, flowers crimson.
1947 Ecuador

Boton of ravine along river

27509 Blechnum occasional
4 10 Blechnum common

Napo-Pastaza

Rhizome short, erect, fertile
Ferns erect, sterile spreading
Rhizome erect, up to 5 cm.
Ferns erect, sterile spreading tips prostrate on ground, terrestrial mud, elongate, young fronds reddish.
Shrub 1.5 m. tall

Shrub 4 m. tall; thorns were purple, fruit immature

Pasture with thickets, not far from river

13 Nectar grandideri S. L. Dunn wet place among thickets, rare

14 Phyllanthus occasional

Prostrate; leaves crispate; flowers pale green; fruit, deep red, translucent

Small tree 4 m. tall, with single erect stem and horizontal, deciduous branchlets which simulate compound leaves; flower pendent, reddish brown
Small tree; fruit flashy, immature; "motile" fruit purple, edible when ripe
140 1947 Ecuador

275 16 Tournefortia
occasional

3 13 rare, epiphytic or treelike, thicket

6 19 Galium longepiliferum, bent, rare, climbing in trees in thicket

6 10 Piper occasional

stems very weedy, can reach in clearing in wet forest on wall of valley

5 21 common

6 22 Solanum rare

4 23 Oxalis common weed

5 24 Stellaria greggii common weed

Napo - Pastaza

slim, 4 m. tall, bushy; flowers white, becoming rusty

small spreading tree; flowers white, becoming rusty, unpleasantly fragrant

slim; flowers white, paniccles very fragile

vines several m. long, tangled; fruit white, flowers greenish; fruit orange, fleshy, unusually large

root, stem 2 m. tall; leaves harsh, thorny

2 crawling, extended herb; flowers and buds white

trailing herb, stems elongate, no tubers found; flowers white, fruit green, ovoid

extensively creeping; flowers yellow, prostrate, tangled; flowers white, rigid
125 25 Lagenaria occasional
6. 26 Hystematichium common in open ravine
5. 27 Jalkium occasional
5. 28 Solanum nigum occasional
5. 29 Drymaria repanda common
6. 30 common
5. 31 Asplenium common, epiphytic and terrestrial
7. 32 pneus rare
33 anch epiphytic or liana, rare
4. 34 anch climbing in trees
1. 35 rare

Napo - Pastaza
prostrate, tangled;
petals white, entire;
fruit yellow, flower yellow.
prostrate, root yellow;
flowers reddish green;
seeds black, slender;
flower white.
elongate prostrate, leaf, petals white, trifid;
seeds than sepals.
flowers deep orange-red.

rhizome erect, several dm. long.
shrubs up to 2 m. tall, weak;
calyx pedicel red, corolla yellow.
flowers white.
tangled liana
small shrub, leaves;
pale beneath; calyx red;
corolla yellowish with red outside getting black inward.
1947 Ecuador

27536 Hofmannia occasional
4 37 Hedyosmum occasional
6 33 epiphytic in tree or ridge
10 38 Asplenium occasional, terrestrial
1 39 Peperomia occasional, terrestrial
5 40 Peperomia common, terrestrial
2 41 Peperomia occasional, epiphytic on branch of tree
3 42 Milania
6 common, 1000

This whole valley, from Llapallacta to at least 5 km below Cuquijá is cut in beds of gneiss and schist. The forests are relatively dense and wet, and would seem to be ideal for Rubiaceae but this family is almost absent. Altogether we have seen no Guettarda (stil, not collected) which is occasional, a single Calliandra which

shrub up to 4 m. Tall; flowers yellow, rug peduncle; shrub 3 m. Tall; aromatic. "Granito" liana-like shrub, dark green.

Plessey, rhizome creeping, to several dm. long leaves pale beneath.
Plessey liana, usually sterile.

was seen a few places near the river, two Galiums which are occasional. Barren least one plant seen, Vertsara granadensis. 2 small colonies seen. The latter 2 are weedy in most place. Weinmannia as seen occasionally but not common, several species. Melastomatae common.
May 22 - Valley of Río Papallacta
1 km below Papallacta
45 km S.E.E. Quito
Thickets of second growth along trail

1947 - Ecuador
Valley of
May 22 - Río Papallacta at confluence of Río Chalipi 6 km below Papallacta
Dry sandy, bare rocky trail across river bed.

No. 49
Thalictrum
very common along trail in edges of thickets

May 22 - Valley of Río Papallacta 5 km below Papallacta
sides of ravine cut by small stream.

No. 45
Calceolaria
wet earth, banks

No. 46
Geranium
species?
common in dense weed growth along trail

No. 47
Prosopodium
in dense weed growth along trail

No. 48
Solanum nigrum
abundant in ravine along stream.

May 22 - Valley of Río Papallacta
1 km below Papallacta
45 km S.E.E. Quito
Thickets of second growth along trail

Napo - Pastaza
50 km S.E.E. Quito
flowers white

herb 1 m tall, 3-4 mm wide
calyx glaucous purplish, stamens maroon

flowers yellow

vines-like, flowers lavender-pink.

great succulent-stemmed herb 1-2 m tall; flowers
1947 Ecuador

275°7' 
common climbing in trees
Centropogon

May 21 - Padalanta, valley of Rio Padalanta, 44° 0' 0" W, 3.84° S

51 
in fence row

52 
leaves

53 
Equinatum
on vertical earth bank
common

54 
common along fence row
(with # 37592)

55 
Miconia crocata (Berg) Naudat, var. setosa Hoffm.
common in fence row

56 
Durandodiscus arborescens HBK, det. Luft (1928)
dominant fence row shrub

Napo-Pastaza

vine, flowers greenish
scrambling shrub, early orange red with greenish-yellow lobes; the only other plant seen in the vicinity had the same elongate calyx lobes.

23°9'
73°8'W
3.84° S, W

vine-like herb; flowers greenish-white; fruit immatures, leaves 1 m. tall; flowers salmon-red.

herb 1-1.5 m. tall; flowers white with deep red calyx.

shrub 1-3 m. tall; flowers white; fruit purple.

shrub 2-3 m. tall very shiny throughout; flowers rose-pink.
May 23 - Laguna Papallacta, above Papallacta.

Lava flow which blocked valley to form lake. Broken lava blocks covered with blanket of mosses and hepatics, with ferns, orchids, dwarf shrubs, a few large shrubs, but with no trees.

Blachnum

37593

dominant on steep slopes at front of flow.

Azorella

57 leaves on steep slopes.

27593

Common, especially on steep slopes, rhizome deep in cracks.
275 1

2. Rare on steep slopes, shrub in cracks between rocks.

6. Gaultheria

1. 63. Heianium

v. common (mostly with head, abating)

1. 64. Rare on steep slope

5. 65. Pernettya

local

5. 66. Lycophorium

rare, usually under
somewhat overhanging
rocks, growing out of crevices

2. 67. Lycophorium

rare on steep slope

5. 68. Diplostephium spinulosum Wall.

rare

1. 69. Vaccinium

common, mostly sterile

4. 70. Hypericum

rare on overhanging rock

7. 71. Pernettya

occasional

1. 72. Miaria

common

1. 73. Vaccinium

rare

Ecuador

napti - Pastaza

ponds exist.

small shrubs. Fruit black

flowers yellow.

shrub up to 0.7 m. tall.

flowers white.

in clumps.

creeping.

brush 1 m. tall, ray white

shrub 1.5 m. tall, flower

pink.

dwarf shrub, fruit pink.

strictly erect, shrub 2 m.

tall, all sterile.

dwarf shrub, flower

coarse hair; fruit white.
27574  Myrsize
occasional

75  Baccharis genistelloides (Kun) Pers.
comm

76  Galium hypnarioides
rare

77  Peperonia
uncommon

78  rare, terrestrial

79  Diplostepphiun hartwegii Hygrom.
occasional

80  Vaccinium
common

81  common, terrestrial

82  Claphytes
common

83  Berberis
rare

84  Claphytes
rare

Napa Pautaga

branching shrub, 1-3 m.
tall, ripe fruit black,
mostly sterile, heads
stipitatum
vine, climbing in low bush;
fruits fleshy, orange
(epiphytic or moss
covered bush, erect,
fleshy.)

1 m. tall, branched
at base and at top, flowers
white, petals segments
with maroon flecks inside,
color mustard.

shrub, 1 m. tall, very
deep lavender

small shrub, fruit white,
translucent when ripe

flowers deep rose (mostly,
not in flower).

flowers erect, stiff

shrub 1-3 m. tall, very
graced and ragged, some
branched, with leaves spines;
leaves white beneath;
flowers orange-yellow
flushed with red.

flowers erect, very brittle
Vf, C

1. Common eucalyptus
2. Panicum commune (March 1927)
3. Prunus domestica
4. Dandelion
5. Giganthronium
6. Hypericum
7. Bachem
8. Munchenheimer plant beds
9. Hynes, wood, marshy nodes
10. Spring flowers, fruit, seed, flowers white
1947 Ecuador

May 23 - Eastern slope of
Paso de Guamani, headwaters
of Rio Papallacta
17 km. N.E. Quite
3800 m.
open mountain meadow
and walls of ravine

27596 Bactea

comm

97 Jaraenia
occasional on vertical banks

98 Bactea
comm

99 Epilobium
common along trail

27600 Plantago
occasional

01 Valeriana
occasional on vertical banks

02 Ranunculus
rare

03 Neoera granadensis
occasional on vertical banks

04 rare

same extensive marsh
dominated by

05 Senecio pimpinellifolius HBK et J. 4treecase
in vertical banks, occasional

88888

leaves pinnate, 4 raps bright
butter yellow.
1947 Ecuador

same - large marsh, dominated by # 27611

9760 cf Lycoperdon
comm

07 Alchemilla

occasional

08 Carex

abundant

09 Hypericum
comm

10 Lonicera chionogeton Wall. det. Iliataceae
rare, in mass and above

11 abundant, dominant

May 13 - Pass de Guamani, just west of summit

small patch of forest, mostly Gynoxys +

11 Lycoperdon

epiphytic on tree trunk

13 Cladopogon

epiphytic on tree trunk

14 Gynoxys baccharisides (HBK) Case. det. J.
codominant tree in forest

15 codominant tree in forest

Napo - Pastaza

3900 m.

strictly erect, in clumps, long red.

caespitose, heads nodding.

small shrub; flower yellow

heads greenish yellow

shrub up to 1 m. tall, branches and leaves in one plane.

large mass, pendent, leaves slightly pungent.

cordeceaes tree 3 dm. thick, 10 m. tall, flowers yellow
tree 3 dm. thick, twisted, 10 m. tall, spikes pendent.
May 23. - Pass de Guanini, just west of summit, headwaters of Guadalupe de Alincave, 35 km. a.m. Quito, 4000 m.

dense very wet forest, very few trees, trunks buried in great mass of moss and tangled branches, trunks very mossy.

27616. Hesperomeles, common

17. Baccharis arctetifolia (Lam.) Vahl, occasional

18. epiphyitic on mossy tree trunk

19. epiphyitic on mossy tree trunk

20. Rubus

epiphytic on mossy tree trunks

21. Aphrissi, common, epiphytic and terrestrial

22. common, pendent from tree trunks

23. 5, 7

24. 18° 11' W

25° 5'

Tree 4 m. tall, flat-topped, dark green, resembling a conifer from a distance, fruit reddish.

Tree 5 m. tall, flat-topped, dark green, resembling a conifer from a distance.

Flower crimson

Strong, oily, cellar odor.
Polygodium
epiphytic on many tree trunks

Hymenophyllum
epiphytic on many tree trunks

Lycopodium
epiphytic on many tree trunks

May 23 - Valley of Rio Papallacta, just below Laguna de Papallacta

Pro. Napo-Pastaza

abundant everywhere, this specimen from fieldiy dry streambed

Talking to several geologists, Walter Darrow, who has a geologic map of Ecuador, based on his own investigation, and those of the oil companies and others, other sources as available. Schwenke, chief geologist of Shell Co., and Franklin Wallis, mining engineer, I gather that the structure of eastern Ecuador consists of a tremendous fault, running along the eastern base of the Cordillera, west of which has been pushed up a tremendous block running from somewhere in Columbia south through Ecuador, with a difference of many thousands of feet. This exposes, on the eastern slope, a great area of metamorphic rocks, prostrate, forming mat; flowers white.
Aschists and greisses. To the east this is deeply buried under at least 9000 feet of sediments, running from at least Jurassic to Quaternary. The relationships is demonstrated by a remnant of the Cretaceous sediments persisting on top of the eastern Cordillera.

In Cretaceous time the Atlantic and Pacific approached to within 50 km of each other, but there was a strip of land corresponding more or less to the intervening valley and the eastern Cordillera a part of it.

The absence of Cincinnus from the higher altitudes in the Cordillera Oriental near the Andes and perhaps the absence of C. macracalyx var. pitagrensis from the eastern slopes of Colombia (and central) may perhaps be explained on the basis of the metamorphic nature of these regions. Walli, say, these sediments would weather to a very sterile soil, low in Ca + K. The actual volcanic slopes of Antisana and Tungurahua have not been explored for Cincinnus.

In southern Ecuador large areas are of Tertiary volcanic and intrusive material, but certain places, such as the Cordillera de Zamora, east of Loja, C. macracalyx is found, are metamorphic, or both sand and Walli.
1947 Ecuador

May 30 - Quito
27677 Emphelina peploides
very common
29 Cardamine
29 Veronica
30 Urtica minor
31 Galinsoga
32 Cotula
very common

May 31 - Santa Rosa, on railroad just south of Quito, Prov. Pichincha
weedy railroad embankment
33 away
common
34 grass
common

May 31 - Machachi railroad station, Prov. Pichincha 3300m.
35 Calceolaria
earth Banks

May 31 - Charapi (water tank), south of Machachi, east of
Cajas Volcano, Prov. Pichincha
sparsely bushy mountain meadows, sides of ravine
metal minute, white
recumbent, flowers blue, lavender
rays reddish-pink even spreading
large herb, flowers yellow
epinalea purplish, nodding
bunched herb, sprawling;
flowers rich yellow
30° 5' 78° 35' W
3300m (see p. 172)
May 31 - Going south from Guay to the m. climb up to perhaps 10,000' west of Chacarri volcan. There are great areas of grass - the stiff bunchgrass of the region, and broken places with sub-paramo-like bush. McPheugh should compare the tall cream-colored liphecamptus of the eastern range and valley with that of the eastern (17557) as the one along the m. is taller and at least Whitish pubescent beneath, and #17557 is not (3).

Area north of Ambato is a rather barren volcanic ash, eroded in places. Helianthus mulate is a very prominent tree in bottom lands along river. Calliopsis spinosa (3) common. Near Ambato fruit trees are planted in bottom lands.

Throughout region the land is cut up into small plots. These are separated by rows of Agave sp., Chusquea (Cylindrochusquea) sp., a green Puya sp., and Tarevyna sp.

There is an appearance everywhere of contour planting. This seems to be because the irrigation practice which utilizes furrows between the rows thus:

The main crops seem to be Vicia fava, potato, wheat and barley. Little cultivation in the higher areas, 3000 m. and up. The valleys near Ambato, and especially Ambasba are very intensively cultivated.

In Chimborazo, grassy vegetation seems to go up clean to snow line, 15,000-16,000 ft.
172  1947: Canada

37 Vicia
common in hummocks of other vegetation.

May 31 - Daule (flag stop)
on railroad, south east of Coroyn Volcano, prov. Pichinda.

38 Eupatorium
common

39 Alchemilla
very common

40 Galium
in clumps of other vegetation.

May 31 - Lasso, north of Latacunga, prov. Leon

Pichinda - Lem
shrub 0.5 m tall, flower violet, banner with a white wedge which later turns red-purple.

39.5
78°36' W
3200 m.

41 Anegada
climbing in bushes along railroad

54.5
78°35' W

cactifera, vine; flower purplish without; del delimit within.
1947 Ecuador

May 31 - Rishambha Prov. Chumbazo

Weedy ground around city with walls, on top of low hill, grazed by goats.

174

V. erugostis
comm

1 43 Nicartiana
on top of mud wall

2 44 Aeranthos juncinum
thickets, probably planted

3 45 Verbena hastate (1)Big. to small
comm in grassy place

4 46 Euphria nodiflora
comm in grassy place

5 47 occasional

6 48 Nasturtium officinale R. Br.
comm in trickle of overflow water

7 49 comm

June 1 - From Rishambha toward Guayaquil we gradually climbed through grain fields to the altiplano south of Chumbazo at about Chumbazo at about 3500 m. This is at about the limit of cultivation spreading tufts

spreading coarse herb,

flowers pale green,

thick 2-3 m. tall,

flowers bright yellow

prostrate; flowers in rosettes; flowers pale lavender

prostrate; flowers pale lavender, calyx longer

tufts

prostrate, stems succulent;

flowers white

tufts, culms erect or ascending

here, and we notice grain growing in the valley surrounded by grassy mountain meadows. Just north of Palmyra is a large flat: probably a old lake-bed, covered with
loose volcanic ash of
dark blue-gray color.
This is dominated, where
there is any vegetation
at all, by sedges and
with a scattering of
stiff bunch-grass.
The bunch grass became
more dominant in the
low knolls and slopes
around about.

The Laguna de Colta
is being drained more
and more. The same close
turf dominates most
of the lake bed, but in
places a dense growth
of sedges may be seen.

Descending the Rio de
Alauzi and the Rio Chanka,
the grassland vegetation
gives way to coarse
brush, cacti, puna,
tillandsias, etc., with
a small fynbos coming
in lower down. On the
gentler slopes this gives
way to pasture, corn
and grain fields.

Well below Libano
the brush begins to
grow thicker and
below it again really
becomes forested, second
growth, of cconia.

Below Naranjate
the river levels out
and soon emerges
on the broad plain of
the Rio Guayas.

Near the railroad there
is no primary forest
left. Open pasture
and cultivated areas
alternate with small
patches of second-growth
woods — largely Cecropia
and Erythrina glauca.
The latter is also
used as a tree to
separate fields and
is the common shade-
tree for cacao, which
is commonly grown
here in the better
drained areas.

As the Rio Guayas
is approached
1947 Ecuador

There are extensive areas of marsh, the less wet parts dominated by Pandion maximus, the wetter ones by a huge Lagittaria, and a Diphysa the sort of Marantaceae. Both of these in flower, at this season, areas of water are filled by Palaquium and Salvinia.

June 1 - Palmyra, Prov.
Chimbuays 3,500 m (11,483 ft)

July 6
Beneath tortifolius DC. det. Austuce
very abundant

June 1 - Tiran, Prov. Chimbuays bottom of deep canyon
Salvia
common throughout region

June 1 - Libambo, Prov.
Chimbuays high on shagrely bushy steep canyon walls
1947 Ecuador

2765

Plantago

53. Drymania

54. Muhlenbergia

55. Phyllogala Morning spicatae Chalas

56. Crassostre

Chimborazo

flowers white

flowers purplish, fruit green, bordered with orange pink.


57. Diospyros common

58. Guam occasional

June 2 - Guayaquil Left 2 boxes, one large, the other small, of specimens marked #9 & #10, with Dr. Varas, agent of the Estacion Experimental, to be shipped by freight to the Plant Quarantine Station in Hoboken, marked with their tags. The boxes contain specimens up to before # 7000, but with no fair press-ful not included as they were not yet dry.
June 4 - Between Puerto Bolivar and Machala are mangrove swamps and at least near the road they are mixed with a huge shrubly Salicornia or similar thing a meter or more tall. Also, a large creeks may be seen mixed with the mangrove vegetation.

Between Machala and Santa Rosa is a rather variable brushy vegetation, with occasional marshly swampy parts. The drier parts dominated by a yellow flowered Cordia, and various maning-glacie. The region has a diverse enough vegetation to make a collecting trip here eminently salutary while. It should be made at this season as everything seems to be in flower.

Beyond Santa Rosa, high ground is reached and some rather dense woods, with large trees. Near Arenillas are extensive Typha marshes surrounded by woods.

Between Arenillas and the Peruvian border, the country becomes drier. A bushy species of Ipomoea with large rose-purple flowers becomes the most abundant plant. There are a great number of other things in bloom. The country changes from a savanna-like bush to just plain bush, which becomes sparse. Not far from the border, there is a small marsh which appeared from a fast moving trickle to contain Aemopbia.